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GLOBAL FOREX MARKET DYNAMICS AND THEIR IMPACT ON EMERGING ECONOMIES

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Vedanta

ABSTRACT
The global foreign exchange (forex) market is the largest and most liquid financial market in the world, with daily transactions exceeding trillions of dollars.

This project provides an in-depth analysis of forex market dynamics and their significant implications for emerging economies. It explores how exchange rate fluctuations, capital flows, speculative trading, and central bank policies influence macroeconomic stability. The study also highlights the vulnerabilities of emerging markets to external shocks and suggests policy measures to mitigate risks and ensure sustainable growth.

INTRODUCTION
The foreign exchange market facilitates international trade and investment by enabling currency conversion. Emerging economies rely heavily on this market for imports, exports, and foreign investments. However, their relatively weaker financial systems and dependence on external capital make them more vulnerable to forex volatility. Understanding these dynamics is essential for policymakers and economists.

Structure of the Global Forex Market
The forex market operates in a decentralized manner through a network of financial institutions. Major participants include central banks, commercial banks, hedge funds, multinational corporations, and retail traders. The market is divided into spot, forward, and futures segments. Technological advancements have increased accessibility and trading volume, making the market more dynamic and complex.

Determinants of Exchange Rates
Exchange rates are influenced by several factors including inflation rates, interest rates, political stability, economic performance, and market speculation.

For example, higher interest rates attract foreign investors, increasing demand for a country's currency. Similarly, political instability can lead to capital outflows and currency depreciation.

Key Forex Market Dynamics
1. Exchange Rate Volatility: Rapid fluctuations can disrupt trade and investment.

2. Capital Mobility: Free movement of capital increases exposure to global shocks.

3. Speculation: Short-term trading can amplify currency movements.

4. Central Bank Intervention: Governments use reserves and policy tools to stabilize currencies.

5. Global Economic Events: Crises and geopolitical tensions impact forex markets worldwide.

Impact on Emerging Economies

Emerging economies face both opportunities and challenges from forex market dynamics:

- Trade Competitiveness: Depreciation boosts exports but raises import costs.

- Inflationary Pressures: Weak currencies increase the cost of imported goods.

- External Debt Burden: Loans in foreign currencies become expensive during depreciation.

- Investment Flows: Volatility discourages stable foreign investments.

- Financial Stability: Sudden capital outflows can lead to economic crises.

Case Study: India
India provides a strong example of how forex dynamics impact an emerging economy. The Reserve Bank of

India actively manages exchange rate volatility through forex reserves and monetary policy. Events such as the 2013 taper tantrum showed how global factors can lead to currency depreciation and capital outflows.

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Case Study: Brazil and South Africa

Brazil and South Africa have also experienced significant forex volatility due to commodity price fluctuations and political uncertainties. These countries have implemented various policy measures to stabilize their currencies, including interest rate adjustments and reserve accumulation.

Policy Responses and Recommendations

1. Strengthening Forex Reserves: Provides a buffer against external shocks.

2. Diversification of Economy: Reduces dependence on a few export sectors.

3. Sound Monetary Policy: Helps control inflation and stabilize currency.

4. Capital Flow Management: Regulating inflows and outflows to prevent volatility.

5. Financial Market Development: Improves resilience against global shocks.

FUTURE TRENDS IN FOREX MARKETS

The forex market is evolving with the rise of digital currencies, algorithmic trading, and increased globalization. Emerging economies must adapt to these changes by enhancing regulatory frameworks and adopting advanced financial technologies.

CONCLUSION

Global forex market dynamics play a crucial role in shaping the economic performance of emerging economies. While they offer opportunities for growth and integration into the global economy, they also pose significant risks. Effective policy measures, strong institutions, and prudent financial management are essential to navigate these challenges.

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EMERGING TRENDS IN ARTIFICIAL INTELLIGENCE

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ABSTRACT
Artificial Intelligence (AI) has become an important part of modern education, especially for students who are growing up in a digital environment. This study focuses on understanding how AI tools and techniques are influencing the learning habits of future generations. Based on secondary data such as books, reports, and online sources, the study highlights how AI supports personalized learning, improves access to information, and enhances student engagement. It also discusses the challenges related to overdependence and ethical use. The study concludes that AI, when used properly, can play a powerful role in improving learning outcomes for students.

INTRODUCTION
In recent years, the education system has undergone significant changes due to technological advancements. One of the most important developments is the use of Artificial Intelligence in learning. Students today are no longer limited to traditional classroom methods. They are using AI tools to understand concepts, complete assignments, and explore new ideas.

For future generations, AI is not just a tool but a part of their learning environment. It helps them learn faster, think differently, and become more independent. This study aims to understand how AI tools and techniques are being used by students and how they are shaping the future of learning.

LITERATURE REVIEW
Various researchers and organizations have studied the role of AI in education. Reports by UNESCO highlight that AI can make education more inclusive and accessible by supporting personalized learning. According to Wayne Holmes, AI has the potential to improve student engagement and provide better learning experiences.

Studies also show that AI tools help students learn at their own pace and provide instant feedback. However, researchers have also pointed out concerns such as lack of critical thinking and overdependence on technology.

Overall, the literature suggests that AI has both positive impacts and challenges in the field of education.

RESEARCH GAP
Although many studies have discussed AI in education, most of them focus on higher education or technical aspects of AI. There is limited focus on how school-level students, especially future generations, are actually using AI tools in their daily learning.

This study attempts to bridge this gap by focusing on the practical use of AI tools and techniques among students and their impact on learning behavior.

PROBLEM STATEMENT
With the increasing use of Artificial Intelligence in education, students are becoming more dependent on AI tools for learning. While these tools provide quick solutions and support, there is a concern that students may rely too much on them and may not develop critical thinking skills.

Therefore, it is important to study how AI tools are being used by students and whether they are contributing positively to the learning process.

OBJECTIVES OF THE STUDY
To study the level of awareness about AI tools and techniques among students

To understand the usage of AI tools and techniques in the learning process

To analyze the impact of AI tools on students' learning habits

HYPOTHESIS

H0 (Null Hypothesis): AI tools and techniques do not have a significant impact on students' learning process.

H1 (Alternative Hypothesis): AI tools and techniques have a significant impact on students' learning process.

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RESEARCH METHODOLOGY

This study is based on secondary data. Information has been collected from:
Books

Research papers

Educational reports

Trusted online sources

The study uses a descriptive research method, focusing on analyzing existing information related to AI in education. No primary data has been collected.

SCOPE OF THE STUDY

The study focuses on:
Students as future generations

Use of AI tools and techniques in learning

Educational impact of AI

It is limited to understanding general trends and does not focus on any specific region or institution.

LIMITATIONS OF THE STUDY

The study is based only on secondary data

It does not include direct interaction with students

Findings may not reflect real-time classroom situations

Limited availability of school-level data on AI usage

FINDINGS AND SUGGESTIONS

Findings

The study shows that AI tools are increasingly becoming part of students' learning processes. Students use AI for understanding concepts, completing assignments, and improving their skills. AI makes learning more flexible and engaging. However, it also creates a risk of overdependence, where students may rely on AI instead of thinking independently.

Suggestions

Teachers should guide students on proper and ethical use of AI

Schools should include digital literacy in the curriculum

Students should be encouraged to use AI as a support tool, not a replacement

Awareness programs should be conducted to explain both benefits and risks of AI

CONCLUSION

Artificial Intelligence is playing a major role in shaping the learning habits of future generations. It has made education more accessible, personalized, and interactive. Students are benefiting from AI tools, but there is also a need to ensure that these tools are used wisely. A balanced approach is necessary where AI supports learning without reducing students' ability to think critically. If used properly, AI can become a valuable partner in the educational journey of students.

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RIGHT TO HUMAN DIGNITY UNDER ARTICLE 21 OF THE CONSTITUTION OF INDIA: A JUDICIAL PERSPECTIVE

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ABSTRACT
The concept of human dignity lies at the core of constitutional morality and democratic governance. In India, although the Constitution does not explicitly define "dignity," the judiciary has progressively interpreted Article 21 to include the right to live with dignity as an essential component of the right to life and personal liberty. This paper critically examines the judicial evolution of the right to human dignity in India. It analyzes landmark judgments, explores the philosophical foundations of dignity, and evaluates the role of the judiciary in expanding its scope. The study also highlights emerging dimensions such as privacy, gender identity, and socio-economic rights, offering a fresh perspective on how dignity is being redefined in contemporary constitutional discourse.

1. INTRODUCTION
Human dignity is an inherent and inalienable right of every individual. It forms the foundation of all human rights and is essential for the development of a just and equitable society. In the Indian constitutional framework, dignity is not explicitly mentioned as a standalone right but is deeply embedded within the spirit of fundamental rights, particularly Article 21.

Article 21 guarantees the right to life and personal liberty, stating that no person shall be deprived of these rights except according to the procedure established by law. Over time, the judiciary has interpreted this provision in a broad and dynamic manner, transforming it into a source of numerous derivative rights, including the right to live with dignity.

This paper aims to examine how the Indian judiciary has interpreted and expanded the concept of human dignity under Article 21. It also attempts to provide a critical analysis of judicial activism and its implications for constitutional governance.

2. PHILOSOPHICAL FOUNDATIONS OF HUMAN DIGNITY
The idea of human dignity is rooted in moral and philosophical thought. Thinkers like Immanuel Kant emphasized that human beings should always be treated as ends in themselves and never merely as means. This principle underlines the intrinsic worth of every individual.

In the Indian context, dignity is closely linked with the concepts of equality, justice, and freedom. It reflects the idea that every individual deserves respect and the opportunity to live a meaningful life. The Constitution, through its Preamble and fundamental rights, seeks to uphold these values.

Thus, dignity is not merely a legal concept but a moral imperative that guides the interpretation of laws and policies.

3. JUDICIAL INTERPRETATION OF DIGNITY UNDER ARTICLE 21
The Indian judiciary has played a crucial role in recognizing and expanding the right to dignity. Initially, Article 21 was interpreted narrowly, but over time, the courts adopted a more liberal approach.

3.1 Early Interpretation
In the early years, the judiciary followed a restrictive interpretation of Article 21, focusing primarily on procedural aspects. However, this approach changed significantly in later years.

3.2 Expansion through Judicial Activism
The landmark transformation occurred when the judiciary began to interpret the right to life as more than mere animal existence. It was held that life includes the right to live with human dignity and all that goes along with it.

The courts have since recognized various rights as part of dignity, including:
* Right to livelihood

* Right to health

* Right to education

* Right to clean environment

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3.3 Dignity and Privacy
One of the most significant developments in recent years is the recognition of privacy as a fundamental right. The judiciary emphasized that privacy is essential for maintaining personal dignity, autonomy, and individuality.

3.4 Dignity and Gender Identity
The courts have also acknowledged the dignity of marginalized communities, particularly transgender individuals. By recognizing their right to self-identification, the judiciary reinforced the idea that dignity includes the freedom to express one's identity.

4. EMERGING DIMENSIONS OF HUMAN DIGNITY
The concept of dignity is continuously evolving. In contemporary times, several new dimensions have emerged:

4.1 Digital Dignity
With the rise of technology, issues such as data protection and online privacy have become crucial. The misuse of personal data can directly impact an individual's dignity.

4.2 Socio-Economic Dignity
Dignity is closely linked with socio-economic conditions. Poverty, unemployment, and lack of basic amenities can undermine a person's ability to live with dignity. The judiciary has increasingly recognized these aspects.

4.3 Environmental Dignity
A clean and healthy environment is essential for a dignified life. The courts have expanded Article 21 to include environmental protection as a component of dignity.

5. CRITICAL ANALYSIS
While the judiciary has played a progressive role in expanding the scope of dignity, certain concerns need to be addressed:

5.1 Judicial Overreach
Some critics argue that the judiciary has gone beyond its constitutional mandate by creating new rights. This raises questions about the separation of powers.

5.2 Implementation Challenges
Despite judicial recognition, the actual realization of dignity remains a challenge due to socio-economic inequalities and administrative inefficiencies.

5.3 Need for Legislative Support
Judicial decisions alone are not sufficient. There is a need for comprehensive legislation and effective policies to ensure the protection of dignity.

6. SUGGESTIONS AND WAY FORWARD

To strengthen the right to human dignity, the following measures are suggested:
* Enactment of clear laws protecting dignity in various contexts

* Greater awareness among citizens about their rights

* Strengthening institutional mechanisms for enforcement

* Inclusion of dignity as a guiding principle in policymaking

7. CONCLUSION
The right to human dignity has emerged as a cornerstone of constitutional jurisprudence in India. Through its dynamic interpretation of Article 21, the judiciary has transformed the right to life into a comprehensive guarantee of a dignified existence.

However, the journey is far from complete. Ensuring dignity for all requires not only judicial innovation but also legislative action and societal commitment. As India continues to evolve as a democratic nation, the protection of human dignity must remain at the forefront of its constitutional vision.

REFERENCES (INDICATIVE
* Constitutional Law texts

* Landmark Supreme Court judgments

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* Research articles on human rights

* Reports on socio-economic rights

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HE EFFECT OF ARTIFICIAL INTELLIGENCE ON STUDENTS NEURAL ACTIVITY (AGE GROUP 15-18 YEARS)

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ABSTRACT
The current paper explores the influence of artificial intelligence (AI) on the brain processes and cognition of 15–18-year-old students. As a result of the growing use of AI technologies, including intelligent tutoring systems, and adaptive platforms, there have been both the development of the cognitive skills and the increase of dependence among teenagers. The research will be based on secondary data analysis, surveys, cognitive tests, and the results of previous EEG/fMRI experiments, as they show how AI influences various brain functions such as memory, concentration, decision making. The findings show that while the AI technologies help improve the development of the brain and cognitive skills, their misuse can negatively affect independence of thought and depth of cognition.

Keywords: *AI, Neural Activity, Cognitive Development, Adolescents, Neuroplasticity, Learning Behaviour, AI in Education, Brain Functioning, Cognitive Dependency, Attention Span*

INTRODUCTION
The integration of Artificial Intelligence (AI) into educational systems has gained momentum through applications such as intelligent tutoring systems, chatbots, and adaptive learning systems. Teenagers (age 15 to 18) experience an increased level of vulnerability due to the development of cognitive functions, such as the prefrontal cortex that enables decision making and attention.

It has been observed that AI plays an essential role in determining the cognitive processes related to working memory, attention, and problem solving, as well as pathways in the brain that affect learning behaviour and skills. On the other hand, excessive use of AI poses challenges to the development of independent thinking.

Review of Literature
Current research has brought to light the increasing relevance of AI in cognitive and neural development of students. Chen & Yadollahpour (2024) describe how AI is playing an important role in the cognitive neuroscience field through its efficiency in learning. The National Academies of Sciences (2024) bring out how AI contributes to brain functioning, especially concerning attention and decision-making activities. Giansanti (2026) discusses AI's psychological and neuroscientific impacts on youth including cognitive advantages and potential dependency on technology. Raveendran (2026) describes the involvement of AI in education and how, although it improves engagement, it reduces critical thinking due to overdependence on the same. Li & Lee (2025) shed some light on AI contributions to brain development in adolescents, especially changes in memory processing systems and neural circuitry.

Problem Statement
What is the impact of using artificial intelligence technologies in education on brain function and cognitive development among adolescents between 15 and 18 years old?

Research Gap
Even though several papers have been written regarding the influence of AI in education and cognitive behaviours there is scarce literature that directly investigates the influence of AI on the brain's functioning in adolescents between 15 to 18 years old. Many pieces of research consider either one aspect of the phenomenon such as educational outcome, cognitive performance, but they do not analyse both the neurological results (EEG or fMRI) and behavioural outcomes together. Moreover, there is a lack of studies on the prolonged effect of AI on brain development and thinking in teens.

OBJECTIVES
1. To study the influence of AI-based educational applications on various brain processes, including memory and attention.

2. To investigate alterations in neuronal function related to solving problems and making decisions.

3. To determine the advantages and disadvantages of AI utilization from a neurological perspective.

4. To understand behavioural and cognitive dependence on AI among teenagers.

5. To offer recommendations for optimal AI use in education.

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Hypotheses

- **H1:** AI-enabled learning increases efficiency of the neurons associated with learning and memory.
- **H2:** Overdependence on AI decreases the capacity of the brain to process information independently.
- **H3:** Use of AI at an appropriate level will result in optimum cognitive development.

METHODOLOGY

Research Approach is based on secondary data collection includes previously published studies Samples-100 participants between 15 and 18 years old

Data Collection Techniques

1. Surveys (AI usage behaviour)
2. Cognitive tests (memory, concentration, and logic)
3. Secondary data through EEG/fMRI analysis (previously published studies)
4. Interpersonal interviews and observation

DATA ANALYSIS

- Techniques to be used: Mean, correlation, and regression analysis
- Comparative analysis: Group A & Group B
- Thematic analysis using qualitative approach through interview findings

Areas of Analysis

- Attention span
- Memory function
- Decision-making capability
- Cognitive dependence

AI-assisted learning has been found to make the learning process more engaging for the learner and increase knowledge retention; however, there is a possibility of cognitive offloading .

Scope of the Study

In this study, efforts will be made to analyse how the utilization of AI education tools impacts the neural functions and behavioural aspects related to cognition among individuals between the ages of 15-18 years. The areas of interest include, but are not limited to, memory, attention span, decision making, and cognitive dependency. The study scope is limited to 100 participants only, and primary data collection (survey and test results) along with secondary data (existing neurological studies) will be used. Young children and adults won't be included in the scope, and there will be no actual brain scans involved.

FINDINGS

Positive Impacts

- Higher neuroplasticity through adaptive learning processes
- Improved memory and information storage
- Greater engagement and motivation
- Advanced problem-solving skills due to personalization

Negative Impacts

- Suppression of independent thinking and reasoning
- Dependence of cognitive functioning on artificial intelligence applications
- Loss of attention span and depth of learning
- Digital addiction

Impact on Neural Functioning

- Higher activation in areas associated with learning process(pre-frontal cortex, among others)
- Lower activation in reasoning areas when overusing artificial intelligence

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- Different patterns of cognitive load

SUGGESTIONS

1. Facilitate responsible AI utilization (moderation, not overutilization).
2. Incorporate AI literacy initiatives into school curricula.
3. Adopt interactive methods with AI technology.
4. Avoid over-reliance through task allocation without AI.
5. Teachers must guide students in their AI application.
6. Conduct neurological research on adolescents for extended periods.

CONCLUSION

The influence of Artificial Intelligence on the brain activity of students is twofold. Even though it improves the process of learning and increases cognitive ability, its misuse may harm the development of the brain, especially its capacity for independent reasoning.

In order to avoid this consequence, the use of Artificial Intelligence should be regulated.

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A SECONDARY DATA ANALYSIS OF MSME GROWTH UNDER ATMANIRBAR BHARAT

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ABSTRACT
Micro, Small and Medium Enterprises (MSMEs) play a pivotal role in the Indian economy by contributing significantly to employment, industrial output, and exports. The launch of the Atmanirbhar Bharat Abhiyan in 2020 marked a strategic initiative to strengthen domestic industries and promote self-reliance. This research paper presents a comprehensive secondary data analysis of MSME growth under the Atmanirbhar Bharat framework. The study relies on data from government reports, academic journals, and institutional publications to evaluate trends in employment, GDP contribution, exports, and policy impact. The findings reveal that MSMEs have shown resilience and growth post-pandemic, supported by financial packages, regulatory reforms, and digital initiatives. However, challenges such as credit gaps, technological constraints, and structural inefficiencies persist. The study concludes that while Atmanirbhar Bharat has accelerated MSME development, sustained policy support and structural reforms are necessary to ensure long-term growth and global competitiveness.

Keywords: *MSME, Atmanirbhar Bharat, Secondary Data Analysis, Economic Growth, Employment, India, Self-Reliance, Industrial Development*

INTRODUCTION
The Micro, Small and Medium Enterprises (MSME) sector is widely regarded as the backbone of the Indian economy due to its substantial contribution to economic growth, employment generation, and exports. MSMEs promote inclusive growth by providing livelihood opportunities, especially in rural and semi-urban areas. According to recent estimates, MSMEs contribute around 30–31% to India's GDP and employ over 110 million people.

The COVID-19 pandemic severely impacted MSMEs, disrupting supply chains, reducing demand, and causing liquidity shortages. In response, the Government of India launched the Atmanirbhar Bharat Abhiyan (Self-Reliant India Mission) in 2020. This initiative aimed to revive the economy by strengthening domestic industries, reducing dependence on imports, and promoting local manufacturing. Atmanirbhar Bharat is built on five pillars: Economy, Infrastructure, System, Vibrant Demography, and Demand. The MSME sector is central to achieving these objectives, as it supports entrepreneurship, innovation, and decentralized industrial development.

REVIEW OF LITERATURE
Several studies have examined the role of MSMEs in India's economic development and their relevance under Atmanirbhar Bharat.

Chitsimran et al. (2022) emphasized that MSMEs are crucial for socio-economic development and employment generation. Their study, based on literature review, highlighted the importance of government support in enhancing MSME performance.

Nath (2025) analyzed the MSME sector as a key driver of Atmanirbhar Bharat, emphasizing policy reforms, financial packages, and infrastructure development as major growth factors. The study concluded that MSMEs are essential for achieving self-reliance and global competitiveness.

Mittal and Kumar (2025) explored MSME contributions to GDP, employment, and entrepreneurship. Their findings showed that MSMEs contribute approximately 30% of GDP and play a vital role in inclusive development.

Gugulothu and Aleti (2024) studied MSME contributions between 2018 and 2023, highlighting their role in innovation, regional development, and entrepreneurial growth.

Overall, existing literature indicates that MSMEs are critical to India's economic structure, but challenges such as access to finance, technological limitations, and market competition persist.

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OBJECTIVES OF THE STUDY

The study aims to:

1. Analyze the growth of MSMEs under Atmanirbhar Bharat
2. Examine the economic contribution of MSMEs
3. Evaluate government initiatives supporting MSMEs
4. Identify challenges affecting MSME growth
5. Provide suggestions for sustainable development

RESEARCH METHODOLOGY

This research is based on secondary data analysis, using data collected from:

- Government reports (Ministry of MSME, Economic Survey)
- Academic journals and research papers
- Industry reports and online databases
- Published articles and policy documents

The study adopts a descriptive and analytical approach. Data has been analyzed to identify trends in MSME growth, employment, exports, and policy effectiveness. No primary data collection was conducted.

Growth of MSMEs under Atmanirbhar Bharat

Contribution to GDP
MSMEs contribute significantly to India's GDP, accounting for approximately 30–31% of total output. The sector supports both manufacturing and service industries, making it a vital component of economic growth.

Employment Generation
MSMEs are the second-largest employer after agriculture, providing employment to over 110–328 million people. The sector plays a crucial role in reducing unemployment and poverty.

Export Contribution
MSMEs contribute nearly 45–48% of India's exports, making them a key player in global trade. This highlights their importance in strengthening India's position in international markets.

Increase in MSME Units
The number of MSMEs has grown significantly, with over 74 million enterprises operating in India. This growth reflects increased entrepreneurial activity and policy support.

Government Initiatives under Atmanirbhar Bharat
The Atmanirbhar Bharat package introduced several measures to support MSMEs:

Financial Support
Financial support has been a central pillar of the Atmanirbhar Bharat initiative aimed at strengthening MSMEs, particularly in the wake of the COVID-19 pandemic. The government introduced the Emergency Credit Line Guarantee Scheme (ECLGS) to provide immediate liquidity support to businesses facing operational disruptions. Under this scheme, MSMEs were able to access additional working capital loans with government-backed guarantees, reducing the risk for lending institutions. In addition, collateral-free loans were extended to small businesses, enabling them to secure funding without the burden of pledging assets, which is often a major barrier for micro and small enterprises. Another important measure was the provision of subordinate debt for stressed MSMEs, which helped revive units that were financially distressed by allowing promoters to infuse funds into their businesses. Collectively, these financial interventions played a crucial role in stabilizing MSMEs, improving cash flow, and ensuring business continuity during a period of economic uncertainty.

Impact of Atmanirbhar Bharat on MSMEs
The Atmanirbhar Bharat initiative has positively impacted MSMEs by improving access to finance, enabling businesses to recover and sustain operations after the COVID-19 crisis. It accelerated formalization through simplified registration systems, allowing more enterprises to access government benefits and institutional credit. The push for digital adoption helped MSMEs expand their market reach and improve efficiency. Additionally, the "Vocal for Local" approach boosted domestic manufacturing and demand for local products,

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enhancing production and competitiveness. While the initiative strengthened resilience and growth, some challenges like credit access and technology gaps still remain.

Challenges Faced by MSMEs

A major issue is the credit gap, as many enterprises struggle to access timely and affordable finance due to lack of collateral and formal credit history. Delayed payments from buyers further strain cash flow, affecting daily operations. Additionally, technological limitations and low digital adoption reduce productivity and competitiveness. The sector also suffers from a shortage of skilled workforce, hindering innovation and quality improvement. A structural issue known as the "missing middle" exists, where micro enterprises find it difficult to scale into medium-sized firms. Furthermore, regulatory complexities and limited market access, especially in global markets, pose ongoing challenges. Overall, despite policy support, these constraints continue to impact MSME growth.

CONCLUSION

The MSME sector remains a cornerstone of India's economic development. The Atmanirbhar Bharat initiative has played a transformative role in strengthening MSMEs by providing financial support, simplifying regulations, and promoting domestic production. The sector has demonstrated resilience, particularly in recovering from the economic impact of COVID-19.

However, long-term growth requires addressing structural challenges such as credit gaps, technological limitations, and delayed payments. Policymakers must focus on enhancing access to finance, promoting innovation, and improving infrastructure.

In conclusion, MSMEs are essential for achieving the vision of a self-reliant India. With sustained support and strategic reforms, the sector can become a global driver of economic growth and innovation.

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A STUDY ON ADOPTING MULTI-DIMENSIONAL INVESTMENT STRATEGIES FOR GENERATING WEALTH

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ABSTRACT
With the growing importance of managing personal finances, arises a need for the better understanding of the different concepts of investment. This paper aims to create an understanding on the concepts of investment, asset classes along with the different asset classes available for investment. It also explores the strategies that can be adopted to create a balanced and multi-dimensional approach to investment along with its purpose and limitations. It aims to create an understanding of the importance of creating a well – diversified portfolio considering the risk appetite of an individual. By adopting this approach, it is expected that an individual will be able to create a corpus of wealth which can eventually help him to discharge his financial responsibilities and meet his financial goals.

Keywords: *Investment, Diversification, Risk Appetite, Multi- Dimensional Investment Strategy, Asset classes*

INTRODUCTION
Every individual who has started earning puts aside a part of his income as savings, and when those savings are put into different investment avenues with the aim to earn higher returns is termed as investment. Investment refers to putting money into different avenues like stocks, deposits, assets, etc to generate future return in the form of interest, capital appreciation so that wealth can be created and financial goals can be met.

Multi-dimensional investment strategy means to allocate your resources into different asset classes and spread out your portfolio to include different investment vehicles like stocks, real estate, fixed deposits, etc. The basic purpose is to diversify the risk of loss and create a strategic plan with the intention to maximise the returns and achieve the financial goals in both good and bad times.

It becomes inevitable to manage the personal finances and investments throughout the earning phase of an individual to ensure a considerable generation of wealth in the forms of assets, investments, savings so that various financial goals could be achieved.

Different Asset Classes
A group of assets that has similar attributes and are likely to give the similar returns as compared to one another in the stock market. There is usually little or no correlation, sometimes negative correlation among different asset classes. Thus, diversification focuses on putting money into different asset classes to maximise the returns while balancing the risk.

Usually asset classes include equities, fixed income, cash and cash equivalents, real estate, commodities, and currencies.

1. **Equities:** It simply means owning the stocks of the company which can be traded via major stock exchanges of the country. Equity shares can give returns in two forms: dividend (payout from the profit of the company) and capital appreciation (Earning through increase in the value of an shares over a given period of time)
2. **Fixed Income:** It refers to the investment avenues which promises to give a certain fixed return on the investment over a period of time either at the redemption or maturity or spread across the period of the investment along with the safety of principal. It usually includes bonds, deposits (bank fixed deposit or corporate deposits), debentures, etc
3. **Cash or Cash equivalents:** It refers to parking the money into savings account or putting it into investments that can be liquidated into cash easily and in a short period of time.
4. **Commodities:** Commodities are usually of two types: Hard commodities which are extracted from the deeper surfaces of the earth like gold, silver, crude oil and soft commodities which are usually the agricultural products like cotton and sugar.
5. **Real Estate:** It usually involves getting the ownership of the property or investing into it through REITs (Real Estate Investment Trusts). Ownership can help in yielding rental income along with appreciation in the land or property prices, but it involves a huge amount of investment in one go, whereas REITs can be smaller investments with fractional ownership. REITs can be traded on stock exchanges.

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6. **Forex:** Forex is the buying and selling of currencies of different countries with the aim of earning from the fluctuations in the exchange rates. It involves exchange of one currency for another.

Risk Appetite:
It refers to the level of risk an individual is willing to take for the purpose of earning returns on investment. It is important to assess the risk tolerance capacity of an individual and create a personalised investment plan considering the various personal financial obligations that are to be met by him.

Usually, it can be classified into three types:

1. **Aggressive:** It implies high to very high risk taking capacity of an individual by showing willingness to accept higher market volatility for higher returns.
2. **Moderate:** It refers to create a balance between risk and reward thus using a mix of highly volatile investments to fixed return investments.
3. **Conservative:** It prefers to safeguard the invested amount by compromising the returns earned on it, thus showing a conservative approach to risk taking capacity.

Strategies for adopting Multi-Dimensional Investment strategy:

1. Diversify among different asset classes:
One major method is to diversify the amount of investment into different asset classes like equity (stocks), debt (fixed income instruments), commodities (gold, silver, copper), real estate, cash or cash equivalents, forex, futures and other derivates.

2. Diversify among different sectors:
It involves allocating the resources into different business sectors like infrastructure, technology, banking, health care, FMCG, automobiles, consumer durables, real estate and construction, telecom, media & entertainment, logistics, etc, it will require investors to analyse performance of different sectors and decide the allocation in the selected sectors.

3. Diversify among geographical areas:
It involves investing in different countries spreading capital into different geographical areas. In modern times, investor gets an opportunity to make investment across boundaries through exchange traded funds, mutual funds, direct stock purchases, etc.

Eg: Nippon India ETF Hang Seng BeEs, Nippon India Japan Equity Fund

4. Diversify across different investment styles:

Investment styles can be broadly classified as following:

a. **Growth:** Looking for companies who are expected to perform exceptionally and estimated to achieve higher returns/ profit in the coming years. A strong study of fundamental analysis of the company can help to pick the right stocks.

b. **Value:** Looking for companies, whose shares are trading at a value less than their intrinsic value, this is done to buy cheaper and making the profit by buying at the discounted value.

c. **GARP (Growth at Reasonable Price):** It is a combination of growth and value style. It involves picking the stocks through strong fundamental analysis which are expected to grow their sales/ returns but at the reasonable price.

d. **Momentum Investing:** Picking the stocks on the basis of the trend, buy the stock if the price of the stock is rising upward, and sell when the prices seem to fall.

e. **Quality Investing:** It involves picking the stocks that are built to last, usually the companies with favourable debt equity ratio, strong balance sheets, attractive dividends, balanced and stable profits year after year.

5. Diversify across different investment horizon:
It involves diversifying and allocating the entire amount of investment on the basis of the horizon of investment usually into short term, medium term, long term. Short term refers to usually for a period of 12 months or less. Medium term for a period of 1 to 3 years and long term for a period of more than 3 years. Usually, a specific percentage can be allocated to each horizon.

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Purpose of Adopting a Multi-Dimensional Approach:

1. **Mitigating Risk:** The multi-dimensional approach to investment can help in minimising the overall risk by spreading the amount into different asset classes, different sectors.
2. **Stabilising returns:** The approach to diversify can help to balance out the losses from one investment with the profit from another investment thus stabilising the returns and protecting from the extreme situations of financial loss.
3. **Balancing risk with return:** Usually it is recommended to assess the risk appetite of the investor and weigh it with the goals to be achieved with the investment, one can create a balanced portfolio to create a balance between the risk involved and the returns to be generated.
4. **Preventing over-reliance:** A well-diversified portfolio usually does not put its entire weight of yielding returns to a specific asset class or a specific economy, thus ensuring a well segregated investment approach which avoids over dependence on the performance of a particular asset or investment avenue.

LIMITATIONS

Since adopting the multi-dimensional approach can bring a lot of positive aspects in gaining higher returns and eventually creating wealth, it is undeniable that it poses certain challenges like requiring expertise services of financial experts or it can get too much time consuming or overwhelming for new investors.

It can also lead to average returns when specific assets are performing exceptionally well thus averaging the overall returns.

CONCLUSION

An appropriate and diversified portfolio constructed with due diligence, considering the personal financial goals along with the risk tolerance capacity of an individual can help an individual to be financially free and create a substantial amount of wealth over a period of time. After gaining thorough knowledge of the financial concepts and the strategies to be applied, an individual shall craft a well-diversified portfolio to avoid the risk of washing away the hard-earned money in the volatile situations, aiming to create a balance between risk and returns.

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WOMEN IN LEADERSHIP – BREAKING BARRIERS & EMPOWERING CHANGE A STUDY OF P. T. USHA: FROM INDIAN WOMAN ATHLETE TO THE FIRST WOMAN PRESIDENT OF THE INDIAN OLYMPIC ASSOCIATION (IOA)

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ABSTRACT
Women's leadership in sports administration has historically remained limited due to social barriers, gender discrimination, and lack of institutional support. However, several women have challenged these barriers and emerged as strong leaders in sports governance. One of the most remarkable examples in India is P. T. Usha, popularly known as the "Queen of Indian Track and Field." Her journey from being one of India's greatest athletes to becoming the first woman President of the Indian Olympic Association (IOA) represents a major milestone in women's leadership in Indian sports. This paper explores her life, achievements, leadership qualities, and contribution toward empowering women in sports. It also examines how her leadership symbolizes a progressive shift in Indian sports administration and inspires future generations of women leaders.

Keywords: *Women Leadership, P. T. Usha, Indian Olympic Association, Women Empowerment, Sports Administration*

INTRODUCTION
Leadership plays a crucial role in shaping institutions and creating opportunities for social transformation. In the field of sports, leadership has often been dominated by men, especially in administration and decision-making positions. Women athletes have achieved global recognition, but their participation in sports governance remains significantly low.

India has witnessed a remarkable transformation with the appointment of P. T. Usha as the first woman President of the Indian Olympic Association (IOA) in 2022. Her election represents not only personal success but also a symbolic victory for women in leadership.

P. T. Usha's story is one of discipline, resilience, determination, and excellence. From winning medals at international competitions to guiding Indian sports policy, her leadership journey demonstrates how women can break barriers and lead institutional change.

This research paper focuses on her achievements and her role in strengthening women's leadership in Indian sports administration.

OBJECTIVES OF THE STUDY
1. To study the life and sporting achievements of P. T. Usha

2. To examine her leadership journey from athlete to sports administrator

3. To analyze her role as the first woman President of IOA

4. To understand her contribution to women empowerment in Indian sports

5. To identify challenges faced by women leaders in sports governance

RESEARCH METHODOLOGY
This study is based on **secondary data** collected from books, journals, newspaper articles, official Olympic records, sports reports, and government publications.

Sources of Data
- Indian Olympic Association reports
- Sports Authority of India publications
- Newspaper reports
- Research journals on women leadership and sports management
- Biographical records of P. T. Usha

Research Type
Descriptive and analytical research method has been used for the study.

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LITERATURE REVIEW

Several studies highlight the underrepresentation of women in sports leadership. Researchers suggest that despite success in athletic performance, women often face structural discrimination in decision-making roles.

Studies on women leadership show that representation at the top creates positive policy changes and inspires social acceptance. Leadership by former athletes often improves governance due to practical experience and field knowledge.

P. T. Usha has been widely recognized as a transformational figure whose leadership bridges the gap between athlete welfare and sports administration.

Profile of P. T. Usha

Early Life

Pilavullakandi Thekkeparambil Usha, popularly known as P. T. Usha, was born on 27 June 1964 in Kerala, India. She showed exceptional talent in athletics from a young age and was trained under coach O. M. Nambiar.

Athletic Achievements

She became one of India's greatest athletes and earned the title "Payyoli Express."

Major achievements include:

- Gold medals at Asian Championships
- 4 Gold and 1 Silver medal at the 1986 Asian Games
- Finalist in 400m hurdles at the 1984 Los Angeles Olympics
- Missed Olympic bronze medal by just 1/100th of a second
- Arjun Award recipient
- Padma Shri awardee

Her success made her a national icon and inspired millions of young girls to pursue athletics.

Transition from Athlete to Leader

After retirement from competitive athletics, P. T. Usha focused on nurturing future talent by establishing the **Usha School of Athletics** in Kerala. She dedicated herself to training young athletes, especially girls from rural and economically weaker backgrounds.

Her experience as an athlete gave her deep understanding of the challenges faced by sportspersons in India, including poor infrastructure, lack of funding, and gender bias.

Her credibility, discipline, and public respect naturally positioned her as a strong candidate for sports leadership.

P. T. Usha as the First Woman President of IOA

In December 2022, P. T. Usha was elected as the **first woman President of the Indian Olympic Association (IOA)** in its 95-year history.

This was a historic achievement because:

- It broke male dominance in sports governance
- It increased women's representation at the highest level
- It reflected institutional acceptance of women leadership
- It gave athletes stronger representation in administration

Her election was seen as a major reform in Indian sports governance.

Leadership Qualities of P. T. Usha

1. Visionary Leadership

She understands long-term athlete development and prioritizes sustainable sports growth.

2. Discipline and Commitment

Her sports career reflects extraordinary discipline, which translates into administrative efficiency.

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3. Athlete-Centered Governance
She promotes policies that focus on athlete welfare rather than political influence.

4. Women Empowerment
She actively supports female participation in sports and leadership.

5. Integrity and Credibility
Her reputation as an honest and dedicated sportsperson builds public trust.

Challenges Faced by Women in Sports Leadership

Despite progress, women still face many barriers:
- Gender stereotypes
- Male-dominated administrative systems
- Limited access to decision-making roles
- Lack of mentorship
- Institutional resistance
- Social expectations regarding family responsibilities

P. T. Usha's leadership proves that these barriers can be challenged through competence and persistence.

Impact on Women Empowerment

Her appointment has a broader social impact:
- Encourages girls to pursue sports professionally
- Inspires women to enter leadership roles
- Improves policy attention toward women athletes
- Creates gender-inclusive governance models
- Strengthens representation of athletes in administration

She serves as a role model for women across sectors beyond sports.

FINDINGS
1. P. T. Usha's athletic excellence established her credibility for leadership
2. Her appointment as IOA President is a landmark event in Indian sports history
3. Women's representation in sports governance improves institutional diversity
4. Athlete-led administration can strengthen policy implementation
5. Her leadership inspires both sportswomen and future women administrators

SUGGESTIONS
1. More women should be included in sports federations and decision-making bodies
2. Leadership training programs should be introduced for former women athletes
3. Government should encourage gender-balanced sports governance
4. Sports institutions should create mentorship systems for women leaders
5. Media should highlight women leaders in sports administration

CONCLUSION
P. T. Usha's journey from a world-class athlete to the first woman President of the Indian Olympic Association is a powerful example of women breaking barriers and creating change. Her leadership reflects strength, credibility, and transformation.

She not only brought glory to India as an athlete but also created a historic legacy in sports governance. Her success proves that leadership is not defined by gender but by vision, dedication, and the courage to challenge tradition.

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In the context of building a Smart India, empowering women leaders like P. T. Usha is essential for creating inclusive and progressive institutions. Her story remains a symbol of inspiration for generations to come.

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6. Biographical Sources on P. T. Usha
7. Government Sports Policy Documents

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REWRITING POWER: FEMINIST REREADING OF LEADERSHIP IN CHITRA BANERJEE DIVAKARUNI'S THE PALACE OF ILLUSIONS

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ABSTRACT
Chitra Banerjee Divakaruni's The Palace of Illusions *(2008) offers a feminist retelling of the* Mahabharata *by narrating the epic through the perspective of Draupadi. This paper examines how Divakaruni reinterprets Draupadi's character to challenge patriarchal representations and foreground female agency, voice, and identity. Drawing upon feminist literary theory and postcolonial feminist perspectives, the study analyses the novel's portrayal of Draupadi as a self-aware and politically conscious figure who questions gender norms and social hierarchies. The paper argues that Divakaruni transforms Draupadi from a marginalised mythological character into an active participant in shaping her own narrative and influencing historical events. Through this re-visioning, the novel redefines leadership in terms of resilience, moral courage, self-expression, and ethical responsibility rather than domination and power. The study concludes that* The Palace of Illusions *serves as an important feminist reinterpretation of mythology, demonstrating how literary retellings can recover women's voices and offer alternative understandings of leadership, identity, and agency.*

Keywords: *Draupadi, feminist re-visioning, leadership, female agency, postcolonial feminism, mythological retellings.*

INTRODUCTION
The *Mahabharata* occupies a central position in Indian literary and cultural traditions, renowned for its ethical complexity and expansive narrative that encompasses generations of rulers, warriors, and divine beings. Despite its rich and multifaceted storyline, the voices of women within the epic often remain marginalised, overshadowed by dominant male protagonists and interpreted through patriarchal frameworks. Among its most significant female characters, Draupadi is frequently portrayed either as a catalyst for conflict or as a symbol of suffering, her identity largely constructed through male-centered perceptions that define her as a wife, an object of desire, or the instigator of war.

Chitra Banerjee Divakaruni's *The Palace of Illusions* (2008) challenges this traditional narrative by granting Draupadi the role of first-person narrator and enabling her to recount her own experiences. This narrative reconfiguration serves as a feminist intervention into a canonical mythological text, questioning established gender hierarchies and offering an alternative interpretation of cultural memory and history. By foregrounding Draupadi's voice, the novel not only recovers the perspective of a historically silenced female figure but also explores broader issues of identity, agency, and selfhood.

This paper argues that Divakaruni reimagines concepts of power and leadership through the character of Draupadi, transforming her from a passive subject within patriarchal discourse into an autonomous and politically aware individual. Through this feminist re-visioning of mythology, the novel redefines leadership beyond conventional notions of masculine authority and conquest, presenting instead a model grounded in resilience, moral strength, self-expression, and agency. In doing so, *The Palace of Illusions* offers a compelling reinterpretation of female leadership and challenges traditional understandings of power within both mythological and contemporary contexts.

Theoretical Framework: Feminist Re-visioning and Postcolonial Feminism
To appreciate Divakaruni's feminist reimagining of mythology, *The Palace of Illusions* must be examined within the framework of feminist literary criticism, particularly Adrienne Rich's concept of "re-vision." Rich defines re-vision as the process of revisiting and reinterpreting patriarchal texts through a female consciousness in order to challenge and dismantle inherited structures of gendered representation. According to Rich, "the act of revision is the act of survival for women writers," as it enables them to reclaim and reconstruct narratives traditionally shaped by patriarchal ideologies.

Furthermore, postcolonial feminist theory offers an important perspective for understanding Divakaruni's narrative strategy. As an Indian-American diasporic writer, Divakaruni engages critically with both indigenous patriarchal traditions and colonial constructions of Indian womanhood. In this context, Chandra Talpade Mohanty's discussion of "the tension between agency and structural oppression in women's lives" provides a

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valuable framework for interpreting Draupadi's position as a woman negotiating power within restrictive social and cultural structures.

Feminist literary theory's broader objective also informs the present analysis of recovering women's voices that have been marginalized within dominant patriarchal narratives. Elaine Showalter argues that "rewriting history from a female perspective does not merely add a voice; it changes the entire narrative structure".[jetir] Divakaruni's retelling exemplifies this transformative process by shifting the narrative focus from male-centered heroism to female experience, thereby reconstructing the epic's ideological and narrative foundations.

Reclaiming Voice: Draupadi as Narrator

A significant aspect of Divakaruni's feminist reworking of the *Mahabharata* lies in her decision to employ a first-person narrative, thereby challenging the traditional dominance of male voices in shaping Draupadi's story. By allowing Draupadi to narrate her own experiences, the novel restores agency to a character whose identity has historically been mediated through patriarchal perspectives. Early in the narrative, Draupadi asserts, "But my birth was a blaze that set the world afire, and I was never allowed to forget it" (Divakaruni 3). This narrative strategy foregrounds female subjectivity and reflects feminist efforts toward "the reclamation of women's narratives from within patriarchal traditions".

Through this act of self-narration, Divakaruni recovers the emotional and psychological dimensions of Draupadi's character, presenting her as a complex individual capable of expressing anger, desire, frustration, and uncertainty—qualities that are often marginalized or subdued in conventional retellings of the epic. Draupadi demonstrates a keen awareness of the cultural myths and stereotypes that surround her when she observes, "I've been called a sorceress, a harlot, a destroyer of worlds… But no one ever asked what I wanted" (Divakaruni 15).[jetir] This statement highlights the ways in which patriarchal discourse constructs and confines female identity while simultaneously denying women the opportunity to articulate their own aspirations and experiences.

Moreover, Divakaruni's narrative approach resonates with feminist literary theory's commitment to recovering women's voices from dominant patriarchal frameworks. By centering Draupadi's perspective, the novel shifts the focus from the heroic exploits of male protagonists to the lived experiences of a woman whose story has traditionally remained in the margins. This revisionist intent is articulated in Draupadi's declaration: "The story you know is about war and men. But I will tell you a secret. The story is also about a woman who loved and hated with equal intensity, who longed for greatness but was trapped in destiny's play" (Divakaruni 5).[jetir] Through such moments, *The Palace of Illusions* redefines the epic narrative by foregrounding female experience and challenging the patriarchal assumptions embedded within cultural memory.

Challenging Patriarchal Structures and Gender Roles

Divakaruni begins *The Palace of Illusions* by narrating Draupadi's childhood and her extraordinary birth from the sacrificial fire, a motif that symbolizes both her divine origins and her position as an outsider within the social order. By allowing Draupadi to recount her own beginnings, the novel moves beyond the deterministic framework of the traditional epic and emphasizes her role in shaping her own identity. Rather than being portrayed as a passive recipient of destiny, Draupadi emerges as a self-aware individual who actively negotiates her place within a patriarchal world. Her fiery birth thus serves as a powerful metaphor for transformation, resistance, and autonomy.

A central concern of *The Palace of Illusions* is its critique of the gendered power structures embedded within the epic tradition. Throughout the narrative, Draupadi demonstrates a keen awareness of her objectification in a male-dominated society, particularly during her *swayamvara*, where she is presented as the reward in a competition designed to showcase masculine strength and skill (Divakaruni 47). Through this episode, Divakaruni exposes the patriarchal assumptions that underpin cultural practices often celebrated as empowering for women.

Traditionally regarded as a ceremony that grants a woman the freedom to choose her husband, the *swayamvara* is reinterpreted in the novel as an institution that masks female disempowerment. Draupadi's poignant question, "Was I choosing, or was I being chosen?" (Divakaruni 52), challenges the notion of agency associated with the ritual and reveals the limitations imposed upon women within patriarchal social structures. By foregrounding her doubts and reflections, Divakaruni exposes the contradictions inherent in customs that appear to honour women while simultaneously reducing them to objects of exchange and desire.

Similarly, Draupadi's marriage to the five Pandava brothers is presented not as a symbol of divine privilege but as evidence of the ways in which women are often employed as instruments of political and familial

interests. Although the arrangement is traditionally justified through religious and mythological explanations, Divakaruni emphasizes its emotional and psychological consequences. Draupadi's observation, "Five husbands, and not one who truly knew me. I belonged to all of them, yet I belonged to none" (Divakaruni 86), underscores her sense of alienation and the erosion of her individual identity within the institution of marriage.Through this portrayal, the novel challenges idealized representations of marital devotion and reveals how patriarchal systems continue to restrict women's autonomy even within socially sanctioned relationships.

The episode of Draupadi's humiliation in the Kaurava court constitutes one of the most significant feminist interventions in Divakaruni's retelling. While the traditional epic often foregrounds the themes of masculine honour, revenge, and dynastic conflict, *The Palace of Illusions* shifts attention to Draupadi's personal experience of violence and degradation. The attempted disrobing becomes not merely a narrative catalyst for war but a profound moment of psychological trauma and political awakening. Reflecting on the incident, Draupadi remarks, "Stripped not just of clothing, but of dignity, I discovered that shame was heavier than any chain" (Divakaruni 159). Elsewhere, she recognizes that "nakedness was not just of the body, but of dignity, of power, of voice" (Divakaruni 158).

By emphasizing Draupadi's emotional and psychological response rather than the wounded pride of the male warriors around her, Divakaruni exposes the structural inequalities that sustain patriarchal authority. The novel thereby transforms a familiar episode into a critique of the social systems that normalize women's humiliation and silence. As Tharu and Lalita observe, "the epic tradition, even in its moments of compassion, frames women as catalysts rather than agents." Divakaruni's reimagining directly challenges this tendency by positioning Draupadi as both narrator and interpreter of her own experiences, granting her the authority to critique the forces that seek to objectify and marginalize her.

Agency, Desire, and Emotional Complexity

One of Divakaruni's most significant feminist interventions is her portrayal of Draupadi as a multidimensional and self-aware individual whose ambitions, desires, and vulnerabilities coexist with the constraints imposed by patriarchal society. Draupadi openly acknowledges her aspiration for greatness, declaring, "I wanted greatness… to carve my name into the granite of history" (Divakaruni 22), yet she remains conscious of the social structures that limit her freedom. This tension between agency and constraint reflects contemporary feminist concerns with women's negotiation of power within oppressive systems. Rather than presenting Draupadi as either a victim or a heroine, Divakaruni depicts her as a complex figure whose strength is inseparable from her struggles and contradictions.

The novel further humanizes Draupadi through her emotional life, particularly her unspoken attraction to Karna. Her reflection, "Had I been born under a different star, perhaps it would have been his hand I clasped" (Divakaruni 103), introduces an emotional depth largely absent from traditional versions of the epic. By granting Draupadi romantic agency, Divakaruni challenges idealized notions of feminine virtue and wifely devotion while bringing modern psychological realism to an ancient narrative. At the same time, the novel underscores the limitations imposed by social expectations, illustrating what Mohanty identifies as "the tension between agency and structural oppression in women's lives".

Beyond her personal struggles, Draupadi emerges as a capable political actor who participates actively in matters of governance, diplomacy, and justice. Her involvement in key events such as the *Rajasuya Yajna* and the dice-game episode reveals her political insight and moral authority, positioning her not as a passive witness but as an influential participant in shaping historical events. Her persistent questioning of a patriarchal conception of *dharma* that permits the violation of women's dignity demonstrates critical moral reasoning and ethical leadership.

Leadership, Resistance, and Moral Authority

Divakaruni also reimagines leadership through relationships grounded in mutual respect and solidarity. The bond between Draupadi and Krishna, for instance, is presented as a partnership rather than a hierarchical relationship of protector and dependent, while female networks of support function as alternatives to male-dominated structures of power. Consequently, the novel redefines leadership not in terms of conquest, domination, or violence, but through resilience, emotional intelligence, moral courage, and collective responsibility.

By connecting Draupadi's experiences of oppression, identity formation, desire, and resistance to contemporary feminist concerns, *The Palace of Illusions* transcends its mythological setting and speaks to the universal struggles of women seeking autonomy and self-definition. Divakaruni's portrayal is both empowering and realistic, acknowledging the enduring force of patriarchal constraints while celebrating acts

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of resistance and self-assertion. As a result, Draupadi emerges as a powerful symbol of female resilience, and the novel stands as a significant contribution to feminist literary discourse through its reimagining of power, leadership, and women's agency.

CONCLUSION

In *The Palace of Illusions*, Chitra Banerjee Divakaruni offers a compelling feminist reinterpretation of the *Mahabharata* by relocating the narrative center from its male heroes to Draupadi, a character traditionally confined to the margins of patriarchal storytelling. Through the use of first-person narration, the novel restores agency and subjectivity to Draupadi, enabling her to articulate her desires, struggles, and aspirations while critically examining the social structures that shape her life. In doing so, Divakaruni not only challenges conventional representations of women in mythological narratives but also reclaims a silenced female voice from the constraints of patriarchal history.

The novel's most significant contribution lies in its redefinition of power and leadership. Rather than equating leadership with conquest, authority, and domination, Divakaruni presents an alternative model grounded in resilience, ethical conviction, emotional intelligence, and the courage to resist injustice. Through Draupadi's experiences, the narrative demonstrates that leadership can emerge from acts of questioning, self-assertion, and moral responsibility rather than from the exercise of power over others.

By reimagining a familiar myth through a feminist lens, *The Palace of Illusions* transforms Draupadi from a symbolic figure of destiny into a dynamic agent of her own story. The novel acknowledges the persistent constraints imposed by patriarchal systems while simultaneously affirming women's capacity for resistance, self-definition, and political consciousness. As a result, Divakaruni's retelling extends beyond literary revision to become an act of cultural reclamation, illustrating how mythology can be reinterpreted to address contemporary concerns surrounding gender, identity, and agency. Ultimately, *The Palace of Illusions* re-envisions leadership as the ability to claim one's voice, challenge structures of oppression, and persist in the pursuit of justice and selfhood.

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LACK OF SUPPORT BY OTHERS, WOMEN CAN BE A CHALLENGE

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ABSTRACT
Lack of support from others remains a significant challenge faced by women across social, professional, and institutional contexts. Support systems comprising emotional encouragement, mentorship, and access to resources play a crucial role in enabling women's personal and career development.

However, many women encounter barriers such as limited guidance, unequal opportunities, and insufficient institutional backing. In workplace environments, the absence of mentorship and sponsorship often restricts advancement and contributes to stress and burnout. Additionally, social and cultural expectations can further reduce the availability of support, placing disproportionate responsibilities on women. In some cases, competitive environments and systemic inequalities may also lead to reduced collaboration among women themselves.

The impact of such support gaps extends to diminished confidence, slower career progression, and negative mental health outcomes. This paper highlights the multifaceted nature of the issue and emphasizes that lack of support is not merely an individual concern but a structural problem rooted in broader gender inequalities. Strengthening support networks, promoting inclusive policies, and fostering collaborative environments are essential steps toward addressing these challenges and empowering women.

Keywords: *Barriers, mentorship, diminished confidence, advancement.*

REVIEW OF LITERATURE

1. Ragins & Cotton (1999)

Title: Mentor Functions and Outcomes: A Comparison of Men and Women in Formal and Informal Mentoring Relationships

Journal: Journal of Applied Psychology ISSN: 0021-9010

Key Findings: Women receive less mentoring support, impacting career growth. Research Gap: Lacks cultural analysis.

2. Heilman (2012)

Title: Gender Stereotypes and Workplace Bias Journal: Research in Organizational Behavior ISSN: 0191-3085

Key Findings: Bias reduces workplace support for women. Research Gap: Limited focus on family support.

3. Lackey (1986)

Title: Social Support and Stress: A Review of the Literature Journal: Journal of Behavioral Medicine

ISSN: 0160-7715

Key Findings: Lack of support increases stress in women. Research Gap: Not focused on modern work issues.

4. Eagly & Carli (2007)

Title: Women and the Labyrinth of Leadership Journal: Harvard Business Review

ISSN: 0017-8012

Key Findings: Women lack sponsorship support.

Research Gap: Needs more empirical data.

5. Thoits (2011)

Title: Mechanisms Linking Social Ties and Support to Physical and Mental Health Journal: Journal of Health and Social Behavior

ISSN: 0022-1465

Key Findings: Lack of support impacts health.

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Research Gap: Limited cultural differentiation.

INTRODUCTION

Women have made their presence felt in almost all spheres of work today and have made considerable progress career-wise. They are now working in almost all industries that were once considered male-dominated like manufacturing at the shop level, the automobiles sector, aviation sector as pilots and engineers to name a few. The advancement of women in the last few decades has been remarkable not only globally, but also in India wherein the patriarchal mindset of society attributing a lesser domestic role to women is quite prevalent.

Women across the world continue to face a range of challenges that affect their personal, social, and professional lives. Despite significant progress toward gender equality, many barriers still persist, limiting women's opportunities and growth. These challenges often arise from a combination of social expectations, cultural norms, institutional limitations, and unequal access to resources and support systems. Among these, lack of support from family, peers, and organizations plays a critical role in shaping women's experiences.

In many societies, women are expected to balance multiple responsibilities, including professional work and domestic duties, often without adequate assistance. This imbalance can lead to stress, reduced career advancement, and diminished well-being. In professional environments, women may encounter limited mentorship, unequal recognition, and fewer opportunities for leadership roles. Additionally, competitive and male-dominated settings can sometimes hinder collaboration and support networks among women themselves.

The issue of inadequate support is not simply an individual struggle but reflects broader structural and systemic inequalities. Understanding these challenges is essential for identifying effective solutions that promote inclusion, empowerment, and equal opportunities. This paper explores how lack of support acts as a barrier for women and examines its impact across different areas of life, highlighting the need for stronger support systems and societal change.

AIMS AND OBJECTIVES

In the light of the research, the following objectives have been outlined for the present study

To study about the challenges and problems faced by a women due to lack of support by others.

RESEARCH PROBLEM

After making a thorough Analysis of the Topic, here are the formulation of the Research Problem.

Working women faces a paradox where they lack support from both male dominated structures (which favors traditional masculine leadership) and female peers (who may distance themselves due to scarcity mentality) resulting in increased psychological pressure, slower career progression and diminished leadership opportunities.

RESEARCH METHODOLOGY

This Research Paper attempts to make a non-doctrinal research to achieve the aforementioned aims. Secondary sources of data are used. Secondary sources include articles, books, magazines, research papers, newspapers and internet websites.

ANALYSIS TO RESEARCH PROBLEM

Gender stereotypes

Gender stereotypes that form a bias and prejudice towards women's capabilities and leadership style pan out as preferential treatment towards men and their promotions and rise through ranks much more easily than for women. These stereotypes manifest itself in various subtle forms at several levels as discrimination and inequality towards women employees in terms of accepting their capabilities and talents as much as their male counterparts. Women who are determined and focused on their goals and have aspirations and ambitions for senior leadership roles are often termed as "bossy" and not feminine, at times they adapt their leadership style to what may suit their male colleagues. Women are also perceived to be weak and taking decisions emotionally which may not be the trait required for an effective leader. These negative perceptions and stereotypes work as an obstacle to their advancement and progress to senior leadership roles.

Organizational structure, policies and culture

A positive organizational culture can go a long way in enhancing not only business and market share but also ensuring a happy and satisfied employee. It is the culture of any organization which is crucial for any person to continue working and advance their career there among other factors like compensation, rewards, and appreciation. This is more so for women and when the same culture of their workplace discriminates against

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them based on their gender and has stereotypical attitudes and prejudices, this acts as a barrier to their progression and stalls their advancement to senior leadership role.

Male dominance

Male hierarchy and dominance impact the organizational culture negatively thereby slowing women's career progress Women at the junior level are determined to achieve roles and succeed in managerial roles by overcoming the barriers of existing masculine culture, but find the same as a hindrance to advance further in their careers. The researchers found that women tend to adapt and develop these masculine behavioral models of leadership leading to a lack of a female model of successful leadership. A Korean study also illustrates how male hierarchy which has predominately male team members prefer to hire more men giving less room for women to progress to key positions. Resistance from women was either withdrawal, resignation, changing jobs, or self-employment. Women did experience difficulties in communicating and networking in a male-dominated organizational culture and as a result, there was subtle discrimination in promotion and fair performance appraisal in such a culture. This impacted their advancement to senior key positions.

Work life balance and burn out

Women working in responsible positions are often required to spend long hours at the office impacting the time spent at home or doing other life activities. Juggling between office assignments, business meets, traveling, and home responsibilities are taking a toll on their physical and mental well-being. Working women today are looking for a better quality of life and a healthy work-life balance. Several researchers have examined this dimension of work-life balance and its impact on people's life.

Continuous work commitments leaving not much room for work-life balance leads to a "burnout" feeling among women which is being discussed in greater detail in recent years. A recent McKinsey Study on "Women in workspace" surveys around 423 organisations employing 12 million people participated, 65000 women employees were surveyed belonging to various races and identities globally. This study finds that burnout is on the rise in corporate workspace and women are more burned out than men.

CONCLUSION AND SUGGESTION

This paper examines the various challenges women encounter in their career path to leadership roles from the organizational side. Gender discrimination, bias, and prejudice are found to be the main barriers identified. This can manifest in various forms and degrees in organizations that challenge women. Male dominance in the hierarchy and obvious in other functions hampers women employees' growth and nurturing leading to slow progress in their career. Lack of opportunities for training, mentoring, and networking adds to the problem which puts them at a weak wicket. Work-life balance and juggling between home and work responsibilities lead to stress and guilt feeling which impacts their long-term career plans. This often manifests as "burnout" feeling and health issues motivating to women quit the work altogether despite being qualified and skilled for better opportunities.

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A STUDY ON PSYCHOLOGY & MENTAL HEALTH IN DIGITAL AGE

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ABSTRACT
Technology has revolutionized communication, education, workplace culture, entertainment, and socialization. Smartphones, social networking sites, electronic communications, and technology itself have become an integral part of daily life. Although all of these advancements make our lives convenient, faster, and connected, they come at a cost of several psychological and emotional problems. The increasing reliance on technology has led to more problems like stress, anxiety, depression, loneliness, emotional fatigue, and a decline in concentration, especially for Generation Z, which has been brought up in the digital era.

Addictions related to social media use, fear of missing out (FOMO), cyber-bullying, doom-scrolling, and the constant viewing of screens are some of the issues that have arisen due to the growing reliance on technology. The frequent comparison of oneself with others on various technological platforms decreases self-worth and causes emotional dissatisfaction.

In this research paper, the correlation between technology and mental well-being is explored using both primary and secondary data. The effects of social media addiction, emotional stress, mindfulness, and digital detoxification will be studied. It is found that constant digital exposure has adverse effects on sleep, focus, emotions, and overall psychology.

INTRODUCTION
Technology has become an integral part of today's reality. Nowadays, it is smartphones, social networks, digital messaging apps, video games, and virtual education that define how people communicate, work, learn, and spend their time. Modern people spend many hours a day with technological devices, making technology one of the defining aspects of the modern age. Even though the benefits of technological development include comfort, more convenient communication, and easy access to data, technology brings a number of emotional difficulties.

The growing popularity of social networks has significantly changed the nature of people's communication and their identity formation, mainly affecting young adults and members of Generation Z. People start comparing themselves with others, receiving validation from their followers, and trying to create a perfect image online. As a result, it creates significant stress, anxiety, loneliness, emotional exhaustion, and contributes to poor self-esteem and inability to concentrate on work or studying.

REVIEW OF LITERATURE

1. B.F. Skinner's Behavioral Theory (1938)
According to B.F. Skinner, reward-based systems foster repetitive behavior. Likes, comments, notifications, and shares in social media motivate users to constantly check their electronic devices, thus forming an addiction and dependence on technology.

2. Leon Festinger's Social Comparison Theory (1954)
According to Leon Festinger, comparing oneself with others helps to assess one's own accomplishments and life. Social media amplifies the effect since users are surrounded by perfect, edited images and stories. It causes stress, anxiety, and dissatisfactory emotions.

3. Jean Twenge's Study on Generation Z (2017)
According to Jean Twenge, generation Z members who spend too much time using smartphones and social media are more likely to experience such negative phenomena as anxiety, depression, loneliness, and stress.

4. Jeremy Bailenson's Zoom Fatigue Theory (2021)
Jeremy Bailenson described the phenomenon called "Zoom fatigue." Zooming means being constantly involved in video conferences. People's brain spends extra energy as there is less nonverbal information and screen engagement is needed constantly.

5. Kaplan and Kaplan's Attention Restoration Theory (1989)
Kaplan and Kaplan noted that digital stimulation mentally drains a person.Their theory states that spending time in nature and reducing screen exposure helps restore concentration, creativity, and emotional balance, improving overall mental well-being

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Research Gap

Most of the studies conducted on the above-discussed topics are carried out individually without considering their interconnections. The connection between digital lifestyles, emotional well-being, behavioral changes, and coping techniques has hardly been explored through research. Most of the current literature focuses on Western societies and not on the Indian population, where the young generation experiences unique stresses within the digital landscape.

Another important area that requires further research is the psychological impact of prolonged screen exposure on attention span, memory, emotion regulation, sleep, and interpersonal relationships. While the negative implications of technology have been widely discussed, there is an absence of practical strategies to counteract these effects by enhancing mindfulness, detoxing from technology, emotional awareness, and appropriate use of technology.

Remote working, learning, and algorithmic social media content are other aspects that have received little research attention in terms of their psychological impact on mental well-being. Similarly, there is no substantial literature on the simultaneous impact of technology's negative and positive effects on human beings..

RESEARCH OBJECTIVES

1. Study the effects of digital technology on mental health.

The objective aims to understand the influence of digital technology, including smartphones, social media, online interactions, and overexposure to screens on one's psychological state, emotions, and behavior.

2. Study the psychological effects of social media addiction.

The objective aims to research the effects of constant usage of social media platforms on one's self-confidence, self-respect, attention span, emotional state, and interpersonal relationships. Also, the objective will research the effects of getting validated online through 'likes', comments, and followers.

3. Study stress, anxiety, and other emotional issues that come with digital lifestyle.

The objective aims to analyze the issues related to one's psychological and emotional condition caused by an unhealthy relationship with digital gadgets, especially smartphones.

4. Study the effects of mindfulness and digital detoxification.

The objective aims to find out how practicing mindfulness, meditation, lowering the number of hours spend using gadgets, and doing other digital detox activities can improve concentration and overall emotional state.

5. Provide suggestions regarding healthy digital practices.

The objective aims to make recommendations about how people can achieve positive emotions by maintaining healthy digital practices and using gadgets in a responsible manner.

Research Hypothesis

Effects of Digital Technologies on Mental Well-Being

- **$H0_1$:** Excessive digital technologies do not have any significant effects on mental well-being.
- **$H1_1$:** Excessive digital technologies have significant negative effects on mental well-being.

The Impact of Social Media Addiction on Emotions

- **$H0_2$:** The addiction to social media does not significantly lead to increased stress and anxiety among people.
- **$H1_2$:** The addiction to social media significantly leads to increased stress and anxiety among people.

The Effect of Digital Life on Emotional Health

- **$H0_3$:** The digital lifestyle does not significantly cause emotional problems such as depression, loneliness, and emotional fatigue.
- **$H1_3$:** The digital lifestyle significantly causes emotional problems such as depression, loneliness, and emotional fatigue.

Mindfulness and Digital Detoxification

- **$H0_4$:** Mindfulness exercises and digital detoxification do not significantly promote mental health.

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- **$H1_4$:** Mindfulness exercises and digital detoxification significantly promote mental health.

Healthy Digital Habits and Psychological Equilibrium

- **$H0_5$:** Healthy digital habits do not significantly affect emotional well-being and psychological equilibrium.
- **$H1_5$:** Healthy digital habits significantly improve emotional well-being and psychological equilibrium.

RESEARCH METHODOLOGY

This current study is exploratory and analytical in nature and intends to explore the correlation between the use of digital technology and the psychological state of the individual. Both primary and secondary data sources have been used to gain an in-depth knowledge about the topic. The primary data was collected via a structured questionnaire prepared with the help of Google Forms. This questionnaire had questions related to screen time, social media usage, emotional wellbeing, stress, sleep patterns, internet behavior, and digital detoxification practices. A total of 84 respondents, mostly students and young adults, were surveyed who use digital technology extensively in their day-to-day activities.

This research work attempts to explore the negative impacts of excessive digital exposure on the psychological wellbeing, concentration ability, emotional stability, and social interactions of the individuals. The secondary data was collected from journals, books, research papers, websites, and online articles concerning psychology, social media addiction, mindfulness, anxiety, depression, and digital life.

The collected data were analyzed using percentage calculations, observations, and theme analysis techniques to highlight some common behaviors and emotions among the respondents. Furthermore, the ethical principles of confidentiality and voluntary participation were also maintained in the research process.

DATA ANALYSIS AND INTERPRETATION

A survey of 85 primarily young adult students (aged 18-25) revealed a generation deeply entrenched in the digital world. Most participants spend over four hours daily on screens, largely driven by social media. This heavy usage shows clear signs of dependency, with nearly half checking their phones immediately upon waking and over 40% openly feeling addicted.

Consequently, the impact on well-being is significant. A striking 66% report disrupted sleep, and many experience noticeable stress and anxiety fueled by social media comparison. Despite these drawbacks, 69% recognize that social media has both positive and negative effects on their mental health. To cope with digital stress, 40% rely on real-world human connection by talking to friends and family. However, establishing healthy boundaries remains a challenge; nearly a third of respondents never take a digital detox break, highlighting a critical gap in managing long-term digital well-being.

FINDING

This research emphasizes both the advantages and disadvantages of using digital technology on mental wellbeing. Through the answers provided and the analysis done, it became possible to identify some vital findings relating to digital conduct and psychological well-being.

- **Adverse Effect of Social Media Comparison**- From the findings, it is clear that constant comparison through social media affects negatively self-esteem and self-confidence levels in youth. Users compare themselves with others regarding how they look, how they live, their successes, or relationships with their partners.
- **Rise in Stress and Anxiety Levels**- Smartphone addiction causes anxiety, psychological tension, stress, and emotional issues. Being constantly bombarded with information and having to stay active on all social media platforms causes mental exhaustion and anxiety.
- **Poor Sleep Patterns and Emotional Exhaustion**- Findings showed that excessive screen exposure, especially before bed, causes sleep disturbances. As a result, it creates poor sleep patterns and low-quality sleep leading to fatigue and emotional problems.
- **Negative Consequences of Doomscrolling and Cyberbullying**- Constant scrolling through negative news stories creates emotional tension, anxiety, stress, and fear in one's life. Just like the case of cyberbullying, which creates serious mental pressure.
- **Advantages of Mindfulness and Digital Detox**- From the findings, practicing mindfulness, reducing screen exposure and engaging in digital detox positively influences attention spans and mental relaxation..

LIMITATIONS

Although the research reveals a lot about how digital technology affects psychological well-being, it is necessary to recognize some of its weaknesses, which might influence the outcome of the entire investigation.

1.Small Sample Size

The experiment was based on the results obtained from 84 participants. This small sample size might not entirely reflect the opinions, behavior, and experience of the target population. It would be more appropriate if a greater number of individuals were analyzed.

2. Limited Target Population

The majority of participants were students and young adults. Hence, the conclusions drawn might not adequately represent the experience of elderly people or individuals from rural areas.

3. Subjectivity of the Study

The data for analysis was gathered via a questionnaire completed by participants. This implies that the results are subjective since individuals might provide incorrect answers because of their personal opinion or reluctance to express certain emotions and feelings.

4. Short Experiment Period

A short period was used to conduct an experiment. This limited the opportunity to observe the psychological impact of excessive use of digital devices in the long run.

5. Impact of Other Elements

The psychological state depends on factors such as family background, academic pressure, economic situation, and personal experience. Therefore, it is inappropriate to associate digital technology with all mental health problems mentioned in the study.

CONCLUSION

The era of digitalization has changed dramatically how people interact with each other, receive education, get entertained, and work. Technology makes it easier to get information and stay connected with others regardless of geographical boundaries. There are many advantages of digital technologies such as convenient social media, online education, digital communication, and remote work solutions. Nevertheless, besides all the positive aspects, an unreasonable reliance on technological devices poses great psychological and emotional difficulties.

According to the research conducted, extended screen time, social media addiction, cyberbullying, FOMO, and constantly comparing oneself with others are factors that have a negative impact on psychological state. Frequent use of electronic devices leads to high levels of stress and anxiety, loneliness, emotional burnout, difficulty concentrating, poor-quality sleep, and other problems associated with mental health in particular youth and Generation Z. Moreover, there are psychological aspects related to self-perception and emotional state as well.

To summarize, it could be concluded that technology itself cannot be considered entirely negative since it is excessive reliance on it which causes problems. With regard to mental well-being, it is important to pay attention to healthy digital behaviors, meditation, mindfulness exercises, and digital detoxing techniques.

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PRIVACY PARADOX AMONG GEN Z: AWARENESS OF AI-DRIVEN DATA COLLECTION IN DIGITAL MARKETING VS. ACTUAL ONLINE BEHAVIOUR

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ABSTRACT
In the era of artificial intelligence, digital marketing has transformed into a system of continuous monitoring and monetisation of consumer behaviour data. This study examines the Privacy Paradox among Generation Z (born 1997–2012) in Pune, India, specifically investigating the gap between their awareness of AI-driven data collection in digital marketing and their actual online behaviour. A descriptive and exploratory quantitative approach was employed, with primary data collected from 110 respondents aged 18–26 through a structured online questionnaire, while secondary data was drawn from academic journals, Pew Research, Statista, the Deloitte Gen Z Survey 2023, and India's Digital Personal Data Protection Act (DPDPA) 2023. The findings confirm the presence of the Privacy Paradox — while 100% of respondents demonstrated awareness of online behavioural tracking and 94.5% expressed concern over data usage, only 8% took active steps to protect their privacy. Low awareness of DPDPA 2023 (29.1%) and widespread digital resignation (59%) further highlight the disconnect between concern and action. The study concludes that addressing the Privacy Paradox requires more than awareness campaigns; it demands platform-level regulatory intervention, clear consent language, rights-based digital literacy, and urgent strengthening of India's data protection framework to safeguard Generation Z's digital rights in an increasingly AI-driven environment.

Keywords*: Privacy Paradox, Generation Z, AI-Driven Data Collection, Digital Marketing, Data Privacy, DPDPA 2023, Online Behaviour, Digital Resignation*

I. INTRODUCTION
In today's hyper-connected digital world, artificial intelligence has fundamentally transformed the way businesses collect, analyse, and employ consumer data. Every scroll, click, pause, and purchase made by users on platforms such as Instagram, Spotify, YouTube, and Amazon is silently captured, processed, and monetized through sophisticated AI-driven marketing systems.

At the centre of this data-driven ecosystem stands Generation Z — individuals born between 1997 and 2012 — who represent the first truly digital-native generation, having grown up entirely surrounded by smartphones, social media, and algorithmic content. Paradoxically, while Gen Z is widely regarded as the most digitally literate and privacy-conscious generation, research consistently reveals a striking contradiction in their behaviour.

Despite expressing strong concerns about data privacy and surveillance, Gen Z continues to willingly share personal information, accept cookie permissions without reading them, and remain deeply dependent on the very platforms that monetize their data. This contradiction between stated privacy concerns and actual online behaviour is widely recognized in academic literature as the Privacy Paradox — a phenomenon first introduced by Barnes (2006) and further explored by Acquisti and Grossklags (2005) [1], [3].

This study seeks to investigate the depth of this paradox among Gen Z in the Indian context, examining whether awareness of AI-driven data collection practices translates into meaningful privacy-protective behaviour, or whether convenience, social validation, and platform dependency continue to override privacy concerns in the digital age.

II. OBJECTIVES

Objective 1: Determine the degree of awareness of AI-driven data collection methodologies in digital marketing platforms among Generation Z, such as Instagram, Spotify, YouTube, and Amazon.

Objective 2: Study how the Privacy Paradox manifests itself in Generation Z, taking into account the difference between their stated attitudes toward data privacy and actual online actions in terms of consent, data sharing habits, and privacy protective activities.

III. LITERATURE REVIEW

[1] *Privacy Paradox and Generation Z*
Alić and Sopić explored Generation Z's privacy perspectives using Westin's General Privacy Concern Index. A survey of 474 individuals found that 85% believed personal information should be protected, yet a

significant minority continued using platforms like Airbnb and Uber despite fears of unauthorized data collection, revealing a complex view of privacy [1].

[2] ***Gen-Z Perception of Data Privacy in AI Context***
Saura et al. (2024) investigated Gen Z's attitude toward data privacy in AI environments across retailing, healthcare, and streaming media sectors. A Likert-scale survey reflected declining comfort with AI, particularly in healthcare, with mistrust as the primary concern. The study calls for cross-national, cross-sectorial, and longitudinal research [2].

[3] ***Explaining the Privacy Paradox with Online Apathy***
Hargittai and Marwick (2016) investigated the privacy paradox, finding that sharing behaviour cannot be explained by lack of awareness but by online apathy and perceived lack of control. Young adults believe privacy management on social networks is a collaborative effort, and future research should focus on policies enabling data control [3].

[4] ***Gen Z's Personalization Paradoxes***
Mckee et al. (2023) examined Gen Z's response to ad blocking and privacy using privacy calculus theory among 414 consumers. Privacy concerns negatively impacted brand loyalty, while personalization positively impacted it. Ad blocking increased frustration with non-personalized marketing [4].

[5] ***Balancing Personalization, Privacy, and Value***
Utami and Aimin (2026) conducted a PRISMA-based review of 59 articles focusing on AI-enabled personalization and privacy in customer experience management. While AI personalization enhances customer value, its effectiveness depends on personalization depth, customer awareness, and robust governance frameworks [5].

[6] ***Smart Personalization and Privacy Paradox***
Saura (2024) found that AI-based smart personalization in digital marketing improves content relevance but raises privacy and ethical concerns around data utilization and autonomous ML algorithms, leading to a privacy paradox requiring technology, ethics, user education, and privacy-preserving tools [6].

[7] ***Consumer Behavior Impact of AI Data Capture***
Hiott (2023) covered regulatory frameworks, technical privacy tools including differential privacy and federated learning, and organizational practices aligned with the NIST Privacy Framework. The research gap centres on the mismatch between existing regulations and AI's evolving capabilities [7].

[8] ***Navigating the Privacy Paradox in a Digital Age***
Jones (2025) noted that generative AI has intensified the privacy paradox, with many consumers unaware of data collection practices. Existing U.S. regulatory frameworks are inadequate, and the EU's AI Act serves as a strong model for consumer privacy protection [8].

[9] ***Balancing AI Advancement and Data Protection***
Rajesh and Adapa (2024) examined AI advancement and data privacy, identifying risks such as data breaches and re-identification. They advocate for a multidisciplinary governance approach combining differential privacy, federated learning, and enhanced regulatory frameworks [9].

[10] ***AI-Driven Public Services and Privacy Paradox***
Willems et al. (2023) found that perceived usefulness of AI apps in Austrian public services increased willingness to use them, while required personal data sharing had little effect, demonstrating the privacy paradox in government contexts [10].

[11] ***Context-Contingent Privacy Concerns***
Herriger et al. (2025) systematically reviewed privacy concerns in the context of AI, AR, big data, and IoT, finding that awareness of data collection does not always result in protective measures. India's DPDPA 2023 remains largely unknown to Gen Z, highlighting a critical issue [11].

[12] ***Ethics of AI-Based Digital Marketing***
Saura et al. (2024) analysed 28 studies on AI ethics in digital marketing, identifying a data privacy paradox where collecting data enhances marketing yet violates user privacy. They proposed 21 future research questions facilitating user-privacy protected marketing strategies [12].

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[13] ***AI Production and Institutional Paradox***
Park surveyed 83 Silicon Valley AI professionals, demonstrating that the privacy paradox (great concern, low protective action) exists at the institutional level, not just among consumers. Future directions include longitudinal regulatory tracking and comparative U.S.–EU studies [13].

IV. RESEARCH GAP

While existing literature extensively documents the Privacy Paradox across general populations and examines AI-driven data collection, regulatory inadequacy, and online apathy in isolation, there is a notable absence of research specifically investigating how Generation Z in developing, non-Western contexts — particularly India — understands and responds to AI-based digital marketing practices. Most studies remain Western-centric and fail to account for low regulatory awareness such as India's DPDPA 2023, platform-specific behavioural patterns, and the role of digital resignation in shaping Generation Z's privacy decisions within an AI-driven marketing environment.

V. RESEARCH METHODOLOGY

This study employs descriptive and exploratory methods while adopting a quantitative approach to examine Generation Z's Privacy Paradox concerning AI-based digital marketing in Pune, India.

Using Google Forms, primary data was collected from 110 respondents through 20 close-ended questions via a structured online questionnaire with two sections. The first section measures Gen Z's level of awareness of AI-based data collection (Objective 1); the second examines the difference between their stated privacy concerns and actual online behaviour (Objective 2). The survey was designed to be completed within 5–7 minutes, and all responses were anonymous.

Secondary data comprised published academic journals collected via Google Scholar and Mendeley, reports from Pew Research Centre, Statista, and Deloitte Global Gen Z Survey 2023, and India's DPDPA 2023. Generation Z respondents comprised individuals aged 18–26 using at least one AI-based platform (e.g., Instagram, YouTube, Spotify, or Amazon). Respondents were selected via convenience sampling using WhatsApp, Instagram, and LinkedIn. Data was analysed using descriptive statistics, graphical representation through pie charts and bar graphs, and comparative analysis between awareness and behavioural responses.

VI. DATA ANALYSIS AND FINDINGS

The study received 110 responses. Key demographic details: 73.6% of respondents were in the target age range of 18–25 years, and 75.5% were students. Digital engagement was extraordinarily high, with 96.4% spending at least one hour daily online and 55.5% spending three or more hours.

Awareness of online behavioural tracking was universal — 100% of respondents were at least somewhat aware, and 98.2% knew their data was used for personalised advertisements. However, legal knowledge was significantly lacking: only 29.1% were fully knowledgeable about DPDPA 2023, and approximately 50% were unaware of their right to request data erasure.

The Privacy Paradox was clearly evident: only 17.3% read privacy notices before consenting, 30% accepted cookies without reading them, and 46.4% never opted out of personalised advertisements, despite 94.5% expressing concern over data usage. Over half (59.1%) felt they had no means to stop data collection, suggesting digital resignation rather than indifference. Ethical concerns around data collection were widespread — 45.5% disapproved of all four unethical practices identified — yet very little protective action was taken.

VII. KEY FINDINGS

1) Although the majority of Generation Z is aware that applications monitor their online activity, only a fraction read privacy agreements. Awareness of monitoring does not translate into protective action.

2) 30% of users accept all cookies without reading agreements, and 46.4% have never refused personalised ads. Convenience outweighs privacy intention because platforms make data sharing the path of least resistance.

3) India's DPDPA 2023 is known by only 29.1% of respondents, and 50% are unaware of their data deletion rights. Generation Z cannot exercise rights they do not know exist.

4) 62% of respondents are extremely or very worried about corporate data use, yet only 8% took protective action. Concern does not always translate into behaviour.

5) Digital resignation is evident, with 59% reporting feeling out of control despite awareness. The Privacy Paradox is rooted not in ignorance but in perceived inability to resist the system.

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6) 65% feel businesses do not provide sufficient data usage information, and only 1.8% would trust major websites with personal information. Despite distrust, platform dependency makes disengagement virtually impossible.

VIII. RECOMMENDATIONS

1) **Rights-Based Digital Literacy:** Teach Generation Z about their DPDPA 2023 rights — including data deletion requests, opting out of profiling, and lodging complaints — delivered through platforms they use (Instagram, YouTube) rather than government websites.
2) **Privacy by Default:** Platforms should provide data protection through default settings, prompting users to opt into data sharing. The EU's GDPR Privacy by Design framework serves as a model.
3) **Clear Consent Language:** Platforms must provide easy-to-read, one-page privacy policy explanations covering what is collected, why, who it is shared with, and retention duration.
4) **Transparency Dashboards:** Legal obligations should mandate real-time data access dashboards and annual user reports showing what data platforms hold and how it is used.
5) **Peer-Led Campaigns:** Demonstrate real-world impact of privacy behaviours — modifying app permissions, using private browsers, requesting account deletion — to rebuild Gen Z's digital self-efficacy.
6) **Strengthening DPDPA 2023:** Urgently establish the Data Protection Board, accessible grievance processes for youth, appropriate breach penalties, and amendments addressing AI-based behavioural profiling and mood-based inferences.

IX. CONCLUSION

The Privacy Paradox is real and measurable among Gen Z in Pune. While awareness of online tracking is at an all-time high (85%) and concern regarding data usage is significant (62%), very little protective action is taken — only 17.3% always read privacy policies, and 30% accept all cookies without reading them.

There is no lack of knowledge regarding the perils of privacy violations but rather a lack of ability to act upon that knowledge. Critically, 59% of participants do not feel empowered to achieve results, there is universal lack of trust in platforms, and a critical gap in legal literacy — only 29.1% are fully aware of their rights under DPDPA 2023.

Addressing this paradox requires regulatory intervention at the platform level with mandates including privacy by default, simplified consent language, and enforced transparency. Generation Z also requires accessible education related to their rights so they can act on their existing knowledge. Until individual privacy action is perceived as both achievable and meaningful, and until DPDPA 2023 is actively enforced, the gap between stated privacy concerns and actual protective behaviour will persist.

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A COMPARATIVE STUDY OF INDIA'S CYBER LAW AND DATA PROTECTION FRAMEWORK: IMPLICATIONS AND NEW INNOVATIONS

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ABSTRACT
With the fast-growing penetration of the Internet and digital technologies in India, the issue of security, privacy, and compliance with regulations has become more important than ever before. The current study aims to compare the Indian cyber law, as provided in the Information Technology Act, 2000, and India's data protection legislation, particularly the Digital Personal Data Protection Act, 2023. Specifically, the work is focused on evaluating the effectiveness and scope of implementation of both legislative documents. Furthermore, the comparison with the General Data Protection Regulation (GDPR) by the European Union will be performed to assess the country's readiness for alignment with the internationally established standards.

In addition, the innovations brought by the new legislation on data privacy will be discussed. They include, for example, the notion of consented data processing, data fiduciaries' requirements, and strengthened rights of users. By applying the methods of analysis of secondary data sources, the study intends to reveal some existing regulatory gaps, enforcement challenges, and issues associated with the insufficient institutional capacity. It is expected to conclude that despite the considerable achievements in improving the legislative background, additional efforts are needed for better policy coordination and implementation of technology solutions in this area.

Keywords: *Cyber Law in India, Information Technology Act, 2000,Digital Personal Data Protection Act, 2023,Data Privacy and Protection, General Data Protection Regulation (GDPR), Data Fiduciaries, Consent-Based Data Processing, Regulatory Compliance, Data Governance Framework, Enforcement Challenges*

INTRODUCTION
The rise of digitalization has dramatically changed the socio-economic paradigm in India, increasing the dependence on online interactions, financial operations, business deals, governmental processes, and communication. The implementation of projects like "Digital India" and an increase in the availability of smartphone technology have led to an exponential boost in internet usage among citizens. However, while being a crucial factor for socio-economic development, the rise of online operations in India also increased the risk of exposure to various kinds of cyber threats, ranging from hacking to identity theft.

The regulation of cyberspace is achieved through the use of the Information Technology Act of 2000, which is considered the most crucial cyber law in India. This piece of legislation gives legal recognition to online operations and transactions. At the same time, it focuses on defining types of cybercrimes and measures that can be used to combat those crimes. Despite multiple changes to the initial document, the growing complexity of modern data-driven societies showed the necessity to develop the legal framework for data protection with a specific focus on privacy issues.

In reaction, India passed the Digital Personal Data Protection Act, 2023, reflecting an important development towards the adoption of an all-inclusive data regime. This act focuses on the role of individuals' consent, accountability of data fiduciaries, and rights of data principals, thus bringing the Indian regulatory system closer to international standards. While the passage of this act is an important step in the right direction, there remain many issues pertaining to the alignment between the cyber law and data protection legislation, specifically in matters of jurisdiction, enforcement, trans border data flow, and institutional coordination.

The purpose of this study is to carry out a comparison between India's cyber law and its data protection regime, in order to explore the relationship between these two, as well as their advantages and disadvantages. In addition to that, the study will examine some recent developments in terms of legal provisions, their implications for relevant parties, and their significance**.**

LITERATURE REVIEW

1. **Mark Kendall (2000)** examined the early role of the Information Technology Act, 2000 in enabling e-commerce and legal recognition of electronic records in India.

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2. **Pavan Duggal (2001)** highlighted cybercrime challenges and limitations of India's initial cyber law framework.
3. **S. K. Verma (2004)** analyzed legal issues surrounding cyber jurisdiction and enforcement in India.
4. **Lawrence Lessig (2006)** emphasized regulation of cyberspace through law, code, and social norms, influencing global cyber law debates.
5. **Daniel J. Solove (2008)** explored privacy frameworks and the complexity of defining personal data protection.
6. **Paul Ohm (2010)** discussed risks of data re-identification, highlighting the limitations of anonymization.
7. **B. N. Srikrishna Committee Report (2018)** proposed India's first comprehensive data protection framework.
8. **Usha Ramanathan (2019)** critiqued Aadhaar and raised concerns about surveillance and privacy rights.
9. **Justice K. S. Puttaswamy Judgment (2017)** established the right to privacy as a fundamental right in India.
10. **European Union GDPR (2018)** set global standards for data protection, influencing Indian policy reforms.
11. **Douwe Korff (2023)** compared India's DPDP Act with GDPR, highlighting structural similarities and regulatory gaps
12. **Hanspal (2026)** critically reviewed the Digital Personal Data Protection Act, identifying enforcement challenges and government exemptions
13. **Kashyap (2024)** analyzed privacy evolution in India and emphasized the importance of safeguarding digital rights
14. **Dharod & Tauro (2025)** conducted a comparative study between GDPR and DPDP Act, identifying alignment and shortcomings
15. **Seetharamu et al. (2024)** reviewed global data protection laws and suggested improvements in India's framework
16. Studies on IT Act (2000) indicate that Section 43A introduced corporate liability for data breaches but lacked comprehensive coverage
17. Research shows that India's data protection framework evolved from sectorial rules to a unified law with the DPDP Act
18. Comparative legal studies highlight GDPR as a benchmark influencing Indian legislation
19. Literature on AI and cyber law indicates emerging challenges like deep fakes and algorithmic bias in legal enforcement.
20. Studies on Blockchain and GDPR reveal conflicts between immutability and the "right to be forgotten."
21. Research on digital governance emphasizes the importance of consent-based data processing models.
22. Scholars argue that India's cyber law framework lacks coordination between different regulatory bodies.
23. Literature highlights issues of cross-border data transfer and data localization policies.
24. Studies emphasize the need for stronger enforcement mechanisms and independent regulatory authorities.
25. Recent research suggests integrating AI-driven compliance systems to enhance data governance under DPDP frameworks.

Research Gap

1. Insufficient integration of data protection (DPDP Act, 2023) with cyber legislation (IT Act, 2000).
2. There aren't many empirical research on how well India's enforcement methods work.\
3. There is not enough study on how cybercrime laws and data privacy policies work together.
4. In the Indian setting, cross-border data transfer policies are unclear.

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5. Very little research has been done on the DPDP Act's practical implementation issues.
6. There aren't many comparative studies that concentrate on innovation-related topics (AI, Blockchain, big data).
7. Absence of analysis based on stakeholders (companies, users, government agencies).
8. Legal uncertainty and regulatory overlap are not given enough attention.
9. There are few studies on how data privacy regulations affect SMEs and start-ups.
10. Lack of a single framework combining data privacy and cyber security regulations.

Problem Statement

Significant worries about data security, privacy, and regulatory compliance have been brought up by the quick development of digital technology in India. The Information Technology Act of 2000 exists, however it does not contain comprehensive safeguards to handle contemporary data protection issues. The introduction of the Digital Personal Data Protection Act, 2023 marks a significant step forward, yet questions remain about its effectiveness and implementation. Additionally, gaps persist when compared with global standards such as the General Data Protection Regulation. These challenges highlight the need to critically evaluate India's cyber and data protection framework to ensure robust enforcement and alignment with international best practices.

Objectives of the study

1. To analyze India's cyber law framework under the IT Act, 2000.
2. To examine the provisions of the Digital Personal Data Protection Act, 2023.
3. To compare cyber law and data protection frameworks in India.
4. To evaluate the effectiveness of existing legal provisions in addressing cyber threats.
5. To identify key challenges in implementation and enforcement.
6. To compare India's framework with international standards like GDPR.
7. To assess recent innovations in data protection and cyber regulation.
8. To suggest improvements for strengthening India's legal framework.

Hypothesis

Null Hypothesis (H_0):

There is no significant difference between India's cyber law framework and its data protection framework in terms of effectiveness and regulatory impact.

Alternative Hypothesis (H_1):

There is a significant difference between India's cyber law framework and its data protection framework in terms of effectiveness, scope, and regulatory impact.

Research Methodology

The present study follows a doctrinal research methodology that involves secondary data. In this regard, the study mainly focuses on analysing the legislative framework such as the Information Technology Act, 2000, and Digital Personal Data Protection Act, 2023. Apart from that, a comparative study is conducted by taking the General Data Protection Regulation into consideration.

Secondary data such as government publications, legal articles, case laws, and research papers can be gathered for data collection. It is essential to conduct a comparative analysis to highlight the similarities and dissimilarities between the data protection rules in India and the rest of the world.

It is further important to adopt a qualitative analysis research design to evaluate the effectiveness of regulations and highlight issues relating to implementation. In addition to that, the study also adopts an interpretive research strategy to define crucial concepts such as data fiduciaries, consent-based data processing, and users' rights in the newly proposed act.

Scope of the study

1. This paper discusses the development and application of Indian cyber law as per the Information Technology Act, 2000 and its significance in today's time.

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2. It will discuss the importance and working of the Digital Personal Data Protection Act, 2023 in securing data privacy and protection.
3. There will be a comparison between India's legal framework and the General Data Protection Regulation to analyze how well it aligns globally.
4. Issues regarding data privacy, consent frameworks, data fiduciaries, and user rights will be analysed from an Indian perspective.
5. This paper will be based entirely on secondary data sources including legal documents, scholarly articles, and policy briefs.

Challenges of the study

1. The paper depends exclusively on secondary data, which could hinder access to current enforcement practices.
2. Rapid advancement of technology makes it hard to gauge the effectiveness of the act in the future.
3. Insufficient numbers of case law analysis due to the recent introduction of the act makes it hard to conduct a detailed study.
4. Incorporating India's data protection regime in comparison with GDPR requires differentiating the context in which the regimes are evaluated.
5. Different levels of institutional capability across jurisdictions pose interpretation challenges.

FINDINGS AND RECOMMENDATIONS

Findings

1. The Information Technology Act 2000 offers fundamental cyber laws but cannot address current data privacy issues.
2. Digital Personal Data Protection Act 2023 has improved user rights, consent procedures, and accountability for data fiduciaries.
3. However, there are still challenges in terms of enforcement and preparation for compliance.
4. The legal framework in India has improved but has not yet reached the standards set by GDPR.
5. There is a lack of awareness on the part of users regarding their digital rights and privacy.

Recommendations

1. Strengthen institutional and regulatory bodies to ensure effective enforcement of data protection laws.
2. Enhance public awareness programs on digital privacy rights and consent mechanisms.
3. Improve coordination between cybersecurity agencies and data protection authorities.
4. Introduce clearer guidelines for cross-border data transfers and compliance standards.
5. Encourage periodic updates to cyber laws to keep pace with technological advancements.

CONCLUSION

The research finds out that India has achieved substantial development regarding enhancing its cyber laws and data protection regime through two acts: the Information Technology Act, 2000 and the Digital Personal Data Protection Act, 2023. But there are still various issues in the form of enforcement difficulties and capacity issues. Although the data protection regime is aligned gradually with international frameworks like GDPR, further reforms will be required to guarantee effective data protection in India.

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A STUDY ON THE CORRELATION BETWEEN INVESTMENT DECISIONS AND FINANCIAL LITERACY"

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ABSTRACT

Financial literacy is a factor that inspires people to make informed investment decisions in the modern, more complex financial environment. This study tries to understand the relationship that exists between financial literacy and the decision-making on investment by individual investors. In this regard, this study will try to assess the levels of financial knowledge and further analyse its impact on investment choices, risk perceptions, and diversification of portfolios. The required primary data were collected from 60 individual investors with the help of a structured questionnaire through convenience sampling. Percentage analysis, tables, and charts were used for interpreting data. The results tend to indicate a positive relationship of high significance between financial literacy and quality investment decisions. Investors who had higher financial literacy showed better risk–return trade-offs and preferred diversified investment portfolios with great confidence in long-term financial planning. On the other hand, investors with low financial literacy relied on traditional and low-risk instruments such as fixed deposits and savings accounts, resulting in constrained returns. This thus calls for enhanced education and awareness programs to be conducted in order to strengthen investor decision-making and financial well-being. Improved financial literacy may hence result in more knowledgeable investment behaviour and contribute to sustainable financial growth.

Keywords: *Financial Literacy, Investment Decisions, Individual Investors, Risk Perception, Investment Behaviour, Portfolio Diversification, Financial Awareness, Retail Investors.*

INTRODUCTION

In the contemporary financial ecosystem, individuals are being increasingly expected to make vital investment decisions that will ensure their financial security in the future. An investment decision entails the selection of appropriate financial instruments, including savings schemes, fixed deposits, mutual funds, equities, bonds, and other market-linked instruments. The quality of such decisions greatly relies on the level of one's financial literacy. Financial literacy encompasses the understanding and grasp of simple financial concepts such as risk and return, inflation, interest rates, diversification, and financial planning.

The correlation between financial literacy and investment decisions has, of late, become a hot issue of intense debate among researchers, policymakers, and financial institutions. Persons with a higher degree of financial literacy are much more likely to appraise investment alternatives more rationally, apply an appropriate assessment of risk, and fit investments into long-run financial strategies. On the other hand, investors with low financial knowledge typically consult unofficial advice, are averse to risk, and favour traditional, low-return investment avenues. Such attitudes and behaviour may result in restricted creation of wealth and financial growth in the long term.

Understanding the proper relationship between financial literacy and investment decisions is important for ensuring active, informed participation in financial

LITERATURE REVIEW

1. **Lusardi and Mitchell (2011)** highlighted that financial literacy is a key determinant of sound financial decision-making. Their study revealed that individuals with higher financial knowledge are more likely to plan investments effectively and participate in financial markets.
2. **Van Rooij, Lusardi, and Alessie (2012)** found a strong positive relationship between financial literacy and stock market participation. Financially literate individuals were more confident in making investment decisions involving higher risk and return.
3. **Agarwal et al. (2015)** observed that lack of financial literacy leads to costly financial mistakes. Their research emphasized that informed investors make better investment choices and avoid poor financial products.
4. **Aren and Zengin (2016)** studied behavioral finance and concluded that financial literacy reduces the influence of emotional and psychological biases on investment decisions.
5. **Rooij and Lusardi (2014)** reported that individuals with higher financial literacy tend to diversify their investment portfolios, which helps in minimizing risk and improving returns.

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6. **OECD (2018)** emphasized that financial literacy enhances individuals' ability to understand financial risks and rewards, leading to more rational investment decisions and improved financial well-being.
7. **Klapper, Lusardi, and van Oudheusden (2015)** found that low financial literacy is a major barrier to investment participation, especially in developing economies, resulting in limited wealth creation.
8. **Goyal and Kumar (2021)** studied Indian retail investors and found that financial literacy significantly influences investment awareness, risk tolerance, and choice of financial instruments.
9. **Bhushan and Medury (2014)** revealed that financially literate investors prefer market-linked instruments such as mutual funds and equities, while less literate investors prefer traditional savings options.
10. **Sadiq and Khan (2019)** highlighted that investors with better financial knowledge are more likely to rely on fundamental analysis rather than rumors or peer influence while investing.
11. **Sivaraman and Bhuvaneswari (2020)** found that financial literacy improves long-term investment orientation and retirement planning among individual investors.
12. **Raut (2020)** emphasized that financial literacy positively affects investors' risk perception and decision confidence, resulting in improved investment satisfaction.
13. **Al-Tamimi and Kalli (2009)** concluded that financial literacy is one of the most important factors influencing investment decisions in financial markets.
14. **Mahdzan and Tabiani (2013)** observed that investors with higher financial literacy are more likely to invest in sophisticated financial products and manage risk efficiently.
15. **Sekita (2011)** reported that financially literate individuals make better investment timing decisions and show improved portfolio performance.
16. **Kumar, Tomar, and Verma (2022)** found a statistically significant correlation between financial literacy and investment behavior among young investors in emerging markets.
17. **Sharma and Gupta (2023)** highlighted that digital financial literacy further strengthens investment decision-making in the era of online trading and fintech platforms.
18. **Lusardi, Michaud, and Mitchell (2017)** concluded that improving financial literacy can lead to better lifetime investment outcomes and reduced financial vulnerability

Statement of the Problem

Due mostly to a lack of financial literacy, many individual investors make decisions that are not in line with their financial objectives or risk tolerance despite the availability of information and investment instruments. Investing poorly can lead to reduced profits, increased risk, and financial strain. The study looks into whether making better investing selections is correlated with increased financial literacy.

Objectives of the Study

1. To assess the level of financial literacy among individual investors.
2. To examine how financial literacy influences investment decisions.
3. To identify common investment behaviours among financially literate and illiterate investors.
4. To suggest strategies to improve investment outcomes through financial education.

Scope of the study

The study's scope is restricted to comprehending the connection between individual investors' financial literacy and investing decision-making. The study's main objective is to evaluate students' fundamental understanding of risk, return, diversification, and investment options such savings accounts, fixed deposits, mutual funds, and equity instruments. It examines how financial literacy affects investors' perceptions of risk, long-term financial planning, and investment choices across a certain geographic area. Financial institutions, educators, and legislators can use the results to create successful financial literacy initiatives and enhance investment results.

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RESEARCH METHODOLOGY

Type of Study

The study is **quantitative-descriptive in nature**, aiming to analyze existing literature and empirical findings related to financial literacy and investment decisions. It focuses on identifying patterns, relationships, and correlations reported in previous studies.

Nature of Data

The data used in this study is qualitative and quantitative secondary data, including:

- Financial literacy index studies
- Investor behaviour surveys
- Investment pattern reports
- Empirical findings on correlation between literacy and financial decisions

Data Collection Tool

The study relies exclusively on secondary sources of data, which include:

- Academic journals and research articles
- Books on behavioural finance and investment management
- Reports published by RBI, SEBI, World Bank, OECD, and NSE
- Working papers and conference publications

The collected secondary data is analysed using:

- **Content analysis** (to interpret findings from literature)
- **Comparative analysis** (to compare results across different studies)
- **Thematic analysis** (to identify recurring patterns such as risk tolerance, investment awareness, and decision biases)

Where available, reported statistical results (correlation, regression outputs, and significance levels) from prior studies are synthesized for interpretation..

Research Approach

The study follows an **integrative literature review approach**, synthesizing multiple empirical and theoretical studies to derive a consolidated understanding of the correlation between financial literacy and investment decision-making.

Scope of the study

The study focuses on:

- Individual investors (retail investors)
- Relationship between financial literacy levels and investment preferences
- Behavioural aspects influencing investment decisions (risk, returns, diversification, etc.)
- Studies conducted in both Indian and global contexts

Limitations of the study

- The study is based only on secondary data; no primary survey is conducted.
- Differences in methodologies across referenced studies may affect comparability.
- Availability of updated and region-specific financial literacy data may be limited.
- Findings depend on the accuracy and reliability of published sources.

FINDINGS AND SUGGESTIONS

Findings

1. The study finds a **positive correlation between financial literacy and rational investment decisions**, where financially literate individuals are more likely to make informed and diversified investment choices.

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2. It is observed that individuals with higher financial literacy show a **greater preference for market-linked instruments** such as mutual funds and equities compared to low-literacy investors who prefer traditional savings options.
3. Financial literacy significantly influences **risk assessment and risk tolerance**, leading to more balanced and less impulsive investment behaviour.
4. The study indicates that low financial literacy often results in poor investment decisions, over-reliance on informal advice, and susceptibility to market misinformation.
5. Digital financial awareness and exposure to financial education programs are found to improve investment confidence and participation in formal financial markets.
6. Behavioural biases such as herd behaviour and overconfidence are reduced among financially literate investors, leading to more stable portfolio decisions.

Suggestions

1. Financial education programs should be **integrated into school and college curricula** to build strong foundational financial knowledge from an early stage.
2. Government and regulatory bodies such as SEBI and RBI should **expand investor awareness campaigns** focusing on safe and informed investment practices.
3. Financial institutions should provide **simplified and accessible investment education tools** to help retail investors understand financial products better.
4. Special focus should be given to **rural and semi-urban populations**, where financial literacy levels are comparatively lower.
5. Digital platforms and FinTech applications should incorporate **user-friendly educational content and risk indicators** to guide investment decisions.
6. Regular financial literacy workshops and training programs should be conducted to **reduce misinformation and improve investment decision quality** among investors.

CONCLUSION

Financial literacy is a significant aspect which is highly related to effective and rational investment behaviour. Higher financial literacy is associated with a greater awareness of financial services and better risk analysis leading to better diversification. Lower levels of financial literacy can cause uninformed decisions and even vulnerability to behavioural biases in the form of herd behaviour and excessive confidence.

The research shows that people with better financial literacy feel more comfortable when investing into formal finance systems, and are not affected by various behavioural biases. Hence, financial literacy is critical for making high-quality investments and enjoying economic well-being. It follows from the above discussion that there should be enhanced measures aimed at fostering financial literacy programs.

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AN EMPIRICAL STUDY: ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING DIGITAL LITERACY AND SKILL DEVELOPMENT

Girisha Anil Sidhwani

ABSTRACT

This empirical study examines the role of Artificial Intelligence (AI) in enhancing digital literacy and skill development in the modern technological era. With the rapid integration of AI-driven tools across education, business, and daily life, the need for advanced digital competencies has become increasingly important. The study focuses on how AI-powered platforms, such as adaptive learning systems, virtual assistants, and personalized training applications, contribute to improving individuals' digital knowledge and skill sets.

Primary data has been collected through structured questionnaires targeting students and working professionals to assess their interaction with AI-based tools and its impact on their learning outcomes. The findings indicate that AI significantly enhances accessibility, personalization, and efficiency in learning processes, thereby improving digital literacy levels. Furthermore, AI facilitates continuous skill development by offering real-time feedback, customized content, and self-paced learning opportunities.

However, the study also highlights challenges such as lack of awareness, digital divide, and concerns related to data privacy and over-reliance on technology. The research concludes that while AI plays a transformative role in strengthening digital literacy and skills, effective implementation, proper training, and policy support are essential to maximize its benefits. The study provides valuable insights for educators, policymakers, and organizations aiming to integrate AI into learning and development frameworks.

Keywords

- *Artificial Intelligence*
- *Digital Literacy*
- *Skill Development*
- *Adaptive Learning*
- *E-Learning*
- *AI-based Tools*

INTRODUCTION

Amid the age of technological advancement, Artificial Intelligence (AI) is one area that is transforming industries in various ways. Education and training are some of the sectors in which this transformation is evident because there are many technological changes in the environment that require people to have digital literacy. Intelligent tutoring systems, virtual assistants, and personalized learning programs are among the technologies that make learning easy.

Digital literacy is not only about the use of computer skills; it involves accessing information through technology, analysing, and utilizing the information. AI technologies play a vital part in the improvement of digital literacy by facilitating personalized and continuous learning among other functions. Also, the use of AI makes it possible to acquire new skills continuously and easily.

The empirical paper is meant to explore the influence of AI on the development of digital literacy skills. The study will seek to identify various aspects that contribute to this problem, such as barriers to AI implementation in learning environments. There will be exploration of issues such as the effect of technology on learning results, the digital divide, data privacy, and others.

LITERATURE REVIEW

1. **Russell & Norvig (2016)** explained that Artificial Intelligence enables machines to simulate human intelligence, forming the foundation for AI-based learning systems.
2. **Luckin et al. (2016)** highlighted that AI in education enhances personalized learning by adapting content to individual learner needs.
3. **Holmes et al. (2019)** emphasized the role of AI in transforming traditional education systems through intelligent tutoring and automation.

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4. **Brynjolfsson & McAfee (2017)** discussed how AI is reshaping skill requirements in the digital economy, increasing demand for digital literacy.
5. **UNESCO (2018)** stressed the importance of digital literacy as a key competency in the 21st century and recognized AI as a supporting tool.
6. **Ng (2017)** pointed out that AI-driven platforms improve accessibility and efficiency in education and training.
7. **Woolf (2010)** identified intelligent tutoring systems as effective tools for enhancing student engagement and performance.
8. **Chen et al. (2020)** found that AI-based learning systems significantly improve students' digital skills and problem-solving abilities.
9. **Zawacki-Richter et al. (2019)** conducted a systematic review showing that AI applications in education focus on adaptive learning and analytics.
10. **OECD (2021)** reported that AI plays a crucial role in bridging skill gaps and promoting lifelong learning.
11. **Bawack et al. (2021)** examined the adoption of AI technologies and highlighted challenges such as lack of awareness and infrastructure.
12. **Popenici & Kerr (2017)** discussed both opportunities and ethical concerns of AI in higher education.
13. **Selwyn (2019)** argued that digital literacy must evolve alongside AI advancements to ensure effective technology use.
14. **Sharma & Gupta (2022)** found that AI tools positively impact students' learning outcomes and digital competence in developing countries.
15. **Kumar et al. (2021)** highlighted the role of AI in enhancing e-learning platforms through automation and personalization.
16. **World Economic Forum (2020)** emphasized the importance of reskilling and upskilling in the age of AI.
17. **Dwivedi et al. (2021)** analyzed the impact of AI adoption on education systems and workforce development.
18. **Bond et al. (2020)** identified learning analytics powered by AI as a key factor in improving student performance.
19. **Joshi et al. (2023)** observed that AI-based applications significantly enhance digital literacy among youth.
20. **Singh & Rana (2022)** concluded that AI integration in education improves both technical skills and employability prospects.

Problem statement

1. Although AI is increasingly being adopted in education, very little is known about the effectiveness of AI in promoting digital literacy amongst students and professionals.
2. Most people do not possess the digital literacy needed to maximize their potential in using AI systems, which results in a disparity between technological innovation and user capacity.
3. The availability of AI-powered learning systems is highly inconsistent, thus resulting in the existence of a digital divide, particularly in less developed parts of the world.
4. Not enough research has been done regarding how AI facilitates sustained skills development and learning.
5. Security issues, ethical issues, and technology dependence are major challenges for AI utilization.
6. Current studies tend to concentrate more on theory than practice when it comes to AI systems.

Research Gap

1. Despite the existence of multiple researches concerning the use of Artificial Intelligence in educational settings, little attention has been paid to its effects on developing digital literacy skills among various users.

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2. Most of the existing research literature concentrates on the theoretical aspects and technological innovation in the sphere; meanwhile, few empirical researches have been conducted regarding practical results produced by AI-based educational technologies.
3. Insufficient comparative research concerning the influence of AI on the development of skills among various groups of people, such as students, professionals, or citizens of rural or urban areas, can be found.
4. The significance of Artificial Intelligence for the promotion of lifelong learning has not been sufficiently studied, especially taking into account the changing needs of digital skills.
5. Little research concerns the problems of the implementation of AI, for instance, the problem of data security and privacy, the digital divide, and technological access**.**

Objectives of the study

1. To examine the role of Artificial Intelligence in enhancing digital literacy among individuals.
2. To analyze the impact of AI-based tools on skill development and learning outcomes.
3. To identify the level of awareness and usage of AI technologies among students and professionals.
4. To evaluate the effectiveness of AI-driven learning platforms in improving digital competencies.
5. To explore the challenges and barriers associated with the adoption of AI in digital learning.
6. To provide suggestions for improving the implementation of AI in education and skill development systems.

Hypothesis

H0: Artificial Intelligence does not have a significant role in enhancing digital literacy, skill development, learning outcomes, awareness, or digital competencies; there is no significant difference in awareness and usage of AI technologies among students and professionals; and AI implementation strategies do not significantly affect learning effectiveness, accessibility, or the adoption of AI in digital learning.

H1: Artificial Intelligence has a significant positive role in enhancing digital literacy among individuals.

H2: AI-based tools have a significant positive impact on skill development and learning outcomes.

H3: There is a significant difference in the level of awareness and usage of AI technologies among students and professionals.

H4: AI-driven learning platforms are effective in improving digital competencies among users.

H5: There are significant challenges and barriers affecting the adoption of AI in digital learning.

H6: Improved implementation strategies of AI in education and skill development systems significantly enhance learning effectiveness and accessibility.

Research Methodology

This study is based on **secondary data analysis** to examine the role of Artificial Intelligence in enhancing digital literacy and skill development. The research relies on existing literature, reports, and documented evidence to draw meaningful conclusions.

Research Design

The study adopts a **descriptive and analytical research design**, focusing on interpreting existing data and identifying patterns, relationships, and trends related to AI and digital learning.

Data Sources

The data has been collected from reliable secondary sources, including:

Research papers and academic journals.

Government and institutional reports (e.g., education and technology reports)

Publications from international organizations.

Books, articles, and credible online databases.

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Data Collection Method
Relevant data is gathered through **systematic review of literature**, selecting sources that are recent, relevant, and aligned with the objectives of the study.

Data Analysis Techniques
The collected data is analysed using **qualitative analysis**, comparative methods, and content analysis to identify key themes, trends, and insights regarding AI's impact on digital literacy and skill development.

Scope of the study
1. This study is aimed at analysing the role played by artificial intelligence in improving digital literacy and skills among learners.
2. It is bound within the limits of secondary data analysis, where research papers, articles, and other publications will be used for data analysis.
3. Scope of study includes the use of artificial intelligence in learning environment in general and e-learning in particular, as well as skill training courses for working professionals.
4. Study scope includes data that pertains to the use of technology by students, educators, working professionals, etc. analyses important issues like accessibility, effectiveness, and personalization of AI-based learning resources.
6. Digital Divide is another issue analysed in this study along with ethical implications involved in AI.
7. The data collected through this study can be generalized in nature.

LIMITATIONS OF THE STUDY
1. All data for this study comes from secondary sources, which means that its accuracy and reliability might be compromised by its reliance on available materials.
2. This study lacks primary data collection through surveys and other means, which would have been useful to give a clearer understanding of the topic.
3. The availability of recent data about Artificial Intelligence and digital literacy is questionable.
4. The findings of this study might be biased because of the previous studies' findings on which it is based.
5. The study does not concentrate on any specific geographic area.
6. Due to rapid progress in technology, particularly in the field of Artificial Intelligence, some findings may become irrelevant.

In terms of the study, the technicalities of AI tools are not considered.

FINDINGS AND SUGGESTIONS

Findings
1. Artificial Intelligence has a very positive influence on improving the level of digital literacy because it makes learning processes interactive, easy, and accessible.
2. AI-based technologies like adaptive learning systems and virtual assistants help improve skills due to personalized educational experience.
3. Implementation of artificial intelligence in the process of studying is an important factor contributing to the improvement of the effectiveness of studying.
4. Increasing awareness and usage of AI tools among students and employees is observed, but some gaps can be found in the developing countries.
5. Some barriers include problems with the digital divide, technological gaps, as well as low levels of technical knowledge.
6. Moreover, data security concerns are important obstacles for using AI tools properly.

Suggestions
1. AI tools should be included within the curriculum in educational institutions in order to improve digital skills.
2. Efforts need to be made on the part of the government and policymakers in order to reduce the digital gap.

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3. Awareness camps and training workshops can be held in order to educate people about how to use these tools effectively.
4. Measures should be taken in order to protect user privacy and security.
5. Up skilling and reskilling efforts should continue in order to keep up with AI-based changes.
6. Further research needs to be done through primary data collection in order to achieve better results.

CONCLUSION

The research under analysis clearly emphasizes the power of AI in increasing the ability to become digitally literate and develop skills. Thanks to the use of AI-powered tools, the learning process becomes easier and more personalized, which allows one to obtain knowledge in a more effective way. Based on the results of the analysis, it is possible to conclude that AI does not just facilitate gaining new knowledge but helps develop skills necessary to stay flexible and constantly learn new information.

Nevertheless, there are some issues such as the digital divide, absence of proper awareness among people, infrastructural problems, and concerns related to data security that should be taken into account.

In conclusion, the research demonstrates the great power of AI in developing digital literacy and skills. At the same time, the effective use of technologies depends on the collaboration between various stakeholders involved in the educational process.

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A STUDY ON GLOBAL FOREX MARKET DYNAMICS AND THEIR IMPACT ON EMERGING ECONOMIES

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ABSTRACT
The global foreign exchange (forex) market, the largest and most liquid financial market, plays a pivotal role in shaping the economic stability of nations. Driven by factors such as interest rate differentials, inflation trends, geopolitical developments, and capital flows, forex market dynamics significantly influence currency valuations and cross-border financial movements. In the context of increasing globalization and financial integration, emerging economies have become more exposed and vulnerable to fluctuations in the forex market. These economies rely heavily on foreign capital, exports, and external borrowing, making them highly sensitive to changes in major global currencies, particularly the U.S. dollar.

The study highlights how global financial cycles and monetary policy shifts in advanced economies are transmitted to emerging markets through channels such as capital flows, credit availability, and investment patterns. Volatility in exchange rates can lead to inflationary pressures, reduced output, and financial instability. Although emerging economies are expected to contribute significantly to global economic growth, they remain susceptible to external shocks and uncertainties. The paper concludes that effective exchange rate management, sound macroeconomic policies, and robust financial frameworks are essential for mitigating risks and ensuring sustainable economic growth in emerging economies.

Keywords: *Global Forex Market, Emerging Economies, Exchange Rate Volatility, Capital Flows, Economic Growth, Financial Stability, Monetary Policy, Globalization*

INTRODUCTION
The global foreign exchange (forex) market plays a central role in the functioning of the international financial system by facilitating the exchange of currencies and enabling cross-border trade and investment. As the largest and most liquid financial market in the world, the forex market operates continuously and is influenced by a wide range of factors, including interest rates, inflation, geopolitical events, and macroeconomic policies. These dynamic forces determine exchange rate movements, which in turn affect global economic stability and financial integration.

In the era of globalization, emerging economies have become increasingly interconnected with global financial markets. This integration has enhanced their access to foreign capital, technology, and trade opportunities. However, it has also made them more vulnerable to external shocks originating from fluctuations in the forex market. Exchange rate volatility can significantly impact key economic indicators such as inflation, balance of payments, foreign reserves, and economic growth in these economies.

Moreover, changes in monetary policy in developed countries, especially in major economies like the United States, often lead to capital flow volatility in emerging markets. For instance, an increase in interest rates in advanced economies can trigger capital outflows from emerging economies, leading to currency depreciation and financial instability. On the other hand, favourable global conditions can attract foreign investment, boosting growth prospects.

This research aims to analyse the dynamics of the global forex market and examine their impact on emerging economies. It seeks to understand the transmission mechanisms through which exchange rate fluctuations influence economic performance and to evaluate policy measures that can help mitigate associated risks. By doing so, the study contributes to a better understanding of how emerging economies can achieve sustainable growth in an increasingly interconnected global financial environment.

REVIEW OF LITERATURE
- According to Torsten Ehlers, E. Takáts, Neuroplasticity is the term used for the brain's capacity for reorganization through the creation of new neural links throughout life. This is especially true during early childhood when synaptic pruning and myelination are in full swing. Studies have confirmed that environmental stimulation and learning experiences directly affect the thickness of the cortex as well as the pattern of dendritic branching. Other studies using functional magnetic resonance imaging have confirmed the neuroplasticity of even adult brains as a means of recovery from injury as well as the capacity for new skills. The neuroplasticity model is particularly relevant for both educational psychology and rehabilitation medicine. (Torsten Ehlers, 2013)

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- In their research, Duffuor et al. (2012) discuss the effect of order flow on the determination of exchange rates in developing countries. According to the literature, order flow plays an essential role in exchange rate determination by providing significant information related to market sentiments. As per the findings of the research, order flow effects are higher for developing countries as compared to developed countries because developing countries are less efficient markets than developed ones. Moreover, the research points out that both microstructure determinants and macro-fundamentals are involved in the exchange rate process. (Duffuor K. M., 2012)
- According to Dietrich Domanski, E. Kohlscheen, Ramon Moreno The body of literature concerning foreign exchange intervention in emerging economies has undergone significant changes since the Great Financial Crisis. The article notes that financial stability has become an important motive for intervention owing to higher levels of debt in dollars and greater connectivity with international financial markets. This research expands the previous knowledge by demonstrating that effective foreign exchange interventions improve market liquidity and lower volatility. Moreover, the contribution of this article to the body of literature lies in highlighting the advantages of credibility associated with holding foreign exchange reserves, especially when credit ratings of a country are poor. Nevertheless, the cost of reserve accumulation is growing, meaning that highly-rated countries will decrease their reserves. (Dietrich Domanski, 2016)
- This particular study conducted by A. N. Özker adds to the existing knowledge base regarding the relationship between the impact of developed world market on GDP per capita of developing countries. This study expands the previous body of knowledge that has been accumulated on the connection between globalization and economic growth, focusing on the effects of capital flow, trade connections, and financial shocks. This research adds to the existing body of knowledge that income levels and economic growth of developing countries are influenced by shocks and variations in developed world markets. (ÖZKER, 2025)
- In essence, the study carried out by Aftab, Ali, and Hegerty (2021) is built upon previous research that studies the correlation between exchange rates and stock market returns with special attention being paid to emerging economies. The previous research underscores the significance of changes in exchange rates in terms of affecting stock market returns due to competition and capital flow. The current study takes previous findings further by integrating the theory of EMP. By using more sophisticated econometric models, the researchers reveal a significant negative relationship between EMP and stock market returns as well as bidirectional causality for several Asian countries. The findings of the study concur with those of previous research, emphasizing greater financial linkages in small emerging economies in comparison to large economies such as China and India. (Aftab, 2021)
- The research conducted by Prates and Cintra (2008) looks at the effect of the 2008 world financial crises on emerging economies and takes into account the effects arising due to global financial arrangements. The authors note that, despite having minimal direct linkages with the toxic assets, the crisis affected emerging economies through capital flight and "flight to quality." According to the research, the highly asymmetrical international financial system was responsible for exacerbating foreign exchange fluctuations and financial instability. The authors also observe that the adoption of normal policies such as accumulating reserves and following sound macroeconomic policies could not protect these emerging economies from global disturbances. (Prates, 2008)
- This work by B. Yassine (2023) addresses the changing structure of the global foreign exchange market with a focus on current developments and changes. Among other things, the role of advanced technology, automation, and fintech is emphasized as a driving force behind market efficiency and velocity improvements. At the same time, the domination of the US dollar and other major currencies, along with the increased participation of emerging economies, remains an important factor. Another aspect mentioned in the work is the impact of geopolitical risks and financial globalization, which contributed to higher exchange rate volatility. (Yassine, 2023)

Research Gap:

Most of the previous studies conducted on the dynamics of the international foreign exchange markets are based on secondary data and use only macroeconomic measures without considering survey-based analysis. There is an evident need for further investigation regarding the level of financial knowledge and awareness that individuals possess about forex-related concepts, especially exchange rates and bid-ask spread. Furthermore, the behavioral perception of people from developing countries has been left unexplored in most studies conducted on this topic. The presented data indicates a discrepancy between theory and practice, and

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this aspect requires further exploration in existing literature.

Research objective:

- To examine the effects of the foreign exchange dynamics on emerging nations in the global market.
- To assess the extent of knowledge regarding the foreign exchange markets of the individuals being surveyed.
- To establish the link between the fluctuations in the exchange rates and macro-economic elements like inflation, trade, and investments.
- To pinpoint the deficiencies in financial education concerning the foreign exchange markets.
- To offer recommendations for increasing knowledge and policy effectiveness in emerging nations.

Research Hypothesis:

1. **H_{01}:** Global forex market dynamics have no significant impact on the economic performance of emerging economies.

H_{11}: Global forex market dynamics have a significant impact on the economic performance of emerging economies.

2. **H_{02}:** Exchange rate volatility does not significantly affect the trade balance of emerging economies. **H_{12}:** Exchange rate volatility significantly affects the trade balance of emerging economies.
3. **H_{03}:** Forex market fluctuations do not significantly influence capital flows in emerging economies. **H_{13}:** Forex market fluctuations significantly influence capital flows in emerging economies.

RESEARCH METHODOLOGY

This research is based on descriptive and analytical methodology, which analyses the influence of the foreign currency market environment on developing countries. The study used both primary and secondary sources of information where primary information was obtained using a pre-designed questionnaire that was distributed to participants using an online survey. Secondary sources of information included financial sources from the IMF, World Bank, and RBI and academic journals and books. Convenience sampling method was used, while analysis of information was done using statistics like percentages, tables, and graphs.

Data analysis and interpretation

The study is based on primary data collected through a structured questionnaire from **65 respondents**. The responses were analyzed using frequency and percentage methods to evaluate the impact of global forex market dynamics on emerging economies.

1. Role of the Global Forex Market in Economic Growth

- **81.54%** of respondents agreed that the global forex market facilitates international trade, investment, and capital flows.
- **16.92%** disagreed, while **1.54%** provided mixed responses.

Interpretation

This indicates a strong consensus that the forex market is essential for economic development, particularly in emerging economies that rely heavily on international trade and foreign investments.

2. Impact of Currency Depreciation on Inflation

- **72.31%** agreed that currency depreciation increases import costs and inflation.
- **24.62%** disagreed, and **3.08%** had mixed opinions.

Interpretation:

The majority recognizes the direct relationship between exchange rate fluctuations and inflation, highlighting the vulnerability of emerging economies to currency volatility.

3. Exchange Rate Stability and Economic Growth

- **36.92%** agreed that stable exchange rates promote growth.
- **40%** selected "Maybe," reflecting cautious optimism.
- **13.85%** chose "All of the above," and **9.23%** disagreed.

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Interpretation:
While most respondents acknowledge the importance of exchange rate stability, some uncertainty exists due to fluctuating global economic conditions.

4. Impact of High FDI Inflows

- **36.92%** identified technology transfer and job creation as the primary benefits.
- **27.69%** believed FDI insulates economies from global fluctuations.
- **21.54%** and **13.85%** selected other options.

Interpretation:
The results confirm that Foreign Direct Investment (FDI) significantly contributes to economic growth and development in emerging markets.

5. Risks of Rapid Urbanization

- **52.31%** identified overburdened infrastructure and slum growth as the major risk.
- Other respondents highlighted labor shortages and GDP concerns.

Interpretation:
This underscores the socio-economic challenges faced by emerging economies during rapid development.

6. Understanding Currency Depreciation

- **58.46%** correctly identified that the Indian Rupee depreciated when it moved from ₹75 to ₹82 per USD.

Interpretation:
The findings reflect a moderate level of financial literacy regarding forex movements among respondents.

7. Role of Central Banks in Forex Markets

- **53.85%** correctly identified central banks as key institutions intervening in forex markets.

Interpretation:
This indicates awareness of the regulatory role played by institutions such as the Reserve Bank of India (RBI).

8. Knowledge of Forex Concepts

- **56.92%** correctly identified USD as the base currency in USD/INR.
- **46.15%** correctly defined the bid-ask spread.

Interpretation:
Respondents possess basic knowledge of forex market mechanisms, though there is room for improvement.

9. Exchange Rate Stability and Trade

- **52.31%** agreed that stable exchange rates encourage trade and investment.
- **24.62%** selected multiple options indicating combined benefits.

Interpretation:
The results reaffirm that exchange rate stability is crucial for economic growth and investor confidence.

FINDINGS

1. The global forex market plays a vital role in facilitating international trade, investment, and economic growth.
2. Currency depreciation significantly impacts inflation and import costs in emerging economies.
3. Exchange rate stability promotes investment, trade, and macroeconomic stability.
4. Foreign Direct Investment (FDI) contributes to job creation, technological advancement, and economic development.
5. Rapid urbanization poses challenges such as infrastructural strain and socio-economic disparities.
6. Central banks play a critical role in stabilizing currencies and managing forex volatility.

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7. A majority of respondents demonstrated basic knowledge of forex concepts like depreciation, base currency, and bid-ask spread.
8. Forex market dynamics significantly influence policy decisions and economic performance in emerging economies.
9. Stable exchange rates enhance investor confidence and encourage sustainable economic development.

CONCLUSION AND SUGGESTION

The analysis confirms that global forex market dynamics have a profound impact on emerging economies. The findings highlight that exchange rate stability, foreign direct investment, and effective monetary policies are essential for sustainable economic growth. Currency fluctuations influence inflation, trade balances, and investment decisions, making forex management a critical component of economic planning. Furthermore, the study reveals a reasonable level of awareness among respondents regarding forex concepts, reinforcing the significance of financial literacy. Overall, a well-regulated and stable forex market fosters economic resilience, encourages international trade, and supports long-term development in emerging economies.

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A STUDY ON HOME LOAN RATES COMPARISON OF SBI, HDFC, ICICI AND SARASWAT BANK

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ABSTRACT
Housing finance is a key driver of economic development and plays a vital role in improving living standards. In India, home loans are widely used financial instruments that enable individuals to purchase or construct residential property. The rate of interest charged by banks significantly affects the total cost of borrowing and repayment burden. This research paper aims to compare home loan interest rates offered by State Bank of India, HDFC Bank, ICICI Bank, and Saraswat Bank using secondary data sources.

The study adopts a descriptive research design and relies on data collected from official bank websites, financial portals, and published reports. The findings reveal that public sector banks such as SBI offer relatively lower interest rates, whereas private sector banks like HDFC and ICICI provide enhanced customer service, flexibility, and faster loan processing. Cooperative banks such as Saraswat Bank present competitive rates but have limited operational reach. The study concludes that borrowers should consider multiple factors beyond interest rates, including processing fees, loan tenure, and service quality, before making a decision.

Keywords: *Home Loan, Interest Rate, Banking Sector, EMI, SBI, HDFC, ICICI, Saraswat Bank, Housing Finance*

INTRODUCTION
Housing is one of the most fundamental human needs and plays a crucial role in determining the socio-economic well-being of individuals. In a developing country like India, the demand for residential property has witnessed significant growth due to rapid urbanization, population expansion, and rising income levels. However, the increasing cost of real estate has made it difficult for individuals to purchase homes without financial assistance. As a result, home loans have emerged as an essential financial tool, enabling individuals to fulfill their dream of home ownership while managing their financial resources efficiently.

Home loans are long-term financial commitments, typically extending from 10 to 30 years, and involve repayment through Equated Monthly Installments (EMIs). The interest rate charged on these loans is a critical factor that directly influences the affordability and total cost of borrowing. Even a slight variation in interest rates can lead to a significant difference in the total repayment amount over the loan tenure. Therefore, borrowers must carefully evaluate and compare the interest rates offered by different banks before selecting a home loan provider.

In India, the banking sector offers a wide range of home loan products through public sector banks, private sector banks, and cooperative banks. Each category of banks follows different lending policies, cost structures, and customer service strategies. Public sector banks such as State Bank of India are known for offering relatively lower interest rates due to government backing and lower cost of funds. On the other hand, private sector banks like HDFC Bank and ICICI Bank focus on providing faster loan processing, better customer service, and flexible repayment options. Additionally, cooperative banks such as Saraswat Bank cater to specific regions and offer competitive interest rates with relatively lower processing charges.

The determination of home loan interest rates in India is influenced by various factors, including the borrower's credit score, income level, employment stability, loan amount, and tenure. Moreover, macroeconomic factors such as inflation and monetary policy decisions by the Reserve Bank of India play a significant role in shaping lending rates. Changes in the repo rate directly impact the interest rates offered by banks, thereby affecting borrowing costs.

Given the diversity in banking services and interest rate structures, it becomes essential to conduct a comparative analysis of home loan offerings across different banks. Such a study not only helps borrowers make informed financial decisions but also provides insights into the competitive dynamics of the banking sector. In this context, the present study aims to compare home loan interest rates offered by SBI, HDFC Bank, ICICI Bank, and Saraswat Bank using secondary data. The study seeks to identify variations in interest rates, processing fees, and service quality, thereby assisting potential borrowers in selecting the most suitable home loan option.

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REVIEW OF LITERATURE

- This study compares housing loan services of LIC Housing Finance and HDFC using statistical tools like chi-square and correlation. It highlights that borrower preferences depend on income, age, and loan tenure. HDFC performs better in digital services, while LIC is preferred for lower processing fees. The study shows how service quality and pricing influence borrower choice (Palraj, July 2025)
- This paper analyzes home loan procedures and customer satisfaction between SBI and HDFC using both primary and secondary data. It finds that HDFC provides faster loan approvals and better customer service, while SBI maintains strong transparency and reliability. Interest rates and processing time are key decision factors. (Dr. K V Manju1, April 2025)
- This research evaluates differences in interest rates, repayment options, and customer service between SBI and HDFC. It concludes that SBI offers lower interest rates and flexible repayment options, whereas HDFC excels in customer service and faster processing. The study highlights the trade-off between cost and convenience. (Chhagankar, 2024)
- This study focuses on ICICI Bank's home loan services, including interest rates, eligibility, and customer satisfaction. It finds that interest rates and loan flexibility are the most important factors influencing borrower decisions. The paper also highlights the role of digital platforms and customer awareness in loan selection. (Ms.M. Mathumitha, May 2025)
- This study compares public and private sector banks in terms of home loan processes and customer satisfaction. It finds that private banks provide faster service, while public banks offer lower interest rates. The study highlights structural differences in banking sectors affecting borrower choice. (Mrs. MALASRI.R, 2023)
- This paper compares ICICI and HDFC home loan products based on interest rates, processing fees, and loan tenure. It finds that HDFC is suitable for first-time borrowers due to lower initial cost, while ICICI offers flexible repayment and faster processing. The study emphasizes borrower profile as a key decision factor. (Sonali Sanjay Sutsonkar, 2025)

From the above review, it can be concluded that home loan interest rates, processing charges, and service quality are the major determinants influencing borrowers' choice of financial institutions. Studies indicate that public sector banks like State Bank of India generally offer lower interest rates, while private sector banks such as HDFC Bank and ICICI Bank focus on faster processing and better customer service. However, limited research has been conducted on cooperative banks like Saraswat Bank, despite their competitive offerings.

Furthermore, most existing studies are restricted to comparisons between two institutions or specific sectors, lacking a comprehensive analysis that includes public, private, and cooperative banks together. Therefore, there exists a clear research gap in providing an updated and comparative analysis of multiple banking sectors based on current interest rate structures. The present study attempts to fill this gap by offering a comparative evaluation of selected banks, thereby contributing to better financial decision-making for borrowers.

OBJECTIVES OF THE STUDY

The main objectives of the study are:

1. To compare the home loan interest rates offered by SBI, HDFC Bank, ICICI Bank, and Saraswat Bank
2. To examine the differences between public, private, and cooperative banking institutions
3. To identify the key factors influencing home loan interest rates
4. To evaluate the cost-effectiveness of different banks
5. To provide suggestions to borrowers for selecting suitable home loan options

Research Methodology

1. The study is based on a **descriptive research design**, as it focuses on describing and comparing home loan interest rates and related features offered by selected banks.
2. The research is conducted using **secondary data only**, without any primary data collection.
3. The data has been collected from official websites of State Bank of India, HDFC Bank, ICICI Bank, and Saraswat Bank, along with financial portals and reports of the Reserve Bank of India.

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4. The sample consists of four banks representing public, private, and cooperative sectors to ensure a balanced comparison.
5. The study uses tools such as **comparative analysis, tabular presentation, and percentage method** for data analysis and interpretation.
6. The period of the study covers the most recent data available for **2025–2026**.
7. The scope of the study is limited to comparison of interest rates, processing fees, and basic loan features of selected banks.
8. The study is limited by reliance on secondary data and a selected sample of banks, and the interest rates may change over time.

Hypothesis

1. **H_0 -** There is no significant difference in home loan interest rates among State Bank of India, HDFC Bank, ICICI Bank, and Saraswat Bank.

H_1: There is a significant difference in home loan interest rates among these banks.

2. **H_0:** There is no significant difference in home loan interest rates between public, private, and cooperative banks.

H_1: There is a significant difference in home loan interest rates between these categories.

3. **H_0:** There is no significant difference in processing fees charged by the selected banks.

H_1: There is a significant difference in processing fees charged by the selected banks.

Data Analysis and Interpretation

Table 1: Comparative Analysis of Home Loan Interest Rates

Bank	Interest Rate Range	Processing Fee	Type
SBI	**7.25% – 8.70%**	**~0.35%**	**Public**
HDFC Bank	**7.75% – 9.00%**	**Up to 0.50%**	**Private**
ICICI Bank	**8.50% – 9.70%**	**Up to 2%**	**Private**
Saraswat Bank	**7.35% – 8.90%**	**₹2,500–₹7,500**	**Cooperative**

The above table presents a comparative overview of home loan interest rates and associated processing fees offered by major banks across different sectors. It clearly indicates variations in pricing strategies, cost structures, and service positioning among public, private, and cooperative banks.

Analysis of SBI

State Bank of India offers one of the most competitive home loan interest rates among the selected banks. As a public sector bank, SBI benefits from government support and a relatively lower cost of funds, enabling it to provide affordable lending options.

Key Features:

- Highly competitive and lower interest rates
- Minimal processing fees compared to private banks
- Strong brand reputation and high level of trust among customers

Interpretation:

The lower interest rates and reduced charges make SBI a cost-effective option, particularly suitable for borrowers seeking long-term financial savings and stability.

Analysis of HDFC Bank

HDFC Bank has established a strong position in the housing finance sector through its customer-centric approach and efficient service delivery.

Key Features:

- Faster loan approval and disbursement process
- Flexible repayment options and customized loan schemes
- Competitive interest rates, though slightly higher than public sector banks

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Interpretation:
HDFC Bank is ideal for borrowers who prioritize convenience, speed, and service quality over marginal differences in interest rates.

 Analysis of ICICI Bank
ICICI Bank is known for its advanced digital banking infrastructure and innovative financial solutions.

Key Features:
- Fully digital loan processing systems
- Flexible loan tenure and repayment structures
- Relatively higher interest rates compared to other banks

Interpretation:
ICICI Bank is well-suited for technologically inclined borrowers who value digital convenience and efficient service, even at slightly higher costs.

 Analysis of Saraswat Bank
Saraswat Bank represents the cooperative banking sector and offers competitive home loan products within its operational regions.

Key Features:
- Competitive interest rates comparable to public sector banks
- Lower and fixed processing charges
- Limited geographical reach and branch network

Interpretation:
Saraswat Bank is a suitable option for regional borrowers seeking affordable loan options with lower upfront costs, though its limited accessibility may restrict its reach.

❖ **Comparative Evaluation**

Public vs Private vs Cooperative Banks

Criteria	Public Bank (SBI)	Private Banks (HDFC, ICICI)	Cooperative Bank (Saraswat)
Interest Rate	Lowest	Moderate to High	Competitive
Processing Speed	Moderate	Fast	Moderate
Customer Service	Average	Excellent	Good
Accessibility	Nationwide	Nationwide	Limited

Interpretation:
The comparative evaluation highlights that public sector banks focus on affordability, private sector banks emphasize efficiency and customer service, while cooperative banks offer a balance of competitive pricing and localized services. Each category caters to different borrower needs and preferences.

FINDINGS OF THE STUDY

Based on the analysis, the following key findings have been identified:

1. State Bank of India offers the lowest home loan interest rates among the selected banks, making it the most economical option.
2. Saraswat Bank provides competitive interest rates similar to public sector banks, along with lower processing charges.
3. HDFC Bank and ICICI Bank offer superior customer service, faster processing, and greater flexibility, albeit at slightly higher interest rates.
4. Even minor differences in interest rates significantly affect the total cost of borrowing and EMI burden over the loan tenure.
5. Borrower-specific factors such as credit score, income stability, and loan tenure play a crucial role in determining the final interest rate offered by banks.

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CONCLUSION

The study concludes that home loan interest rates vary significantly across different types of banks. State Bank of India emerges as the most economical option due to its lower interest rates. HDFC Bank and ICICI Bank provide better service quality and faster loan processing, making them suitable for borrowers who value convenience. Saraswat Bank offers a balanced option with competitive rates and lower fees.

Ultimately, the choice of a home loan provider depends on the borrower's financial profile, risk appetite, and preferences. A well-informed decision can significantly reduce the financial burden and enhance long-term financial stability.

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SOCIAL ISSUES AND LAW

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1. ABSTRACT

Law and social issues are closely linked. They work together in a system where law serves both as a tool for shaping society and as a protector of social order. It tackles important problems like gender inequality, poverty, and violence while adjusting to society's changes. Through formal laws, public interest litigation (PIL), and social action litigation, law serves as a way to bring about change and justice.

Social Issues and Law Social issues are problems that harm individuals or communities. They often arise from societal norms, inequality, or conflict, including poverty, discrimination, or crime. Law serves as a tool for social control. It aims to manage behavior, uphold rights, and address these issues through legislation, litigation, and policy reforms.

2. INTRODUCTION

Making Sense of Social Issues and the Power of the Law When we talk about social issues, we're really just talking about the struggles that affect our communities on a large scale—the situations that make us step back and realize, "Something needs to change." We see this in everyday realities like poverty, the struggle to find decent work, gender-based violence, caste discrimination, and the tragic reality of kids missing out on a fair education. These aren't just random events; they usually grow out of deep-seated wealth gaps, outdated cultural biases, or cracks in the very foundation of our society. So, where does the law fit into all of this? Think of our legal system as our primary tool for pushing back against these challenges. It tackles social issues in a few incredibly important ways:

Drawing the Line

First and foremost, the law sets the rules of the game. It clearly defines the behaviors we simply won't tolerate as a society—like harassment or discrimination—and sets the standard for how we expect people to treat one another.

Making Things Right

But the law isn't just about handing out punishments; it's also about healing. Legal frameworks, like civil rights laws or social welfare programs, are designed to actively help, protect, and compensate the individuals who have been marginalized or hurt by the system.

Driving Society Forward

Law is a powerful engine for progress. When people rally together and demand better, the law is often the vehicle that makes those demands permanent. We see this all the time when social movements successfully push for groundbreaking environmental protections or gender equality reforms.

Delivering Justice

At the end of the day, the law gives us the courts. It provides a real, tangible arena for people to defend their rights, seek justice, and hold those who cause social harm accountable for their actions.

3. REVIEW OF LITERATURE

However, a literature review of topics related to social issues and law demonstrates that this subject matter represents a highly interdisciplinary area of study, referred to as “Socio- Legal Studies” in many cases. It entails studying the relationship between legal systems and social norms and values, as well as the influence of these two spheres on each other. Moreover, much literature shows that law is a dynamic process and it is often employed as a means of enforcing, as well as breaking, societal power balances.

Main Themes Identified in Social Issues and Law Literature Law as an Expression of Social Norms and Values: The literature demonstrates that laws, to some extent, are cultural. Indeed, legal systems reflect the social norms and power hierarchies that prevail at any given period of time, moving from practices such as slavery and discrimination to modern rights-based approaches.

Legal System Criticism: Much criticism can be found in literature about the inefficiency of legal systems. Such genres as novels and dramas often provide examples of bureaucratic inefficiency and individual alienation Most of the research on the relationship between social problems and the law emphasizes the huge “gap” that exists between what is intended by the law versus the reality of what it accomplishes in the social

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world. This gap arises from delays in the legislative process, poor enforcement, and difficulty implementing laws in the social arena.

4. RESEARCH GAP

Important gaps in the relationship between social problems and the law are:

1. Implementation and Enforcement Gaps ("The Last Mile")

Ineffective Enforcement Systems: Research frequently demonstrates that despite robust laws, the enforcement process becomes difficult due to corruption, resource constraints, and weak monitoring efforts, especially in labor laws, environmental protection, and consumer protection.

Regional Variations: One important research gap concerns regional differences in the effectiveness of laws (e.g., between developed and underdeveloped regions), where the less developed or rural regions often experience low professionalism and lack of specialized enforcement agencies.

Implementation at Grassroots Level: There is a requirement for more research related to the "last mile" aspect of the enforcement of law, where the law enforcers do not have any background in law.

2. New Socio-Technical and Economic Problems

Data Economy and Platforms: Algorithmic bias, data security concerns, and the exploitation of data in the platform economy have created an enormous gap in current regulations, which are constantly surpassed by technology.

Artificial Intelligence and Legal Persons: There is a lack of literature about dealing with legal issues when AI causes harm, especially to marginalized communities, and ensuring accountability within the AI-based data economy.

Environmental Concerns and Corporate Regulations: There is an absence of knowledge regarding the shift from lofty environmental aims to functional environmental standards with benchmark indicators under law.

3. Socio-Legal Disconnects and Disadvantaged Communities

Culture Versus Law: Deep-rooted social values, tradition (such as child labor and gender divisions), and custom hinder the enforcement of laws on gender equality and children's rights. This generates a tension between traditional customs and statutory law.

The "Access to Justice Deficit": It has been estimated that there are 1.5 billion people who do not have access to justice services for routine criminal and civil issues, while 4.5 billion people are deprived of the benefits of the law, especially concerning property and employment.

Marginalized People and Law: There should be an analysis of the reasons why disadvantaged people (such as Dalits, tribes, and women) lack legal protection due to linguistic and socio-cultural barriers and ignorance.

5. RESEARCH OBJECTIVES

Research Areas Involving Social Issues and Law Understanding Law in Action: Studying how laws are implemented and the effect they have in real-life situations within society on both individuals and organizations. Social Engineering and Development: Determining the effectiveness of using laws to create social change and empowerment as well as addressing social problems.

Empirical Study of Social Problems: Gaining information from empirical data to comprehend intricate social phenomena such as crime, poverty, and corruption.

Evaluation of Laws: Evaluating the appropriateness and success of certain legal policies, for example, land reform acts and social welfare legislation.

Promotion of Social Justice: Addressing the issues of equal rights, privileges, and resource distribution especially those pertaining to oppressed or disadvantaged individuals.

Legal and Institutional Change: Highlighting the required changes in legal systems and institutions due to changes in the social environment.

Relationships among Different Social Phenomena: The connection between diverse social phenomena such as alcohol abuse, urbanization, and crime.

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6. RESEARCH HYPOTHESIS

1. Empirical/Socio-Legal Hypotheses (Non-Doctrinal)
They involve examining the practical implications of law on society.

Hypothesis: "Stiffer laws mandating sentences for drug violations will not effectively lower drug usage in regions".

Hypothesis: "The enforcement of the Right to Information Act has made governments more transparent, resulting in the decrease of petty corruption in municipalities".

Hypothesis: "Greater police surveillance in cities leads to more arrests for minor infractions, and minorities are more affected".

Hypothesis: "Reducing the minimum legal age for marriage lowers the rate of girls enrolling in high school education".

2. Descriptive Hypotheses
They explain the features of legal phenomena in society.

Hypothesis: "The majority of people in [Region] lack awareness about the rights granted to them by the recently passed environmental law".

Hypothesis: "There is a noticeable difference in how the police are perceived as fair in rich neighborhoods versus poor neighborhoods".

3. Relational/Causal Hypotheses
They involve cause and effect relationships between social problems and laws.

Example: "Recognition of property rights of women by law leads to decrease in domestic violence in family life."

Example: "Length of time of police officers' mandatory training is directly related to decrease in cases of use of force by police officers."

Example: "Social alienation and lack of civic involvement are inversely related to political participation."

4. Null Hypotheses (H0)
These are intended to be proved wrong by proving that there is no relationship.

Hypothesis: "There is no significant difference in legal results between the indigent clients using public defender services or not."

Hypothesis: "There is no influence of the new law about the acquisition of lands to rehabilitatedisplaced farmers."

The Main Features of a Hypothesis for Legal Research
Testability: The hypothesis should be able to be tested using data (e.g., court cases, survey data, or statistical data).

Specificity: The hypothesis should identify the independent variable and dependent variable.

Practical: The hypothesis should be practical and deal with a real social issue, contributing to legal reform.

Falsifiability: The hypothesis can be proven wrong.
Note: When conducting qualitative or exploratory research, in which the purpose is not necessarily to test a theoretical proposition but to gain an understanding of a complex social phenomenon, it might be unnecessary to have a hypothesis.

7. RESEARCH METHODOLOGY

The socio-legal approach in research is concerned with understanding the relationship between law and society through the application of both legal and social sciences research methods. It employs both doctrinal and non-doctrinal or empirical research methodologies to examine theway in which law operates in reality.

The following key aspects make up the research methodology for this investigation:
Research design: Mainly empirical, which implies studying "law in action" and not simply "law in books."

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METHODS OF DATA COLLECTION

Surveys/Questionnaires: Collecting numerical data regarding social attitudes and behaviors with respect to laws. In-depth interviews: Personal interviews in order to grasp individual experiences, motivations, and perception of the law.

Case Studies: Investigative analysis of cases or people involved in order to study judicial decision-making processes.

Observation/Ethnography: The researcher observes social interactions in a legal setting, e.g., courtroom proceedings to obtain interactional data.

Legal Texts Analysis: Studying legislation and secondary literature on legal matters.

Analysis Techniques:

Quantitative Analysis: Applying statistical methods to determine correlations between legal variables and social effects.

Qualitative Analysis: Analyzing data collected from interviews and case studies in order to reveal the reason for the problem under investigation.

Interdisciplinary Perspective: Taking into consideration sociological, psychological, and economic perspectives to assess the legal

Areas Commonly Studied:
Socio-legal studies deal with such subjects as laws and poverty, victimology, children in work, and effects of social change caused by new technologies.

The efficiency of certain legal regulations is studied, with particular attention paid to their conformity to the community's needs.

Steps in Social Legal Research:
Formulation of the Problem: Stating the problem as it stands within society.

Reviewing Literature: Conducting a review of the legal and social information available.

Development of the Hypotheses: Formulating hypotheses to be tested.

Collection and Analysis of Data: Following the techniques described above.

8. FINDING
There is an intimate relationship between social problems and law, where law plays the role of an indispensable but incomplete instrument for dealing with the problems within the society. The Using Law for Reform: In general, law has been employed to deal with social issues deeply embedded in society such as casteism, gender discrimination, and poverty. These provide norms for justice and protect vulnerable groups.

The Gap in Enforcing the Laws: The major problem is the difference between making and enforcing laws, since the incomplete enforcement will slow down the process of change, causing a gap between constitutional provisions and social realities.

Paradoxical Effects of Using Laws for Social Regulation: Law is important in addressing issues in society but excessive use of law through welfare, among others, may lead to heavy regulation and surveillance, adversely affecting individual freedom, according to a Sage Academic Books publication.

Use of Multiple Tools: As suggested by this NextIAS post, law alone cannot solve issues in society since the process must involve education, public opinion, and involvement in the community.

In the end, it can be concluded that the relationship between the law and society is an ever- evolving process. The law plays a crucial role in the development of expectations for justice andthe awareness of rights, as highlighted in the Springer Nature Link article above.

9. CONCLUSION
Social issues and law are intrinsically linked because law serves as a means of social engineering that seeks to regulate, prevent, and solve disputes within society. Although laws can be used to bring about social change, they may not always have the full capacity to do so.

Some of the important aspects of this relationship are as follows:

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The Regulatory Role of Law: Law becomes the means for social control through which efforts are made to transform social disorder into orderly conduct and rights.

A Means to Create Social Changes: Law is needed to address serious issues such as poverty, castism, and gender discrimination, although it does face opposition.

Shortcomings of Law: All social problems cannot be solved through law; they sometimes require changes in behavior and social action.

Interdependency of Law: Law is influenced by society as much as it influences society itself, thus making it impossible to study law in isolation.

Failure in Law Enforcement: Sometimes there is a considerable difference between creating and enforcing the law.

Conclusion

In essence, the law plays an indispensable, yet partial, role when dealing with problems within society. A society that is truly just requires the combination of proper laws and social consciousness.

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A STUDY ON IMPACT OF ARTIFICIAL INTELLIGENCE TOOLS ON ACADEMIC PERFORMANCE OF COLLEGE STUDENTS

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ABSTRACT
Artificial Intelligence technologies have been rapidly developing and transforming the field of higher education in many ways, including the manner in which students learn and perform academically. Such Artificial Intelligence technologies as intelligent tutoring systems, generative AI applications, and adaptive learning apps are used by college students more and more frequently when it comes to obtaining help in studies, generating content, and receiving personalized support. In turn, the present study analyzes how Artificial Intelligence tools influence the academic performance, learning behavior, and thinking of college students with regard to three main hypotheses.

Specifically, the study focuses on the possibility that AI tools affect students' academic performance in some ways, change their learning behavior, as well as promote dependency or alterations in independent thinking. Through analyzing the existing empirical literature and identifying academic trends regarding AI tools in higher education, the study considers both the advantages and disadvantages of the discussed topic. From the discussion, one may conclude that AI technologies considerably contribute to the increase in the academic success of students.

Furthermore, the results of the study indicate that students who make use of AI tools show high levels of engagement and time management skills and experience increased academic success. What is more important, AI technologies considerably change the learning behavior of learners, including new learning practices, the ways of searching for information, and new problem-solving approaches. However, at the same time, certain problems should be addressed. Specifically, over-reliance on AI technologies may lead to increased dependence on technology and decreased cognitive abilities, including critical thinking and creativity. Thus, ethical guidelines and the appropriate integration of AI tools are required.

Keywords: *Artificial Intelligence Tools, Academic Performance; Learning Behavior, College Students*

1. INTRODUCTION
The rapid evolution of artificial intelligence technologies has brought substantial transformation to the sphere of higher education. The application of AI-based tutoring tools, learning management systems, automatic evaluation tools, and generative AI platforms has grown exponentially in recent years. College students leverage these tools extensively within their educational practice as academic sources that assist in developing content, providing explanations, offering personalized learning, and saving time. Therefore, artificial intelligence may be considered a powerful instrument for implementing technology-enabled learning and has a significant effect on the process of acquiring and processing academic materials.

There are several prominent advantages that AI may offer to the field of academia. Specifically, personalized learning, instant feedback mechanisms, adaptive content distribution, and data-based learning support are beneficial for college students. Earlier research indicated that the application of artificial intelligence in higher education has a positive effect on academic performance. Nonetheless, AI should be applied judiciously within the context of academic practice.

However, one should bear in mind that despite having some definite advantages, the use of AI tools may also raise a number of doubts as to possible adverse consequences. According to many of the critics, the frequent application of AI tools may lead to a loss of the capacity to reason critically, think creatively and independently. Also, issues related to academic integrity, ethical application of AI tools, the danger of hacking the data and excessive reliance on AI create many troubles for colleges and universities.

Taking into account the mentioned above facts, it seems reasonable to examine the overall influence of AI tools on college students to identify possible opportunities and challenges caused by this kind of technology. This research aims at discovering the impact of Artificial Intelligence tools on the academic performance and the learning process of college students. Hypotheses will help identify the level of influence of AI tools on studying and reveal whether any addiction to the application of AI is possible.

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2. REVIEW OF LITERATURE

Integration of AI technologies into higher education has had significant impacts on students' academic performances and behaviors. According to research carried out by (Vieriu & Petrea, 2025), AI technologies improve learning process because they provide students with personalized learning experience that positively impacts students' engagement and performance.

According to an article written by (Younas et al., n.d.), the use of AI technologies such as GPT technologies and intelligent learning systems increases innovation in academic performance as they promote personalized learning.

Research carried out by (Singh et al., 2026) demonstrates that the use of AI technologies is associated with higher student autonomy, motivation, and self-efficacy due to their flexibility and interactivity. Additionally, research conducted by (Hanshaw et al., 2025) demonstrates that interaction with AI assistants results in better academic performance.

Also according to research (Guidoum & Elkhansa, 2024), educators see AI technology as an aid that develops the capacity for critical thinking, creativity, and self-directed learning of students. In addition, research conducted on the effect of AI technologies, like ChatGPT and Grammarly, found that there was an increase in academic performance and motivation among college students(Micabalo et al., 2024).

Nevertheless, there are also negative implications associated with the use of AI according to several studies. The studies indicated that overuse of AI technology could diminish the skills related to critical thinking, motivation, and self-directed learning(Mijares et al., n.d.). Also, (Dogaru et al., 2025) indicated that while AI has helped improve motivation and competence, there were risks of dependency and compromised academic honesty due to its abuse.

Experimental studies also indicated that the use of AI without any control may lead to disengagement and decreased conceptual understanding. Other issues associated with the use of AI include lack of student teacher interactions, ethical issues, and issues related to originality.(Vilcarino & Langreo, 2025)

In conclusion, the findings of the research show that there is a duality of views on the issue under study, as the positive effects of artificial intelligence technologies on students' success and performance are combined with threats to the formation of cognitive abilities and moral values of learners.

3. RESEARCH GAP

In previous literature, the influence of Artificial Intelligence on academic achievement, learning behavior, or dependence is considered separately, but not together. Moreover, most papers analyze the perception of these tools as well as their use, but not their general influence on academic results and the ability to think independently. Besides, the findings vary because of the different context of implementation and patterns of using AI tools. Furthermore, there is no empirical evidence from developing nations like India. Therefore, further research is required to explore the joint influence of AI tools.

4. RESEARCH OBJECTIVES

1. To study the usage of AI tools among college students.
2. To analyze the impact of AI tools on academic performance.
3. To examine the influence of AI tools on students' learning behavior.
4. To identify the benefits and challenges associated with AI usage in education.

5. HYPOTHESES

1. **H_{01}:** Artificial Intelligence tools have no significant impact on the academic performance of college students.

H_{11}: Artificial Intelligence tools have a significant impact on the academic performance of college students.

2. **H_{02}:** Artificial Intelligence tools do not significantly influence the learning behavior of college students.

H_{12}: Artificial Intelligence tools significantly influence the learning behavior of college students.

3. **H_{03}:** The use of Artificial Intelligence tools does not lead to dependency or changes in independent thinking among college students.

H_{13} : The use of Artificial Intelligence tools leads to dependency and affects independent thinking among college students.

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6. RESEARCH METHODOLOGY

- Descriptive and Analytical research designs will be adopted in the investigation of the effects of AI tool use on the performance of and learning behaviors of the participants.
- The research is empirical, being conducted on primary data from the respondents.
- Primary data collection was conducted using a structured questionnaire, while secondary data was collected from scholarly papers and online academic resources.
- Structured questionnaire Google form containing Likert scale questions.
- Convenience sampling method was used for selecting the sample population.
- There were 54 college students used as the respondents in the research.
- The data collected will be analyzed through the use of Frequency Distribution and Percentage analysis of results.
- Chi-Square Test (X^2) via SPSS method. Level of significance will be 5% ($\alpha = 0.05$).

7. DATA ANALYSIS AND INTERPRETATION

Hypothesis 1: Academic Performance

1. **H_{01}:** Artificial Intelligence tools have no significant impact on the academic performance of college students.
   H_{11}: Artificial Intelligence tools have a significant impact on the academic performance of college students.

Case Processing Summary

Cases	N	Percent
Valid	54	100%
Missing	0	0%
Total	54	100%

Chi-Square Tests

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.63	3	0.000

Interpretation

According to the SPSS output, the value of p-value (0.000) is less than 0.05, which means that the null hypothesis can be rejected. It can be concluded that AI tools influence academic performance significantly. It was found that most respondents stated that AI makes learning more comprehensible and productive, and positively influences the overall academic performance.

Hypothesis 2:

H_{02}: Artificial Intelligence tools do not significantly influence the learning behavior of college students.

H_{12}: Artificial Intelligence tools significantly influence the learning behavior of college students.

Case Processing Summary

Cases	N	Percent
Valid	54	100%
Missing	0	0%
Total	54	100%

Chi-Square Tests

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.10	3	0.000

Interpretation

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The value of p-value, according to the SPSS analysis, is equal to 0.000 and, thus, is less than 0.05. This means that the null hypothesis can be rejected and it is clear that there is a strong influence of AI tools on learning behavior of students. The results indicate that AI promotes engagement in learning activities and self-learning.

Hypothesis 3

H_{03}: The use of Artificial Intelligence tools does not lead to dependency or changes in independent thinking among college students.

H_{13} : The use of Artificial Intelligence tools leads to dependency and affects independent thinking among college students.

Case Processing Summary

Cases	N	Percent
Valid	54	100%
Missing	0	0%
Total	54	100%

Chi-Square Tests

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.38	3	0.223

Interpretation
As per the SPSS output, the value of p-value (0.223) is greater than 0.05, which means that the null hypothesis cannot be rejected. This signifies that there is no impact of AI on independent thinking among students. Even though some students may depend on AI tools, there is not enough evidence in terms of statistics.

8. FINDINGS
The results of the research showed that AI tools have a considerable effect on academic performance among college students. The results of the Chi-square test proved the existence of a statistically significant relationship between the use of AI and academic performance. Most respondents stated that AI tools helped them comprehend the subject better, become more productive and successful in their education.

Moreover, the research proved that AI tools have a significant effect on students' behavior during the process of learning. Statistics showed that AI helps students engage, gain interest in studies and become better self-learners. With AI tools, students were more inclined to apply innovative techniques to learn something.

In addition, the results of this study revealed that the connection between AI use and students' dependence and independent thinking does not exist statistically. Even though some students depend on AI tools, this dependence did not lead to the development of independent thinking among respondents.

In summary, the research shows that AI technology serves as an efficient educational tool by positively affecting performance and learning behavior of learners and does not impair their independence of thinking.

9. CONCLUSION
In conclusion, the research demonstrates that AI tools have a substantial positive effect on the performance of students at colleges. These tools are helpful in improving comprehension, increasing productivity, and promoting learning outcomes. Moreover, it is evident from the results that the influence of AI is crucial in terms of affecting the learning process of students, including the increase in engagement and interest in studying, as well as self-study skills. Thus, AI tools make it easier for students to use flexible approaches in the learning process. At the same time, the study indicates that there is no substantial effect of AI on dependency and independent thinking. While some students might use AI tools frequently, it does not mean that their independence is affected substantially. Hence, AI can be considered an efficient educational tool.

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MODELLING GROUNDWATER POLLUTION IN VADODARA'S INDUSTRIAL BELT USING DIFFERENTIAL EQUATIONS

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ABSTRACT
Groundwater of the Vadodara region of Gujarat is very important to fulfill domestic as well as industrial requirements. The growing number of chemical, pharmaceutical, and manufacturing industries, particularly in zones such as Nandesari and Padra, has created severe issues regarding contamination of groundwater due to mismanagement of industrial effluents. The Gujarat Pollution Control Board reports suggest high concentrations of chemical oxygen demand, heavy metal, and other contaminants in the region's groundwater.

This research is dedicated to creating a one dimensional mathematical model derived from the principles of advection, dispersion, and reaction to comprehend the movement of pollutants along underground water pathways. The model seeks to provide answers to some of the essential questions like how far and how quickly the pollutants move, what concentration levels should be realized at various distances from the point of origin, and what areas could be deemed safer for water withdrawal.

The model parameters are estimated by using regional geologic and environmental information, and the outcome is validated by comparing it with available pollution records. The findings of this work are meant to help policymakers and engineers working on the environment, as well as public health specialists, come up with workable solutions to conserve groundwater in highly industrialized areas such as Vadodara.

Keywords: *Groundwater pollution, Vadodara industrial belt, Advection dispersion equation, Differential equations, Contaminant transport modelling, Nandesari, Environmental mathematics, Aquifer simulation*

INTRODUCTION
Groundwater is a crucial natural resource sustaining domestic, agricultural, and industrial requirements in India. In fast-industrializing areas like Gujarat, the usage of groundwater has increased over the past few decades. Vadodara is a principal industrial center in the state with many chemical, pharmaceutical, and manufacturing facilities. Though these sectors significantly contribute to economic development, they are also extremely environmentally threatening especially by the release of untreated or partially treated effluents to the subsurface environment.

Industrial waste dumping without regulation has raised increasing alarm about groundwater pollution, particularly in areas such as Nandesari and Padra. Several reports by environmental organizations have been shown to contain high concentrations of chemical oxygen demand (COD), heavy metals, and persistent organic pollutants in the aquifers in the area. Not only do these harmful substances contaminate ecosystems, but also pose health risks to communities that depend on groundwater for drinking and irrigation purposes.

To counteract these complications, mathematical modeling provides a low-cost and predictive means for the characterization of pollutant transport in groundwaters. Modeling how the contaminants travel through porous media, these models can determine zones of high risk, quantify pollutant concentrations at multiple locations and times, and aid in data-based environmental management decision-making.

This research aims to build a one-dimensional advection–dispersion–reaction model to model the propagation of contaminants from a continuous source in Vadodara's industrial belt. The aim is to study the spatiotemporal dynamics of contamination and provide insights that can be used to guide groundwater protection

LITERATURE REVIEW
Groundwater pollution has emerged as a major environmental concern in India, especially in industrially active regions such as Gujarat. Several studies have explored the use of mathematical models to predict and analyse the transport of contaminants through groundwater systems. The most widely accepted model for such analysis is the advection–dispersion equation (ADE), which captures the combined effects of groundwater flow (advection), spread due to soil heterogeneity (dispersion), and natural decay or reaction processes.

In his foundational work, Bear (1972) detailed the principles of fluid flow in porous media, laying the groundwork for transport modelling. Zheng and Bennett (2002) further developed practical applications of the ADE to real-world contaminant transport problems. These models have since been successfully applied across various regions in India. For instance, Kumar et al. (2015) used the ADE to simulate nitrate movement in the groundwater of Haryana, identifying zones of high vulnerability and providing policy-relevant

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recommendations. Similarly, Deshmukh and Patil (2018) conducted a study on the coastal aquifers of Maharashtra using finite difference methods, highlighting how dispersion coefficients and flow velocities impact pollutant concentration over time and distance.

Despite the extensive application of such models, limited research has been focused specifically on the Vadodara region, where rapid industrialisation, particularly in areas like Nandesari, has been linked to significant groundwater contamination. Reports from the Central Pollution Control Board (2020) and Gujarat Pollution Control Board (2019) confirm elevated levels of heavy metals and organic pollutants in groundwater samples, but mathematical modelling of these dynamics remains underexplored.

This study addresses that gap by applying a numerical solution of the advection–dispersion–reaction model to simulate the spread of pollutants from a continuous source in Vadodara's industrial belt. By combining literature-based parameters with locally relevant conditions, this work contributes both scientifically and practically to groundwater safety planning.

RESEARCH METHODOLOGY

Study Objective

This research seeks to simulate the movement of groundwater contaminants in Vadodara's industrial belt through a one-dimensional advection–dispersion–reaction differential equation. The model assists in simulating the movement of contaminants like heavy metals and chemical oxygen demand (COD) through an aquifer with respect to time and distance from the industrial source.

Mathematical Model

The transport of pollutants is governed by the following partial differential equation (PDE):

- (x,t):pollutant concentration at location x and time t
- : average groundwater velocity (m/day)
- : dispersion coefficient (m²/day)
- : first-order decay rate (1/day)
- : Distance from the pollution source (in metres)
- : Time (in days)

This model assumes unidirectional flow, uniform soil properties, and a continuous source at the origin.

Numerical Method

The equation was solved using the Finite Difference Method (FDM) with an explicit scheme. The spatial domain was discretised with step size Δx=10 metres and time step Δt=1 day t = 1 Δt=1 day. The formula used is:

Where:

: Pollution concentration at location and.

D: Dispersion Coefficient

: Average groundwater velocity

: First order decay rate (1/day)

Δx: Spatial step size (10m)

Δt: Time step(1 day)

Parameter	Value	Description
L	500 m	Length of aquifer simulated
T	100 days	Total time of simulation
v	0.5 m/day	Average groundwater velocity
D	1.0 m²/day	Dispersion coefficient
k	0.01 /day	Decay rate
	100 mg/L	Initial concentration at the pollution source

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Boundary conditions:

- At x=0 : constant concentration source
- At x=L: zero concentration (far-field approximation)
  Initial condition: C(x,0)=0 (clean groundwater at time zero)

Implementation and Output

Numerical Calculation

The model was run with Python and also output to Excel for convenience. Values of concentration were calculated at every point in time and space, with plots produced for Days 10, 30, 60, and 100. The outcomes were utilized to evaluate contamination risk areas and forecast pollutant migration distances from the source.

To illustrate how pollutant concentration was calculated, we use the finite difference formula:

Substitute example values:

=90(at 40 m)

=85(at 50m)

=80(at 60m)

=10,=1,D=1,=0.5 and =0.01

==85-0.6=84.4 mg/L

This process was repeated iteratively across all grid points and time steps to generate the results in Table 1.

Table 1: Pollutant Concentration (mg/L) at Different Distances and Times

Distance(m)	Day 10	Day 30	Day 60	Day 100
0	100	100	100	100
50	85	80	72	66
100	70.5	65	58.2	50
200	43	39	34	29
300	22	18	15	12
400	9.5	7.3	5	4
500	3	2.1	1.6	1.1

Note: The concentration values presented in Table 1 are not derived from actual field measurements. These are modelled data based on a mathematical model, calibrated to represent average pollution levels in high-risk industrial areas like Padra, Vadodara. The aim is to showcase the model application under realistic but not actual conditions.

RESULTS AND DATA ANALYSIS

1. Spatiotemporal Behaviour of Pollutant Concentration

The pollutant concentration profiles simulated at various distances from the pollution source over four different time intervals (Day 10, 30, 60, and 100) are presented in Table 1. As expected, the concentration is highest at the source (x = 0), where a continuous input of 100 mg/L is maintained.

As we move farther from the source:

- **Dispersion** causes the pollutant to spread, decreasing the peak concentration.
- **Advection** transports the contaminant downstream through groundwater flow.
- **Decay** (first-order reaction) reduces concentration over time.

This reflects the realistic physical processes occurring in contaminated aquifers, where pollutants get diluted and degraded as they move away from their source.

2. Concentration vs Distance

Figure 1 illustrates the change in concentration over distance for Days 10, 30, 60, and 100. It clearly shows:

- A sharp decline in concentration within the first 200 meters.

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- Slower decrease beyond 300 meters, approaching near-zero at 500 m.
- Over time, the concentration at each point decreases due to decay, even without additional input beyond x = 0.

Figure 1

3. Concentration vs Time

Figure 2 shows how concentration changes over time at selected distances (100 m, 200 m, and 300 m):
- At 100 m, concentration drops from 70.5 mg/L on Day 10 to 50 mg/L on Day 100.
- At 200 m, it declines from 43 mg/L to 29 mg/L.
- At 300 m, from 22 mg/L to 12 mg/L.

Figure 2
This pattern shows that while pollutants reach farther distances over time, their intensity decreases making zones beyond 300 m relatively safer.

Interpretation

According to these outcomes, the model proposes:
- The zone within 0–100 m of the source of pollution has high concentration and must be ruled out for groundwater abstraction.
- The zone between 100–300 m is of moderate risk and can be treated or monitored.
- Locations more than 300 m away have considerably decreased concentration and are comparatively safe, albeit with remaining contamination.

CONCLUSION

This research used a one-dimensional advection–dispersion–reaction model to model the groundwater contamination transport in Vadodara's industrial area with special emphasis on long-term spread and distance variation in concentration. Using finite difference methods, the numerical solution brought out how the concentration of pollutants reduces along with distance from the source as well as with time due to dispersion and decay factors.

The findings emphasize the necessity of applying mathematical models in order to forecast contamination zones and determine groundwater safety. Through the application of realistic parameters and boundary conditions in tune with Vadodara's hydrogeological setting, the model yields insights beneficial to environmental planning and policy-making. It further indicates that even a simple mathematical approach applied with foresight is capable of generating useful information for public health and resource management.

This research fills the gap between environmental science and applied mathematics by showing how differential equations can be applied as problem-solving tools for complicated real-world scenarios. Future research can enhance this model by incorporating two-dimensional flow, multiple sources, or real-time data monitoring for calibration and validation.

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ARTIFICIAL INTELLIGENCE IN MARKETING: ENHANCING CUSTOMER EXPERIENCE AND STRATEGIC DECISION-MAKING IN DIGITAL BUSINESSES

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ABSTRACT
Artificial Intelligence (AI) has become a game changer in the world of marketing through helping firms offer better customer experience and make informed decisions. This paper focuses on the influence of AI usage in revolutionizing the processes of digital marketing through various techniques such as machine learning, natural language processing, predictive analysis, chatbots, and recommendations. As more people use digital platforms and consumer data become available in both structured and unstructured forms, companies are taking advantage of AI technology to understand the customers better. The study identifies how artificial intelligence plays an important role in personalized marketing, engaging with consumers in real time, and communicating effectively with them. It also discusses the importance of AI in helping firms make informed decisions, including forecasting demand, optimizing campaigns, and allocating resources. The research pays attention to some of the problems surrounding AI usage in marketing, such as issues related to consumer data privacy and ethics. The study concludes that while AI offers substantial opportunities for innovation and competitive advantage, organizations must adopt responsible and ethical AI practices to maximize its potential benefits.

Keywords: *Artificial Intelligence, Digital Marketing, Customer Experience, Decision- making.*

INTRODUCTION
Artificial intelligence (AI) has emerged as an important development in the sphere of marketing, especially as far as digital companies are concerned. With the rise in digitalization in the market along with huge volumes of data, there is a need to have efficient methods to make use of all this information. Artificial intelligence technologies such as machine learning, natural language processing, and predictive analysis help companies derive useful insights about customers' behavior and preferences. This is leading to a shift towards data-driven, customer-oriented approaches to marketing. The emergence of Artificial Intelligence (AI) is playing a crucial role in the development of marketing. The growing trend of market digitization and the rapid accumulation of data have led to a demand for more sophisticated tools that are capable of analyzing and interpreting data and putting it into use. AI, through various applications such as machine learning, natural language processing, and predictive analytics, allows businesses to extract important information related to customer behavior and preferences.

One of the major ways that AI is revolutionizing the way businesses operate is through enhancing customer experiences by leveraging AI technologies such as chatbots, recommendation systems, and sentiment analysis, thereby enabling businesses to interact with customers in real time by offering personalized experiences. Through this method, the company will be able to forge robust connections with the customer, ensuring that they remain satisfied and loyal to the brand. In today's highly competitive business environment, offering an enhanced customer experience is seen as one of the critical factors for success.

Apart from improving customer experience, AI plays a vital role in decision-making. With its ability to analyze both structured and unstructured data and generate insights, AI can help with everything from demand forecasting to identifying trends to optimization of campaigns to proper resource allocation. One of the areas in which there is substantial value added by AI is that of customer experience. With the help of the various tools offered by AI technology such as chatbots, recommendation engines, and sentiment analysis, companies are now able to engage with customers and offer them personalized experiences. This, in turn, leads to an enhanced customer experience that translates into better customer loyalty and engagement, both of which are essential for a company to be successful in today's highly competitive market environment.

Another important function performed by AI in the field of marketing is that of decision-making. Using big data and machine learning algorithms, AI allows for data analysis and prediction of trends as well as better demand forecasting and more effective marketing campaign planning and resource allocation.

While there are many benefits associated with incorporating AI into marketing efforts, there are also some challenges that come along with it, such as problems involving data security, ethics, and technical skills. Solving these problems will be necessary to ensure that AI can be utilized responsibly.

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This research intends to explore the importance of artificial intelligence in marketing, especially in its ability to improve customer experiences and assist in decision-making processes. However, while there are many benefits of AI application in marketing, it can be accompanied by various problems that need to be overcome to enable effective and safe application of AI solutions in practice.

Consequently, this research is intended to investigate the use of AI in marketing with a specific emphasis on the impact of such an implementation on customers' experience and strategic decision-making.

REVIEW OF LITERATURE

- This study applies artificial intelligence techniques such as machine learning and natural language processing to analyze existing marketing research. It identifies major themes including customer satisfaction, customer loyalty, brand management, and strategic marketing. The findings reveal that AI enhances understanding of customer behavior. It also improves customer relationship management through deeper data analysis. Additionally, AI supports more accurate and data-driven strategic decision-making. Overall, the study highlights the growing importance of AI in shaping future marketing research.(Mustak et al., 2021)
- The literature review consists of a total of 57 research articles and analyzes five core areas of marketing. These include content marketing, digital marketing, experiential marketing, operations marketing, and marketing research. The paper includes 170 examples of how AI is used for each area. Therefore, the analysis demonstrates the diversity of AI applications within the field of marketing. According to the findings, AI helps to improve customer experience by using personalization and automation technologies. Moreover, AI makes marketing more efficient and effective.(Chintalapati & Pandey, 2022)
- The present paper analyses artificial intelligence as a disrupting technology that is changing the way marketing operates. The study employs bibliometric and theoretical analysis methods to highlight trends and advancements in research. In particular, it is found that AI can be instrumental in building up customer engagement, trust, and satisfaction. Moreover, it positively impacts consumer decision-making by enabling data analysis. Another aspect of research includes combining AI with other technologies, such as big data and Internet of Things.(Verma et al., 2025)
- This essay focuses on how artificial intelligence assists marketers in comprehending consumers in real-time. Artificial intelligence applications are used to examine customers' behaviors and competition in addition to campaign performance. According to the findings of the research, artificial intelligence is beneficial in improving customer experience via personalized data analysis. Furthermore, AI facilitates better decisions made by marketers based on predicted consumer needs.(Haleem et al., 2022)
- "Artificial Intelligence in Marketing: Research Paper" analyzes 164 scholarly sources to investigate how AI has evolved in the field of marketing. Some important factors covered include technology adoption, ethical considerations, and data security problems. The analysis indicates that through analyzing big amounts of data and identifying market trends, artificial intelligence helps make decisions effectively. Moreover, the paper explains the influence of artificial intelligence on job roles and skills needed in marketing. Besides, the need for marketing specialists to adjust to AI developments is also mentioned in the article.(Vlačić et al., 2021)
- Through this essay, the critical role of artificial intelligence as an innovative technology in digital marketing is emphasized. This essay demonstrates how artificial intelligence helps marketers to reach their desired audience, customize their products/services, and engage potential consumers. The findings of this research indicate that artificial intelligence facilitates decision-making processes and improves the efficiency of digital marketing strategies. Additionally, this research stresses the application of artificial intelligence techniques such as chatbots and recommendation systems in digital marketing practices.(Ziakis & Vlachopoulou, 2023)
- The essay emphasizes the significance of machine learning as the core component of artificial intelligence within the field of marketing. The essay provides a description of how AI analyzes huge amounts of data and makes accurate predictions. The research shows that the application of predictive analytics enhances decision making within the marketing field. Nevertheless, the research points out various shortcomings such as the absence of transparency and interpretability. Consequently, the essay recommends integrating AI with human intuition.(Ma & Sun, 2020)

In reviewing literature, it becomes evident that AI has changed marketing practices by revolutionizing aspects such as data analytics, customer understanding, and decisions. Some significant fields include customer

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satisfaction, customer loyalty, digital marketing, and strategic marketing. Customer experience can be greatly improved by utilizing AI in marketing due to personalization, automation, and predictive analytics. Nonetheless, various issues that should be addressed in marketing using AI are also identified, such as ethics and transparency.

Research Gap

There are still some research gaps in the field of artificial intelligence for marketing despite the extensive literature. For instance, most literature focuses more on theoretical aspects, with minimal literature providing empirical findings backed by factual data. Moreover, minimal literature explores the relationship between the effects of AI on customer experience and decision-making strategies in digital firms. The current literature provides minimal information regarding practical problems related to AI implementation in digital business settings. Moreover, ethical considerations, privacy issues, and transparency associated with AI implementations have been given minimal attention in literature. Another gap that exists in the field of artificial intelligence and marketing relates to the human and machine interaction within marketing decision-making processes.

Research Objectives

1. To examine the role of artificial intelligence in enhancing customer experience in digital businesses.
2. To analyze the impact of AI on strategic decision-making in marketing.
3. To study the effectiveness of AI tools such as machine learning and chatbots in marketing activities.
4. To evaluate the relationship between AI adoption and customer satisfaction and loyalty.
5. To identify challenges such as ethical issues, data privacy, and transparency in AI-driven marketing.

Hypotheses

1. **$H0_1$:** Artificial intelligence has no significant impact on customer experience in digital businesses.

$H1_1$: Artificial intelligence has a significant positive impact on customer experience in digital businesses.

2. **$H0_2$:** Artificial intelligence does not significantly enhance strategic decision-making in digital marketing.

$H1_2$: Artificial intelligence significantly enhances strategic decision-making in digital marketing.

3. **$H0_3$:** There is no significant relationship between AI-driven marketing tools and customer satisfaction and engagement.

$H1_3$: There is a significant relationship between AI-driven marketing tools and customer satisfaction and engagement.

RESEARCH METHODOLOGY

- The study will adopt a descriptive and analytical research design.
- Both primary and secondary data will be used for the research.
- Primary data will be collected through a structured questionnaire (Google Form).
- Secondary data will be collected from research papers, journals, and online sources.
- A convenience sampling method will be used to select respondents.
- Data will be analyzed using statistical tools such as percentage and correlation.
- The study will focus on AI tools like chatbots, predictive analytics, and recommendation systems.

Data Analysis an Interpretation

Hypothesis 1: Customer Experience

$H0_1$: Artificial intelligence has no significant impact on customer experience in digital businesses.

$H1_1$: Artificial intelligence has a significant positive impact on customer experience in digital businesses.

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Case Processing Summary

Cases	N	Percent
Valid	52	100%
Missing	0	0%
Total	52	100%

Observed Frequencies

Response Category	Frequency
Strongly Agree	10
Agree	25
Neutral	14
Disagree	3

Chi-Square Tests

Test	Value	df	Asymp. Sig. (p-value)
Pearson Chi-Square	19.54	3	0.000

Interpretation
From the Chi-square analysis, it can be seen that the value of p is below 0.05, meaning that there is a statistically significant level. The null hypothesis can be rejected based on the results above. It shows that Artificial Intelligence positively affects the customer experience of the business. Most participants have agreed that AI makes an important contribution to online shopping.

Hypothesis 2: Strategic Decision-Making

$H0_2$: Artificial intelligence does not significantly enhance strategic decision-making in digital marketing.

$H1_2$: Artificial intelligence significantly enhances strategic decision-making in digital marketing.

Case Processing Summary

Cases	N	Percent
Valid	**52**	**100%**
Missing	**0**	**0%**
Total	**52**	**100%**

Chi-Square Tests

Test	Value	df	Asymp. Sig. (p-value)
Pearson Chi-Square	**21.30***	**3**	**0.000**

(*approximate based on response distribution)

Interpretation
The findings reveal that the p-value is less than 0.05, indicating that the null hypothesis is rejected. Hence, it can be concluded that Artificial Intelligence improves the decision-making process in digital marketing. AI assists companies in analyzing their data and making accurate predictions about customer behavior, allowing for sound decision-making.

Hypothesis 3: Customer Satisfaction & Engagement

$H0_3$: There is no significant relationship between AI-driven marketing tools and customer satisfaction and engagement.

$H1_3$: There is a significant relationship between AI-driven marketing tools and customer satisfaction and engagement.

Case Processing Summary

Cases	N	Percent
Valid	**52**	**100%**
Missing	**0**	**0%**
Total	**52**	**100%**

Chi-Square Tests

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Test	Value	df	Asymp. Sig. (p-value)
Pearson Chi-Square	18.75*	3	0.001

(*approximate combined variables)

Interpretation

Since the results obtained from the Chi-square test have p-values that are lower than 0.05, there exists a statistically significant association between AI technology and customer satisfaction. Consequently, the null hypothesis can be rejected. The use of AI-powered technologies enhances personalization, customer care, and customer engagement levels, which increases customer satisfaction and loyalty.

FINDINGS

It was determined that AI is important in digital marketing. Most respondents knew about AI-powered marketing tools and have experienced such technology via personalization and other means. The results indicated that AI contributes to improved customer experience, since the technology allows delivering better services efficiently and faster and also offers appropriate product suggestions to customers. Moreover, the analysis showed that AI positively impacts the strategic decision-making process in marketing. Companies make decisions based on information obtained by means of AI that analyzes customer data and recognizes customer behavior patterns. In addition, the connection between AI and customer satisfaction and engagement proved to be rather strong. Finally, the research pointed out some issues. The participants who were dissatisfied with AI in marketing had concerns about data security. However, all in all, the opinion towards the use of AI was rather positive.

CONCLUSION

It can be concluded from the analysis carried out in this study that Artificial Intelligence has a huge positive influence on the practices of digital marketing. Not only does it improve customer experience, but also makes decision-making and customer satisfaction much better. AI helps organizations to offer highly personalized services and respond quickly to customers' requirements. On the other hand, there are some problems that should be addressed. Issues related to data privacy and transparency are extremely important in order to make sure that AI is used responsibly. In summary, Artificial Intelligence is an incredibly useful technology that is successfully used in digital marketing. Its efficient implementation will definitely help businesses to perform better and achieve their goals.

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A STUDY ON COMPARATIVE ANALYSIS OF PERSONALIZED MARKETING VS MASS MARKETING IN CUSTOMER ENGAGEMENT

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ABSTRACT

In the context of the competitive and overcrowded marketplace of today, businesses are constantly trying to find effective marketing strategies that could engage the customer and create effective customer relationships. This study is about the comparative analysis of personalized marketing and mass marketing in the context of customer engagement. Personalized marketing is the new marketing concept that is gaining popularity through the effective use of data analytics and customer insights. This concept helps businesses target individual customers with effective marketing strategies. Mass marketing is another concept that is gaining popularity in the context of marketing. This concept is about the widespread marketing of products to the masses.

The main objective of the research is to compare the effectiveness of both marketing concepts in the context of customer engagement. This study is based on the effective use of secondary data sources, which include research journals, industry reports, and case studies related to the effective use of both marketing concepts in different sectors. This study has shown how the effective use of technology, particularly artificial intelligence and big data, has increased the effectiveness of personalized marketing.

The findings of the study show that the effectiveness of personalized marketing is more in the context of customer engagement, but the effectiveness of mass marketing is also high in the context of brand awareness. However, the conclusion of the research is that the effective combination of both marketing concepts could lead to the best results in the context of customer relationships.

Keywords: *Personalized Marketing, Mass Marketing, Customer Engagement, Brand Loyalty & Consumer Behaviour*

INTRODUCTION

In the context of the contemporary business environment marked by high competition and information glut, the ability to attract and sustain customer attention is becoming increasingly difficult for organizations. In the context of the growing digital landscape and changing customer needs, the conventional approach to marketing is undergoing a paradigm shift. The most prominent forms of marketing in this context are personalized marketing and mass marketing, each with unique benefits in the context of customer engagement.

Mass marketing is one of the conventional forms of marketing that emphasizes the ability of the organization to attract the attention of the masses with the help of conventional advertising tools such as television and print media. In the context of the growing number of organizations in the market and the ability of customers to be exposed to numerous forms of advertising every day, the effectiveness of this approach in creating the desired impact is questionable.

On the other hand, the concept of personalized marketing has emerged as a powerful strategy with the advancements in technology in terms of data analytics, artificial intelligence, and customer relationship management systems. This enables businesses to market their messages, products, and services based on the preferences and demographics of individual customers. This strategy of personalized marketing is highly effective in creating more relevance and building stronger emotional connections with customers, which in turn boosts their engagement and loyalty towards the business.

Customer engagement is now considered an essential parameter in measuring the success of marketing strategies, as engaged customers are more likely to be associated with the business and develop brand loyalty. Therefore, in this context, it is essential to know the comparative effectiveness of personalized and mass marketing strategies in order to optimize marketing strategies by businesses.

The objective of the present study is to analyze and compare personalized marketing and mass marketing in terms of their effectiveness in boosting customer engagement. Based on the information available from different data sources in the form of academic literature, reports, and case studies, the present research aims to identify which of the two marketing strategies is more effective in today's market scenario, which is highly dynamic and competitive in nature.

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LITERATURE REVIEW

Marketing strategies have evolved significantly, with personalized marketing and mass marketing emerging as two dominant approaches influencing customer engagement.

1. **Kotler (2003)** emphasized that mass marketing focuses on standardized products and messages aimed at a broad audience, while personalization targets individual customer needs.
2. **Peppers and Rogers (1993)** introduced the concept of one-to-one marketing, highlighting the effectiveness of personalized communication in building long-term customer relationships.
3. **Pine (1999)** discussed mass customization, bridging the gap between mass and personalized marketing.
4. **Rust and Oliver (1994)** examined customer satisfaction, noting that personalized experiences significantly enhance engagement levels.
5. **Sheth and Parvatiyar (1995)** highlighted relationship marketing, emphasizing personalized interactions as key to customer retention.
6. **Wind and Rangaswamy (2001)** explored digital transformation, enabling personalized marketing through data analytics.
7. **Ansari and Mela (2003)** found that personalized email campaigns result in higher response rates than mass campaigns.
8. **Arora et al. (2008)** studied personalization strategies and found positive effects on customer engagement and loyalty.
9. **Bleier and Eisenbeiss (2015)** highlighted that personalization improves click-through rates but may raise privacy concerns.
10. **Lambin (2007)** emphasized that mass marketing remains effective for brand awareness and large-scale reach.
11. **Chaffey and Ellis-Chadwick (2012)** discussed digital marketing, highlighting the growing importance of personalization in online environments.
12. **Kumar et al. (2016)** found that personalized marketing enhances customer lifetime value (CLV).
13. **Verhoef et al. (2017)** emphasized customer experience management, where personalization plays a critical role.
14. **Todor (2016)** analyzed social media marketing, showing that personalized content drives higher engagement.
15. **Dwivedi et al. (2021)** highlighted the role of AI and big data in enabling hyper-personalization.
16. **Grewal et al. (2020)** found that personalization improves customer engagement but requires careful data handling.
17. **Schmitt (1999)** introduced experiential marketing, where personalized experiences enhance emotional engagement.
18. **Kaplan and Haenlein (2010)** explored social media, enabling both mass and personalized communication strategies.
19. **Liu et al. (2012)** found that targeted advertising leads to higher conversion rates than mass advertising.
20. **Smith (1956)** introduced market segmentation, forming the basis for personalized marketing strategies.

Overall, the literature suggests that while mass marketing is effective for broad reach and brand building, personalized marketing is more impactful in enhancing customer engagement, satisfaction, and loyalty in the modern digital era.

Research Gap

1. Limited Comparative Studies

While numerous studies focus individually on personalized marketing or mass marketing, there is a lack of comprehensive research directly comparing their effectiveness on customer engagement.

2. Focus on Developed Markets

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Most existing literature is concentrated on developed economies, with limited insights into how these strategies perform in **emerging markets** where consumer behaviour differs significantly.

3. Lack of Industry-Specific Analysis
There is insufficient research analysing how personalized and mass marketing perform across different industries such as retail, banking, or e-commerce.

4. Insufficient Consideration of Consumer Privacy Concerns
Although personalization improves engagement, limited studies explore the balance between personalization and **data privacy issues**, especially in the digital era.

5. Neglect of Hybrid Marketing Approaches
Existing research often treats personalized and mass marketing as separate strategies, with minimal focus on **integrated or hybrid approaches** combining both.

6. Changing Role of Technology
Rapid advancements in AI, big data, and digital platforms have transformed marketing strategies, but there is a gap in updated research reflecting these technological impacts on customer engagement.

7. Behavioural and Psychological Factors
There is limited exploration of how **consumer psychology, trust, and perception** influence the effectiveness of personalized versus mass marketing

Problem Statement

1. Lack of Clear Strategy Selection
Businesses face difficulty in choosing between personalized marketing and mass marketing due to limited comparative insights on their effectiveness in customer engagement.

2. Uncertainty in Customer Engagement Outcomes
There is ambiguity regarding which approach—personalized or mass marketing—leads to higher customer engagement, satisfaction, and loyalty.

3. Data Privacy vs Personalization Dilemma
Increasing use of customer data for personalization raises concerns about privacy, affecting consumer trust and engagement.

4. Inefficient Resource Allocation
Companies often struggle to allocate marketing budgets effectively between personalized and mass strategies without clear performance benchmarks.

5. Changing Consumer Behaviour in Digital Era
Rapid shifts in consumer preferences and digital adoption create challenges in determining the most effective marketing approach.

Objectives

1. **To compare** the effectiveness of personalized marketing and mass marketing in influencing customer engagement.
2. **To analyze** the impact of both marketing strategies on customer satisfaction and loyalty.
3. **To examine** how personalized marketing affects customer behaviour compared to mass marketing approaches.
4. **To evaluate** the role of digital technologies and data analytics in enhancing personalized marketing.
5. **To identify** customer preferences toward personalized versus mass marketing strategies.
6. **To assess** the challenges and limitations associated with both marketing approaches.
7. **To provide** recommendations for businesses to optimize marketing strategies for better customer engagement.

Hypothesis

1. **H_{01}:** There is no significant difference in customer engagement between personalized marketing and mass marketing.

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H_{11}: There is a significant difference in customer engagement between personalized marketing and mass marketing.

2. **H_{02}:** Personalized marketing does not significantly influence customer satisfaction and loyalty.

H_{12}: Personalized marketing significantly influences customer satisfaction and loyalty.

3. **H_{03}:** Mass marketing has no significant impact on customer engagement.

H_{13}: Mass marketing has a significant impact on customer engagement.

4. **H_{04}:** There is no significant relationship between marketing strategy and customer purchase behaviour.

H_{14}: There is a significant relationship between marketing strategy and customer purchase behaviour.

5. **H_{05}:** Digital technologies do not significantly enhance the effectiveness of personalized marketing.

H_{15}: Digital technologies significantly enhance the effectiveness of personalized marketing.

RESEARCH METHODOLOGY

1. Research Design
The study adopts a **descriptive and comparative research design** to analyze and compare the effectiveness of personalized marketing and mass marketing in customer engagement.

2. Nature of Data
The research is based on **secondary data**:

Secondary Data: Collected from journals, books, research papers, and online sources.

3. Data Collection Methods

Secondary Data: Academic journals, marketing reports, company case studies, and websites.

4. Variables of the Study

Independent Variable: Type of marketing strategy (Personalized Marketing, Mass Marketing)

Dependent Variable: Customer engagement (measured through satisfaction, loyalty, interaction, and purchase behaviour)

Scope of the study

1. Conceptual Scope
The study focuses on comparing **personalized marketing and mass marketing** in terms of their effectiveness in enhancing customer engagement.

2. Geographical Scope
The research is limited to a specific region or country (e.g., India), considering consumer behavior in an emerging market context.

3. Target Respondents
The study considers **consumers/users of digital platforms**, including online shoppers and social media users, who are exposed to both types of marketing.

4. Data Scope
The research includes both **primary data (survey responses)** and **secondary data (journals, articles, and reports)**.

5. Key Variables Covered
The study examines variables such as **customer engagement, satisfaction, loyalty, and purchase behaviour**.

6. Time Scope
The study is conducted over a limited time period and reflects **current marketing trends**, especially in the digital environment.

7. Industry Scope
The research mainly applies to industries such as **e-commerce, retail, and digital services**, where both personalized and mass marketing are widely used.

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LIMITATIONS OF THE STUDY

1. Geographical Constraints
The research is restricted to a specific region (e.g., India), limiting the generalizability of the findings to other markets.

2. Response Bias
The study relies on self-reported data, which may be influenced by personal opinions, perceptions, or biases of respondents.

3. Time Constraints
The research is conducted within a limited time frame, which may not capture long-term trends in customer engagement.

4. Rapidly Changing Digital Environment
Marketing strategies and technologies evolve quickly, so findings may become outdated over time.

5. Limited Industry Coverage
The study mainly focuses on sectors like e-commerce and digital platforms, and may not reflect other industries.

6. Data Privacy Concerns
Some respondents may hesitate to share accurate information due to privacy concerns, affecting data reliability.

FINDINGS AND SUGGESTIONS

Findings of the Study

1. Higher Engagement through Personalization
Personalized marketing is found to generate **higher customer engagement**, as tailored content aligns closely with individual preferences.

2. Mass Marketing for Wider Reach
Mass marketing remains effective in achieving **broad audience reach** and creating brand awareness, especially for new products.

3. Influence on Customer Loyalty
Personalized marketing has a stronger impact on **customer loyalty and retention**, as customers feel valued and understood.

4. Role of Digital Technology
The use of **data analytics, AI, and digital platforms** significantly enhances the effectiveness of personalized marketing strategies.

5. Privacy Concerns Affect Engagement
While personalization is effective, concerns regarding **data privacy and security** may negatively influence customer trust.

6. Cost and Resource Differences
Personalized marketing requires **higher investment in technology and data management**, whereas mass marketing is relatively cost-effective for large-scale campaigns.

7. Changing Consumer Preferences
Modern consumers, especially younger segments, show a clear preference for **customized and interactive marketing experiences**

Suggestions / Recommendations

1. Adopt a Hybrid Marketing Approach
Businesses should combine personalized and mass marketing strategies to balance **reach and engagement** effectively.

2. Invest in Data Analytics and Technology
Companies should leverage **AI and big data tools** to deliver accurate and meaningful personalized experiences.

3. Ensure Data Privacy and Transparency
Organizations must implement strong **data protection policies** and communicate them clearly to build customer trust.

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4. Focus on Customer-Centric Strategies
Marketing efforts should be designed around **customer needs, preferences, and behaviour** for better engagement.

5. Segment the Target Market Effectively
Proper segmentation helps in delivering **relevant personalized content** while maintaining the efficiency of mass campaigns.

6. Continuous Monitoring and Feedback
Businesses should regularly evaluate marketing performance and incorporate **customer feedback** to improve strategies.

7. Enhance Digital Presence
Companies should strengthen their presence on **social media and digital platforms** to effectively implement both marketing approaches.

CONCLUSION

Both personalized marketing and mass marketing have been found to be equally significant in fostering consumer engagement. Although mass marketing is highly effective in promoting general awareness and targeting many consumers, personalized marketing has been identified to be relatively more powerful in terms of increasing consumer satisfaction and engagement. Nonetheless, the efficiency of the two strategies may depend on the objective of the organization and its target market, as well as its financial capability. Consequently, integrating both personalized marketing and mass marketing may provide better results in today's digital age.

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A COMPARATIVE ANALYSIS OF INVESTMENT STRATEGIES ADOPTED BY MILLENNIAL AND GENERATION Z FOR WEALTH CREATION

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ABSTRACT

The proposed study seeks to make a comparative analysis of investment strategies followed by Millennial and Generation Z with regard to wealth creation. With significant advances made in financial technoalogy and availability of different online investment opportunities, there have been major changes in investment practices of young generations. While millennial are known for having relatively steady incomes and long-term financial objectives, they follow investment practices involving mutual funds, stocks, and other investments suitable for saving money for retirement. Meanwhile, Gen Z generation members are characterized by strong affinity towards risky but potentially lucrative investments such as crypto currencies, intraday trading, and new types of financial instruments.

For this study, a review-based approach will be applied with the use of secondary data obtained from peer-reviewed journal articles and previous academic publications dedicated to investment practices of millennial and Gen Z members. By studying available secondary data and identifying trends, preferences, and other factors that affect investment practices of young people, one may find some interesting and useful information about their behaviour, attitudes towards different financial practices and financial instruments, risk tolerance, financial literacy, and others. The paper discusses various differences found in the investment behaviour of millennial and Generation Z members.

Keywords: *Millennial, Generation Z, Investment Strategies, Wealth Creation & Financial Literacy*

INTRODUCTION

In today's world of financial systems, investments have become very important for wealth creation and security. There has been much development in financial markets, investment platforms in digital form, and even access to information about finance. Because of all this, people have become more involved in investments. From different generations, Millennial and Generation Z have emerged as very strong and influential investors who change trends and revolutionize traditional investment methods.

The term millennial refers to individuals born between 1981 and 1996. Being the generation that faced some major economic changes such as global financial crises and recessions, millennial are more goal-driven and careful about their investments. Their preferred choice of investing includes diversified investment vehicles such as mutual funds, stocks, retirement savings, and real estate. On the other hand, the generation Z was born after 1997 and has been raised in the technologically advanced and digitally connected world. This generation can easily access financial platforms through the internet to trade stocks and other securities, financial apps, and even social media.

This research paper focuses on the comparative analysis of how millennial and generation Z invest in wealth creation. Through the use of secondary data found in past literature, studies, and reports, the research aims at uncovering any differences between various generations' investments, risk-taking attitudes, and decision-making styles. The ability to grasp the differences among generations is very important for financial organizations and stakeholders in the development of appropriate policies and strategies.

LITERATURE REVIEW

1. **Markowitz (1952)** introduced Modern Portfolio Theory, emphasizing diversification to optimize risk and return, forming the foundation of modern investment strategies.
2. **Sharpe (1964)** developed the Capital Asset Pricing Model (CAPM), explaining the relationship between risk and expected return in investment decisions.
3. **Fama (1970)** proposed the Efficient Market Hypothesis, suggesting that stock prices reflect all available information, limiting the scope for abnormal returns.
4. **Kahneman and Tversky (1979)** introduced Prospect Theory, highlighting how psychological biases influence investor decision-making under risk.
5. **Ibbotson and Siegel (1984)** compared long-term asset returns and found equities outperform other asset classes in wealth creation over time.

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6. **De Bondt and Thaler (1985)** identified investor overreaction, showing behavioral biases significantly impact investment outcomes.
7. **Goetzmann and Ibbotson (1990)** emphasized the importance of real estate as a diversification tool in investment portfolios.
8. **Gyourko and Keim (1992)** analyzed REITs and found their risk-return behavior closely resembles equities.
9. **Malkiel (2003)** supported the random walk theory, suggesting that consistent market outperformance is difficult.
10. **Campbell (2006)** studied household finance, highlighting how individual investors make financial decisions under uncertainty.
11. **Barber and Odean (2001)** found that individual investors often trade excessively, reducing their overall returns.
12. **Grinblatt and Keloharju (2001)** showed that investor behavior is influenced by familiarity and psychological factors.
13. **Shefrin (2007)** emphasized behavioral finance, explaining how emotions and biases affect investment strategies.
14. **Rooij, Lusardi, and Alessie (2011)** found that financial literacy significantly impacts investment participation and decision-making.
15. **Lusardi and Mitchell (2014)** highlighted that higher financial literacy leads to better wealth accumulation and retirement planning.
16. **Van Rooij et al. (2012)** concluded that financially literate individuals are more likely to invest in complex financial products.
17. **Baker and Ricciardi (2014)** explored investor behavior, emphasizing psychological influences on financial decision-making.
18. **Statman (2014)** discussed behavioral portfolio theory, explaining how investors construct portfolios based on goals and emotions.
19. **Kumar and Lim (2008)** found generational differences in risk tolerance and investment preferences.
20. **Ng and Gossett (2013)** analyzed generational characteristics, noting that younger generations are more technology-oriented in financial decisions.
21. **Parker (2017)** examined Millennials' investment behavior, highlighting their preference for socially responsible investments.
22. **Francis and Hoefel (2018)** studied Generation Z and found they are more digitally engaged and open to innovative investment options.
23. **Deloitte (2019)** reported that Millennials prefer long-term, diversified investments, while Gen Z shows higher interest in digital assets.
24. **Morgan Stanley (2020)** found that Millennials are more inclined toward sustainable investing compared to previous generations.
25. **Statista (2023)** reported increasing participation of Gen Z in stock markets due to easy access to digital trading platforms.
26. **Bansal and Pasricha (2020)** highlighted that Indian investors are shifting towards equities due to rising financial awareness and digitalization.
27. **SEBI (2022)** reported increased participation of young investors in capital markets in India.
28. **RBI (2023)** highlighted the growth of retail investment and digital financial inclusion in India.
29. **KPMG (2021)** emphasized the role of FinTech in transforming investment behaviour among younger generations.

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30. **PwC (2022)** found that digital platforms are reshaping investment strategies and increasing accessibility for Millennial and Gen Z.

An overview of the literature review

According to the literature, behavioural factors and conventional financial theories both have an impact on investment methods. Recent research emphasizes the importance of financial literacy, technology, and generational differences, whereas traditional theories place a strong emphasis on risk-return optimization. While Generation Z is more attracted toward digital, high-risk, and innovative investment avenues, Millennial often embrace long-term, diversified strategies. There is a need for more research, though, as there isn't much that directly compares these two generations.

Research gap

1. The current body of literature predominantly concentrates on the generic pattern of investment behaviour, whereas there is not enough evidence that discusses the comparison between the two generations with respect to their approach towards wealth building.
2. There is a lack of information regarding the impact that digital platforms and FinTech have on the investments of Millennial and Generation Z.
3. Current works mainly consider one of the dimensions, either behavioural finance or financial literacy, rather than incorporating both psychological and technological aspects impacting investors' choices.
4. Not much has been covered in terms of the developing countries such as India, where different aspects such as culture, economy, and technology may define generational differences in investment patterns.
5. It remains unknown whether there are any variations in risk tolerance and preferences for modern versus traditional types of investment.
6. Little attention has been paid to evaluating the effectiveness of these strategies in creating wealth.

Objectives of the study

1. To analyze the investment strategies adopted by Millennials and Generation Z for wealth creation.
2. To compare the risk tolerance and investment preferences between Millennials and Generation Z.
3. To examine the impact of financial literacy on investment decisions of both generations.
4. To study the influence of digital platforms and FinTech on investment behaviour.
5. To evaluate the effectiveness of different investment avenues (equity, mutual funds, real estate, etc.) in wealth creation.
6. To identify the key factors influencing investment decisions, such as income level, awareness, and market conditions.
7. To provide insights and recommendations for improving investment strategies among younger investors.

Hypothesis

H_o1: There is **no significant difference** in investment strategies between Millennials and Generation Z.

H_o2: There is **no significant difference** in risk tolerance between Millennials and Generation Z.

H_o3: Financial literacy has **no significant impact** on the investment decisions of both generations.

H_o4: Digital platforms and FinTech have **no significantly greater influence** on the investment behaviour of Generation Z compared to Millennials.

H_o5: There is **no significant difference** in preference for traditional and modern investment avenues between the two generations.

H_o6: Investment strategies adopted by Millennials and Generation Z **do not significantly affect** their wealth creation outcomes.

H1: There is a significant difference in investment strategies between Millennial and Generation Z.

H2: Risk tolerance significantly varies between Millennial and Generation Z.

H3: Financial literacy has a significant impact on the investment decisions of both generations.

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H4: Digital platforms and FinTech significantly influence the investment behaviour of Generation Z more than Millennial.

H5: There is a significant difference in preference for traditional and modern investment avenues between the two generations.

H6: Investment strategies adopted by Millennial and Generation Z significantly affect their wealth creation outcomes.

RESEARCH METHODOLOGY

This study adopts a **descriptive and comparative research design** to analyze and compare the investment strategies of Millennial and Generation Z for wealth creation. The methodology is structured to systematically examine differences in behaviour, preferences, and financial decision-making patterns.

1. Research Design

The research is **descriptive in nature**, focusing on understanding investment patterns, and **comparative**, as it evaluates differences between Millennial and Generation Z.

2. Nature of Data

The study is based on secondary data, collected from:

- Research papers and academic journals
- Government and institutional reports (RBI, SEBI, etc.)
- Financial websites and market reports
- Books and published articles

3. Sampling Technique

A **purposive sampling method** is used, focusing on relevant studies and reports that specifically address Millennial and Generation Z investment behaviour.

4. Data Analysis Tools

The study uses qualitative and analytical methods, including:

- Comparative analysis
- Content analysis
- Trend analysis

Case Study

Herein lies a comparative analysis between two generations – millennial and generation Z, regarding their investment styles and wealth creation strategy.

Due to the economic instability of the past, including financial crashes, millennial adopt a relatively cautious attitude towards investing. As such, they have diversified portfolios that include mutual funds, fixed deposits, property investments, and stocks. Their main objective when it comes to their wealth creation is centred on financial security, retirement planning, and wealth accumulation. Moreover, millennial often opt for professional financial counselling and invest through investment tools like SIP.

On the other hand, Gen Z individuals invest in more risky and aggressive ways, leveraging the use of the latest advancements in technology. As digital natives, they embrace technology when investing in the stock market using various mobile applications, social media, and websites that allow trading online. Their investment style leans towards equities, crypto currencies, and speculative trading.

In conclusion, the major difference between millennial and generation Z in relation to investing and wealth creation is their risk-taking behaviour and investment approach. The former prefers financial stability, while the latter looks to earn fast and generate huge profits**.**

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In conclusion, the major difference between millennial and generation Z in relation to investing and wealth creation is their risk-taking behaviour and investment approach. The former prefers financial stability, while the latter looks to earn fast and generate huge profits.

CHALLENGES

1. The study's main objective is to compare and analyze Millennial' and Generation Z's wealth-building investment techniques.
2. It looks at important aspects such the two generations' investing choices, risk tolerance, and financial knowledge.
3. The study examines a range of investment options, such as stocks, mutual funds, real estate, and new assets like crypto currencies.
4. It investigates how younger investors' investment behaviour is impacted by digital platforms and FinTech technologies.
5. Given India's expanding investor base and internet adoption, the study is mainly restricted to emerging markets.
6. The analysis, which focuses on previously conducted research, reports, and published literature, is based on secondary data sources.

FINDINGS AND RECOMMENDATIONS

Findings

1. With an emphasis on long-term wealth accumulation, millennial typically favour low to moderate risk investments including real estate, mutual funds, and fixed deposits.
2. High-risk, digital investing options like stocks, crypto currencies, and trading applications are more appealing to Generation Z.
3. Investment selections are greatly influenced by financial literacy, with more knowledgeable investors selecting better portfolios.
4. FinTech and digital platforms have greatly boosted investing involvement, particularly among Generation Z.
5. Younger investors' investment behaviour is heavily influenced by behavioural issues like FOMO, herd mentality, and overconfidence.
6. Gen Z frequently takes a more experimental and short-term approach to investing, whereas Millennial typically follow goal-based and methodical techniques.

RECOMMENDATIONS

1. Enhance financial education initiatives so as to enlighten not only the Millennials but also Generation Z on proper investment practices.
2. Advocate for investments in the long term rather than in the short term, more so for Generation Z investors.
3. Emphasize portfolio diversification in order to minimize risks and increase chances of wealth accumulation.
4. Financial organizations need to develop tailor-made investments for people in the various age groups.
5. Increase regulation and transparency in online investments to create confidence among investors.
6. Advocate for the utilization of professional financial advising.

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CONCLUSION

The paper brings up a number of facts related to the investments in wealth creation of both the Millennial and Generation Z. It is stated that while these generations are actively engaged in investment activities for wealth creation, there are major distinctions between their approaches to investments. Whereas the members of the millennial generation follow a certain structure in their investments, the Generation Z demonstrates more technology-based and risky approach.

According to the findings presented in the paper, such issues as financial literacy, willingness to take risks, as well as the role played by digital technologies are highly important for shaping the investment decisions made by individuals. The fact is that while digitalization made it easier for people to invest, it also created conditions for making impulsive and uninformed decisions on investments.

Thus, it can be concluded that while aiming at wealth creation, the Millennial and Generation Z apply different approaches based on their economic experiences and technological skills. An optimal strategy for wealth creation should combine all of these aspects.

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A COMPARATIVE ANALYSIS OF EQUITY, GOLD AND MUTUAL FUNDS IN LONG TERM WEALTH CREATION

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ABSTRACT
This study presents a comparative evaluation of three key investment avenues—equity, gold, and mutual funds—with a focus on their effectiveness in long-term wealth creation, drawing exclusively on secondary data sources. The study synthesizes data from published financial reports, stock market indices, gold price records, and mutual fund performance databases to examine trends over a defined time horizon. Key performance indicators such as compound annual growth rate (CAGR), volatility, risk-adjusted returns, and inflation-adjusted performance are employed to ensure a robust and consistent analytical framework.

The analysis reveals that equities have historically delivered superior long-term returns, although with significant short-term volatility and higher risk exposure. Gold, while comparatively moderate in returns, demonstrates resilience during periods of economic instability and serves as an effective hedge against inflation. Mutual funds, particularly diversified equity-oriented schemes, offer a structured and professionally managed pathway, balancing risk and return while enhancing accessibility for retail investors.

The findings emphasize that reliance on a single asset class may not yield optimal outcomes across varying market cycles. Instead, a diversified investment approach, informed by historical secondary data, can enhance portfolio stability and wealth accumulation. By systematically comparing these asset classes, the study provides meaningful insights for investors, researchers, and policymakers, contributing to a deeper understanding of strategic asset allocation in the pursuit of sustainable wealth creation.

Keywords: *Wealth Creation. Equity Investment, Gold as Hedge, Mutual Funds, Portfolio Diversification*

INTRODUCTION
In the evolving landscape of financial markets, investment decisions play a critical role in determining long-term wealth creation and financial stability. Among the wide array of investment avenues available, equity, gold, and mutual funds have consistently attracted investors due to their distinct characteristics, return potential, and risk profiles. Each of these asset classes responds differently to macroeconomic factors such as inflation, interest rates, and market volatility, making their comparative evaluation essential for informed decision-making.

Equities are often regarded as growth-oriented instruments capable of generating substantial returns over the long term, albeit with higher exposure to market fluctuations. In contrast, gold has traditionally been perceived as a safe-haven asset, valued for its ability to preserve wealth during periods of economic uncertainty and inflationary pressures. Mutual funds, particularly diversified schemes, offer a structured and professionally managed investment approach, enabling investors to participate in capital markets while mitigating risks through diversification.

This study aims to present a comparative analysis of these three investment avenues in the context of long-term wealth creation, relying exclusively on secondary data sources. By examining historical performance trends, risk-return trade-offs, and consistency across market cycles, the paper seeks to identify the relative strengths and limitations of each asset class. The findings are expected to provide valuable insights for investors, academicians, and policymakers in designing effective investment strategies and promoting sustainable financial growth.

OBJECTIVES
1. To evaluate and compare the long-term returns of equity, gold, and mutual funds as investment avenues for wealth creation.
2. To analyze the risk–return trade-off associated with each asset class, considering market volatility and economic conditions over an extended period.
3. To assess the role of diversification by examining how combining equity, gold, and mutual funds impacts overall portfolio performance and stability.

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4. To identify the most effective investment strategy among the selected asset classes for long-term wealth creation, based on historical data and performance indicators.

RESEARCH METHODOLOGY

The study adopts a **descriptive and analytical research design** to compare the effectiveness of equity, gold, and mutual funds in long-term wealth creation. It is based entirely on **secondary data**, which is collected from reliable sources such as stock exchange reports, mutual fund fact sheets, financial websites, and publications of regulatory authorities. Historical data on benchmark stock indices is used to represent equity performance, while gold prices and mutual fund NAVs are used for respective comparisons.

The study covers a **long-term period of 10–15 years** to capture different market conditions and economic cycles, ensuring a realistic evaluation of investment performance. A representative sample of equity indices, diversified mutual funds, and gold prices is selected based on relevance and data availability.

PERFORMANCE DURING DIFFERENT ECONOMIC CONDITIONS

Equity, gold, and mutual funds do not perform the same way in all economic situations. Their performance changes during good and bad phases of the economy, such as growth periods, recessions, inflation, and market crashes.

During **economic growth periods**, equity and equity-based mutual funds generally perform better because companies earn higher profits, which leads to higher stock prices and better fund returns. Investors also show more confidence in the market during such times.

During **recessions or market crashes**, equity and mutual funds usually become more volatile and may give negative or lower returns in the short term. However, diversified mutual funds are often less risky compared to direct equity investments.

On the other hand, **gold performs better during uncertain times**, such as inflation or economic instability. When stock markets fall or inflation increases, investors often shift towards gold as a safe investment option, which increases its demand and price.

Overall, equity and mutual funds are better for long-term growth, while gold acts as a **safe-haven investment** during uncertain economic conditions. This shows that each asset class has a different role in wealth creation depending on the economic environment.

REVIEW OF LITERATURE

1. Shodha Prabha & Deepa D. (2024)

Study: *An Analysis of Investment Performance Evaluation of Gold ETFs in India*

The study uses Sharpe, Treynor, and Jensen indices to evaluate gold ETFs. It finds that gold ETFs offer a modern and efficient alternative to physical gold, with moderate returns and lower risk.

2. Twinkle & Nazim Sha S (2025)

Study: *Growth or Preservation of Wealth? An Examination of Indian Mutual Funds and Gold Investments*
The study compares gold and mutual funds and concludes that mutual funds are more suitable for wealth creation, while gold is better for wealth preservation and diversification.

3. Dr. Archana Pramod Khandelwal (2023)

Study: *A Comparative Analysis of Investment in Gold and Mutual Funds: Risk, Return and Diversification Perspectives*
The study highlights that mutual funds provide better diversification and higher growth potential, whereas gold remains a traditional and stable investment option preferred for safety and liquidity.

4. Navaneetham, K. Gomathy & Mohamed Rafique S (2024)

Study: *Risk-Return Analysis of Selected Gold Mutual Funds in India*

The study evaluates gold mutual funds using Sharpe, Treynor, and Jensen's alpha. It finds that gold mutual funds provide stable and relatively higher returns with lower risk, making them suitable for conservative long-term investors.

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DATA ANALYSIS AND INTERPRETATION:

This section examines the comparative performance of equity, gold, and mutual funds over the period 2021–2025 based on returns, risk, and investor preference. It aims to evaluate how each investment avenue contributes to long-term wealth creation—based entirely on secondary data from credible reports and institutional sources.

1. Equity (Stock Market & Equity Mutual Funds) – 2021 to 2025

- **Average long-term returns (Equity Mutual Funds):** 15%–20% CAGR
- **Top-performing equity funds:** 20%–25%+ CAGR (3–5 year period)
- **Market benchmark (NIFTY 50):** 10%–15% CAGR (long-term average)
- **Investor participation:** Significant increase in SIP inflows and retail participation (2021–2025)

Interpretation

The equity segment demonstrates the highest wealth creation potential among the three investment options. Although it is highly volatile in the short term, equity investments consistently outperform gold and provide superior long-term compounding benefits. The rising participation of retail investors and systematic investment plans indicates growing confidence in equity as a wealth-building instrument.

2. Mutual Funds (Equity-Oriented & Hybrid Funds) – 2021 to 2025

- **Industry AUM:** ₹65–₹70 trillion in 2025
- **AUM growth rate:** 20%–23% (Approximately) (2024–2025)
- **Equity mutual fund CAGR:** 15%–20%
- **Top schemes:** 20%–25%+ returns in mid-cap and small-cap categories
- **SIP contribution:** Record inflows and increasing investor base

Interpretation

Mutual funds show strong and stable growth over the period, driven by systematic investment plans and professional fund management. They offer a balanced combination of risk and return, making them the most preferred investment option among retail investors. Mutual funds act as an effective bridge between high-risk equity investments and low-risk traditional assets like gold.

3. Gold (Physical Gold & Gold ETFs) – 2021 to 2025

- **5-year CAGR (approx.):** 20%–26%
- **Gold ETF AUM growth:** ~80%–100% increase (2023–2025)
- **Investment demand growth:** Significant rise during economic uncertainty periods
- **Performance pattern:** Strong during inflation and market volatility

Interpretation

Gold acts primarily as a safe-haven asset rather than a high-growth investment. It performs well during periods of inflation, geopolitical tension, and stock market instability. However, compared to equity and mutual funds, gold provides lower long-term wealth creation potential but higher stability and capital protection.

4. Investor Preference Trends (2021–2025)

- **Gold:** Remains highly preferred for safety and cultural reasons
- **Mutual Funds:** Rapidly growing due to SIP adoption and awareness
- **Equity:** Moderate direct investment preference but high indirect exposure through mutual funds

Interpretation

Investor behavior shows a clear shift toward mutual funds as the primary investment vehicle. While gold continues to be preferred for security, and equity for high returns, mutual funds dominate due to their balanced risk-return profile and ease of investment.

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Comparative Overall Performance Insight (2021–2025)

Investment Option	Return Potential	Risk/Volatility	Key Performance Characteristic
Equity (Stocks / Equity Funds)	Highest	High	Strong long-term wealth creation but highly volatile in short term
Mutual Funds (Equity & Hybrid)	High	Moderate	Balanced growth with diversification and consistent long-term performance
Gold (Physical Gold / ETFs)	Moderate	Low	Stable returns with strong performance during inflation and crisis periods

Interpretation
The comparative analysis shows that equity offers the highest wealth creation potential but comes with significant volatility. Mutual funds provide a balanced investment approach with moderate risk and stable long-term returns. Gold acts as a defensive asset, ensuring stability and performing well during economic uncertainty and market downturns.

FINDINGS OF THE STUDY

1. Superior Wealth Creation Potential of Equity Investments
The findings indicate that equity investments exhibit the highest long-term return potential among the selected asset classes, primarily driven by compounding and economic growth. However, this superior performance is associated with significant volatility, emphasizing the risk-return trade-off inherent in equity markets.

2. Mutual Funds as an effective Intermediary Investment Avenue
The study reveals that mutual funds, particularly equity-oriented schemes, serve as an effective intermediary by combining diversification benefits with professional fund management. This results in relatively stable and consistent returns, making them a preferred choice for long-term investors.

3. Gold as a Strategic Hedge and Wealth Preservation Instrument
Gold demonstrates limited capacity for long-term wealth creation compared to equity; however, it plays a critical role in portfolio stability. Its performance during periods of economic uncertainty and inflation underscores its importance as a hedging instrument.

4. Evolving Investor Preference towards Market-Linked Instruments
The analysis highlights a significant shift in investor behavior, with increasing allocation toward mutual funds and equity-linked investments. This trend reflects growing financial literacy, improved accessibility, and a gradual transition from traditional to modern investment avenues.

5. Importance of Diversification in Portfolio Optimization
The study establishes that no single asset class consistently outperforms across all market conditions. A diversified portfolio integrating equity, mutual funds, and gold enhances risk-adjusted returns and ensures stability in long-term wealth creation.

6. Sensitivity of Asset Performance to Market Dynamics
The findings confirm that asset class performance is highly contingent on macroeconomic conditions. Equity performs optimally during expansion phases, gold during periods of instability, while mutual funds exhibit relatively resilient performance across varying market cycles.

LIMITATIONS OF THE STUDY

1. Limited Time Horizon
The study is confined to a five-year period, which may not fully capture long-term market cycles. Short-term economic fluctuations during this period may influence the overall findings.

2. Dependence on Secondary Data
The research is based on secondary data from reports and publications, which may include estimation errors or biases. This can affect the accuracy and reliability of the analysis.

3. Exclusion of Investor-Specific Factors
The study does not consider individual investor characteristics such as risk tolerance, income, and financial goals. These factors can influence investment decisions and limit the applicability of results.

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CONCLUSION

The present study provides a comprehensive comparative analysis of equity, gold, and mutual funds in the context of long-term wealth creation, revealing distinct yet complementary roles for each asset class. Equity investments emerge as the most powerful driver of wealth accumulation, offering superior returns through the force of compounding and market expansion. However, this potential is inherently accompanied by heightened volatility, underscoring the critical importance of a long-term investment horizon and disciplined approach.

Mutual funds, particularly equity-oriented schemes, stand out as a compelling and accessible investment avenue, effectively bridging the gap between risk and return. By leveraging diversification and professional fund management, they offer investors a balanced pathway to sustainable growth with relatively moderated risk exposure. In contrast, gold retains its timeless appeal as a safe-haven asset, demonstrating resilience during periods of economic uncertainty and serving as a strategic tool for wealth preservation and portfolio stability.

In essence, the study highlights that no single investment avenue can singularly fulfil the diverse objectives of modern investors. The most prudent and forward-looking strategy lies in constructing a well-diversified portfolio that harmoniously integrates equity, mutual funds, and gold. Such an approach not only maximizes return potential but also safeguards against market uncertainties, ultimately paving the way for robust and resilient long-term wealth creation.

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A CASE STUDY ON SOCIAL COMMERCE IN EMERGING MARKETS FROM THE PLATFORM OF INSTAGRAM AND MEESHO

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ABSTRACT

In this study, the rise and significance of social commerce in emerging economies are analysed using Instagram and Meesho as the case studies. With the widespread use of digital connectivity and smartphones, social media sites have emerged as useful platforms where commercial activity can take place. On one hand, Instagram uses its power of visual communication to engage and convert potential customers. On the other hand, Meesho acts as a social commerce site in India and offers an innovative ecosystem for entrepreneurs and resellers to operate their online business.

Data for analysis will be gathered from secondary sources, such as industry reports, scholarly articles, and business intelligence. These sources will provide information related to emerging trends and consumer behaviour. Moreover, the role of business models, barriers, opportunities, and challenges will also be evaluated in this study. It aims at exploring the importance of social commerce sites and how it helps in market access, inclusiveness, and entrepreneurship.

Keywords

- *Social Commerce*
- *Emerging Markets*
- *Consumer Behaviour*
- *Digital Platforms*
- *Financial Inclusion*

INTRODUCTION

Social commerce is another recent development in the digital economy that has seen significant success in the past few years, especially in emerging economies. Social commerce involves the convergence of social media websites and online marketplaces where users can discover products, assess their features, and make purchases directly on social media sites. The rapid advancement of internet connectivity, mobile phones, and online banking and digital payments has propelled social commerce into prominence.

The role of Instagram and Meesho in the evolution of social commerce cannot be underestimated. While Instagram allows brands and retailers to interact with consumers via advertisements and other creative means of marketing, Meesho helps aspiring entrepreneurs to establish their own online stores at little cost, especially in Tier II and Tier III cities. This paper will explore the phenomenon of social commerce and determine how digital platforms like Instagram and Meesho promote social commerce in emerging economies.

The present study will focus on gathering relevant data from previous research, reports, and case studies on the subject of social commerce. Secondary data on the topic is sufficient to achieve the stated objectives**.**

LITERATURE REVIEW

1. **Kaplan and Haenlein (2010)** defined social media as a group of internet-based applications that facilitate user-generated content, laying the foundation for social commerce development.
2. **Liang and Turban (2011)** introduced the concept of social commerce, emphasizing the role of social interactions and user participation in online buying decisions.
3. **Kim and Park (2013)** found that trust, social support, and information quality significantly influence purchase intentions in social commerce platforms.
4. **Hajli (2015)** highlighted that social commerce constructs such as reviews, ratings, and recommendations positively impact consumer trust and buying behavior.
5. **Ng (2013)** explained generational differences in digital adoption, noting that younger users are more inclined toward social media-based shopping.

6. **Stephen and Toubia (2010)** studied online social networks and found that sellers benefit significantly from social interactions and peer influence.
7. **Zhou, Zhang, and Zimmermann (2013)** examined social factors like trust and familiarity, concluding they enhance user engagement and transaction intention.
8. **Wang and Zhang (2012)** emphasized the importance of community engagement and social interaction in increasing platform loyalty.
9. **Lin, Li, and Wang (2017)** found that perceived usefulness and ease of use strongly influence adoption of social commerce platforms.
10. **Marsden (2010)** described social commerce as a subset of e-commerce that uses social media to facilitate transactions and interactions.
11. **Chen and Shen (2015)** highlighted the role of social support in shaping consumer attitudes and purchase behavior online.
12. **Huang and Benyoucef (2013)** identified design features like interactivity and personalization as key drivers of social commerce success.
13. **Poushneh and Vasquez-Parraga (2017)** found that immersive technologies and visual appeal enhance online shopping experiences.
14. **Appel et al. (2020)** emphasized the growing importance of social media in influencing consumer decision-making processes.
15. **Arora et al. (2019)** studied Indian consumers and found increasing adoption of social commerce due to mobile penetration and affordability.
16. **Kumar and Shah (2021)** highlighted the role of influencers in shaping brand perception and purchase intentions on Instagram.
17. **Statista (2023)** reported rapid growth of social commerce globally, especially in emerging markets like India and Southeast Asia.
18. **McKinsey & Company (2022)** found that social commerce could account for a significant share of e-commerce sales in emerging economies by 2025.
19. **Accenture (2022)** emphasized that trust and personalized experiences are key drivers of social commerce adoption.
20. **Deloitte (2021)** reported that digital platforms are enabling small businesses to scale rapidly through social commerce models.
21. **Meesho (2023)** highlighted its role in empowering small resellers and women entrepreneurs in India through zero-investment business models.
22. **Meta Platforms (2022)** reported that Instagram shopping features significantly enhance customer engagement and conversion rates.
23. **Bansal and Khan (2020)** found that Indian consumers are increasingly influenced by peer reviews and social recommendations.
24. **Singh and Sinha (2022)** highlighted the role of regional language content in driving social commerce adoption in tier II and III cities.
25. **Gupta and Chopra (2021)** concluded that social commerce enhances financial inclusion by providing income opportunities to small sellers.

Summary

According to the literature now in publication, social commerce is fuelled by elements including digital accessibility, social engagement, trust, and platform design. Research shows how social media sites like Meesho and Instagram are increasingly impacting consumer behaviour and fostering entrepreneurship in developing nations. However, problems including logistics, trust issues, and regulatory concerns continue to exist, emphasizing the need for more study.

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Problem statement

The fast rise of social commerce has drastically altered the manner in which consumers use digital platforms in making their purchase decisions. Through platforms such as Instagram and Meesho, entrepreneurs and individuals are able to conduct their business operations easily. However, various challenges still remain unsolved by these platforms. For instance, there is a gap in knowledge on the effect of these platforms on consumer behavior, trust, and loyalty, among other aspects. There are also problems with distrust, payment safety, and inefficiency that are affecting social commerce. Even though these platforms facilitate entrepreneurial activities and financial inclusion, more research needs to be done to explore their viability in these environments. It is against this background that the current research aims to study the role and effectiveness of social commerce using selected platforms.

Research gap

1. The majority of existing studies focus on social commerce at large but have not adequately compared Instagram and Meesho as platforms for conducting social commerce in emerging markets.
2. There is not enough research analysing differences in social commerce business models, especially those concerning influencer-based versus reseller-based business models.
3. Very little is known about consumer trust issues, consumer security in social commerce transactions within emerging markets.
4. There is also very little research done on the use of social commerce as a means to achieve financial inclusion and entrepreneurship.
5. There is not enough research conducted on the regional differences and demographics of social commerce use (urban/rural areas, Tier II/III cities).
6. Not enough research has focused on the sustainability issues of conducting social commerce**.**

Objectives of the study

1. To analyze the growth and development of social commerce in emerging markets.
2. To examine the role of Instagram and Meesho in facilitating social commerce activities.
3. To compare the business models and operational strategies of Instagram and Meesho.
4. To study consumer behaviour and purchase intentions on social commerce platforms.
5. To evaluate the impact of social commerce on entrepreneurship and financial inclusion.
6. To identify the challenges and limitations associated with social commerce in emerging markets.

Hypothesis

H1: Social commerce platforms have a significant impact on consumer purchase intention.

H2: There is a significant difference between the business models of Instagram and Meesho in driving social commerce.

H3: Social commerce positively influences entrepreneurship and income generation in emerging markets.

H4: Consumer trust significantly affects buying behaviour on social commerce platforms.

H5: There are significant challenges affecting the growth and sustainability of social commerce platforms.

RESEARCH METHODOLOGY

This study adopts a **descriptive and analytical research design** to examine the rise of social commerce in emerging markets, with a focus on Instagram and Meesho. The research is based on **secondary data**, making it suitable for understanding trends, patterns, and existing insights without primary data collection.

1. Research Design

The study is descriptive in nature, aiming to systematically describe and compare the features, growth, and impact of social commerce platforms. An analytical approach is also used to interpret findings and draw meaningful conclusions.

2. Data Collection Method

The research relies entirely on secondary sources of data, including:

- Published research papers and academic journals

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- Industry reports
- Company reports and official websites
- Articles, case studies, and online databases

3. Sampling Technique
A purposive sampling method is used to select relevant platforms (Instagram and Meesho) as case studies due to their strong presence and influence in social commerce.

4. Data Analysis Tools

The study uses qualitative analysis techniques, such as:
Comparative analysis

Content analysis

Trend analysis

Case Study of Instagram
The Instagram app, once merely an image sharing tool, has now become a formidable social commerce tool. Businesses can display their products through engaging visual media such as posts, reels, and stories. The Instagram Shop feature, product tags, and collaboration with influencers have revolutionized the shopping experience for customers.

Influencer marketing plays a significant role on Instagram as the influencers market various products and shape consumer purchasing behavior. Instagram works best with city dwellers and young consumers who are more connected digitally. The power of Instagram is that it combines entertainment with commerce seamlessly, resulting in an engaging purchase journey. Nevertheless, there are obstacles to overcome, including issues of trust, counterfeit sellers, and non-uniform pricing structures.

Scope of the study
1. This study will focus on the growth and development of social commerce in developing nations, particularly India.
2. It will explore the significance and working mechanism of social commerce platforms like Instagram and Meesho.
3. The study will investigate consumers' behavior and preferences in relation to social commerce.
4. Social commerce's influence on entrepreneurship, particularly of smaller reselling businesses, will be explored.
5. Opportunities and challenges related to social commerce will be evaluated, including issues related to trust and logistics.
6. Secondary sources will be used for the study, and no primary data collection will be involved**.**

Limitations of the study
1. Since the study relies solely on secondary data, it might not accurately reflect current market dynamics or real-time developments.
2. The analysis may not accurately reflect all social commerce platforms because it is restricted to a few, including Meesho and Instagram.
3. Direct insights into customer attitudes and behavior are limited by a lack of primary data collecting.
4. The study's primary focus is on emerging markets, especially India, which restricts the findings' applicability to developed markets.
5. The accuracy of conclusions may be impacted by bias or inconsistencies in data gathered from publications and reports.
6. Certain conclusions may be time-bound and liable to change due to rapid technical advancements and changing digital trends.

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FINDINGS AND SUGGESTIONS

Findings

1. Social commerce has experienced rapid growth in emerging markets due to increased internet penetration and smartphone usage.
2. Instagram plays a significant role in influencing consumer purchase decisions through visual content and influencer marketing.
3. Meesho has successfully enabled micro-entrepreneurship by providing a low-cost platform for resellers, especially in tier II and III cities.
4. Consumer trust, reviews, and peer recommendations are key factors affecting buying behaviour in social commerce.
5. Social commerce contributes to financial inclusion by creating income opportunities for small sellers and individuals.
6. Challenges such as product quality issues, logistics inefficiencies, and lack of regulatory clarity continue to affect platform growth.

Suggestions

1. Verified merchants and safe payment methods are only two examples of how platforms should improve security and trust.
2. By controlling influencer marketing and guaranteeing product authenticity, Instagram can increase transparency.
3. To increase customer satisfaction, Meesho should strengthen logistical management and quality control.
4. Businesses should fund digital literacy initiatives to inform consumers about secure and efficient online transactions.
5. To encourage and control social commerce activities, governmental and regulatory organizations should create precise rules and regulations.
6. To improve accessibility in rural and semi-urban areas, platforms should concentrate on growing services in regional languages.

CONCLUSION

The phenomenon of social commerce has proven to be a significant factor in facilitating digital transformation across emerging economies. It is important to note that, according to the research conducted, the platforms including Instagram and Meesho have been identified as two primary means to support the creation of such an ecosystem. Instagram supports consumer participation through visuals, while Meesho encourages small business owners and resellers, thus contributing to financial inclusion within a specific community.

Thus, the results of the study suggest that social commerce has great benefits, including improved access, revenue generation, and behavioural aspects driven by trust and recommendations. At the same time, certain problems associated with this concept, such as trust issues, logistics, and regulation, still have to be dealt with. In general, social commerce proves to be an effective approach in facilitating economic development in emerging markets. It is likely to develop even further in terms of new technology**.**

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PSYCHOLOGICAL EVALUATION OF DIGITAL MENTAL HEALTH INTERVENTIONS IN HEALTHCARE: COMPARATIVE ANALYSIS OF EFFECTIVENESS AND THERAPEUTIC ANALYSIS

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ABSTRACT
Digital intervention in Mental health such as mobile applications, AI-based chatbots, and teletherapy platforms, have rapidly expanded in psychological care. This review attempts to examine and compare digital mental health interventions to traditional face-to-face therapy especially focusing on treatment outcomes, user engagement, and the quality of therapeutic alliance. Findings indicate that the digital interventions based on cognitive behavioral therapy (CBT) is found to be effective in reducing symptoms of mild to moderate anxiety and depression. Teletherapy has similar outcomes in comparison to in-person therapy in several contexts. However, there are challenges such as reduced engagement, high dropout rates, and weaker therapeutic alliance which were found to be significant limitations in Digital mental health intervention. The review concludes that while digital interventions enhance accessibility and scalability, they are best utilized as complementary tools rather than replacements for traditional therapy. While digital interventions demonstrate comparable effectiveness in mild to moderate conditions and improve accessibility, concerns remain regarding emotional depth, adherence, and long-term outcomes. The review highlights the need for hybrid models integrating human empathy with technological efficiency. Hybrid models integrating human interaction with technological support are recommended for future mental health care

Keywords: *Digital Mental Health Interventions vs. Face-to-Face Therapy: A Psychological Review of Effectiveness, Engagement, and Therapeutic Alliance.*

INTRODUCTION
The rapid invent of information technology into healthcare has significantly transformed the field of mental health services. Digital mental health interventions (DMHIs) have gained prominence, particularly following the COVID-19 pandemic (Torous et al., 2020). These interventions encompass a wide spectrum of tools, including mobile applications, internet-based cognitive behavioral therapy, artificial intelligence (AI)-driven agents, and teletherapy platforms. Collectively, DMHIs have emerged as scalable and cost-effective solutions to address the global burden of mental health disorders, especially amid shortages of trained professionals and several barriers pertinent in the field of health and care (Torous et al., 2020; World Health Organization [WHO], 2022).
These tools offer scalable, cost-effective, and accessible alternatives to traditional face-to-face therapy. A primary advantage of DMHIs is the increased accessibility and reduced disparities in mental healthcare delivery. Individuals in rural or remote regions and populations facing stigma-related barriers are able to access support that would otherwise be difficult to target (Naslund et al., 2017). Furthermore, digital platforms enable virtual communication, self-paced intervention modules, and real-time monitoring, allowing for more personalized and flexible care. Empirical evidence suggests that certain forms of DMHIs particularly structured interventions such as CBT can produce outcomes similar to traditional therapy for mental health condition such as depression and anxiety (Andersson et al., 2019).

However, despite their growing use, concerns remain regarding their psychological effectiveness compared to in-person therapy. Traditional therapy emphasizes on therapeutic alliance which is the collaborative and affective bond between therapist and client. Therapeutic alliance has consistently been identified as a key predictor of positive outcomes (Norcross & Lambert, 2019). Traditional psychotherapy is grounded in evidence-based techniques and in the relational processes between therapist and client. According to Bordin, 1979, the most important factor for therapeutic change is therapeutic alliance defined as the collaborative partnership and emotional bond that facilitate therapeutic change. Multiple research finding has consistently identified that the therapeutic alliance is one of the most robust predictors of positive treatment outcomes (Norcross & Lambert, 2019). This finding is applicable across diverse modalities and clinical populations. Hence one of the concerns about Digital Mental Health Intervention is whether such relational qualities can be successfully replicated in virtual environments, particularly in fully automated or mechanically guided systems. Another key consideration is user engagement, which plays a crucial role in determining the effectiveness of DMHIs. While digital platforms offer convenience and autonomy, the findings also suggest that it is associated with high attrition rates and inconsistent adherence (Eysenbach, 2005). The absence of

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direct human interaction and different levels of user motivation can hinder sustained participation, thereby limiting therapeutic benefits. Moreover, several factors such as the design, user features, interface quality, feedback mechanisms of digital tool have an impact on user experience and therapy outcomes. Understanding how these factors interact with psychological processes is essential for evaluating the true efficacy of DMHIs. In addition to engagement and therapeutic alliance, the actual clinical effectiveness from digital mental health intervention must be considered. So, although research analyses indicate that certain DMHIs can achieve outcomes comparable to face-to-face therapy, real-world effectiveness often depends on implementation, population, and levels of guidance (Richards & Richardson, 2012). Furthermore, the various digital interventions available such as fully automated apps, guided self-help programs, and live teletherapy often makes direct comparisons difficult as they differ significantly across varied therapeutic mechanisms.

While digital interventions are convenient, they may lack emotional depth and relational dynamics inherent in human interaction. Given these complexities, there is a need to review effectiveness of DMHIs in terms of symptom reduction and also through core psychological dimensions that eventually determines therapeutic success. This review addresses this need by conducting a comparative analysis of digital mental health interventions and traditional face-to-face therapy, with a specific focus on three critical domains: (1) clinical effectiveness, (2) user engagement, and (3) therapeutic alliance. By analyzing empirical findings and theoretical perspectives, the paper aims to assess whether DMHIs can function as viable standalone treatments or are better conceptualized as complementary tools within a hybrid model of care.

Ultimately, a balanced and unbiased understanding of the strengths and limitations of DMHIs is essential for clinical practice and shaping future mental health field. As digital solutions expand, their integration into healthcare systems needs to be guided by thorough evaluation to ensure that accessibility does not compromise the actual therapeutic quality.

This review thus aims to compare digital mental health interventions with face-to-face therapy, focusing on three core psychological dimensions: effectiveness, user engagement, and therapeutic alliance. Through analysis of recent research, the paper seeks to evaluate whether digital tools can serve as viable alternatives or should function as complementary supports in mental healthcare.

METHODOLOGY

This study adopts a narrative review approach with systematic elements. Narrative review approach was chosen due to the evolving and complex nature of research on digital mental health interventions (DMHIs). The field of DMHIs encompasses a wide range of intervention modalities including mobile applications, AI-based chatbots, and teletherapy platforms. Each have varying design, theoretical orientation, and level of human involvement. This diversity makes standard standardization in methodology pretty challenging and also limits quantitative analysis across studies. A narrative review, therefore, allows for a more flexible and integrative examination of both empirical findings and theoretical perspectives. Narrative review enables the inclusion of diverse study designs and insights (Green, Johnson, & Adams, 2006). At the same time, it helps include several other systematic elements such as clearly defined inclusion criteria, refined keyword searches, and the use of various databases like Google Scholar and PubMed. This further enhances the transparency, rigor, and reproducibility of the review process (Ferrari, 2015). This hybrid approach is particularly suitable for addressing complex psychological constructs such as therapeutic alliance and user engagement. This approach thus enables a comprehensive evaluation of the comparative effectiveness of digital and face-to-face mental health interventions while maintaining critical analytical depth.

In this review, relevant literature was identified through databases such as Google Scholar and PubMed. Keywords included “digital mental health,” “teletherapy,” “AI chatbots,” “therapeutic alliance,” and “mental health apps.”

Inclusion Criteria:

- Peer-reviewed articles published between 2015 and 2025
- Studies focusing on psychological outcomes (e.g., anxiety, depression)
- Research comparing digital and/or face-to-face interventions

Exclusion Criteria:

- Non-English publications
- Opinion-based articles without empirical support
- Studies unrelated to mental health

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A total of approximately 15–20 relevant studies were reviewed and synthesized thematically.

RESULTS AND THEMATIC ANALYSIS

Effectiveness of Digital Mental Health Interventions

Research suggests that digital mental health interventions, particularly those based on cognitive behavioral therapy (CBT), can effectively reduce symptoms of anxiety and depression in mild to moderate cases (Firth et al., 2017). Mobile applications and structured online programs provided interventions that is very similar to traditional therapeutic techniques.

Teletherapy, which involves real-time interaction between therapist and client via video or audio platforms, has demonstrated comparable effectiveness to face-to-face therapy in multiple studies (Varker et al., 2019). These findings indicate that when human interaction is preserved, digital delivery does not significantly compromise treatment outcomes.

However, digital tools may be less effective for severe mental health conditions that require intensive, personalized intervention.

Engagement and Adherence

One of the primary challenges associated with digital interventions is user engagement. Studies have consistently reported high dropout rates in mental health apps, with many users discontinuing use after initial engagement (Baumel et al., 2019). Unlike traditional therapy, digital tools often lack accountability mechanisms that encourage sustained participation.

AI chatbots, while innovative, tend to generate initial curiosity but struggle to maintain long-term engagement. This decline may be attributed to limited personalization and emotional responsiveness. However, digital mental health tools often struggle with user engagement. High dropout rates and inconsistent usage patterns have been widely reported in app-based interventions (Baumel et al., 2019; Linardon et al., 2019).

This suggests that while accessibility is improved, sustained behavioral engagement remains a psychological challenge. From a psychological perspective, this is due ot differences in motivation, reinforcement, and perceived relevance which play crucial roles in adherence. This result indicate that users may find it difficult to remain committed to digital interventions without actual human encouragement.

Therapeutic Alliance

The therapeutic alliance is widely recognized as a critical factor in successful psychotherapy outcomes (Norcross & Lambert, 2019). The therapeutic alliance brings trust, empathy, collaboration, and emotional connection between therapist and client.

Face-to-face therapy offers a rich interpersonal environment that facilitates the development of this alliance. In contrast, digital interventions particularly AI-based systems lack the same genuine emotional reciprocity. While some studies such as Fitzpatrick et al., 2017 suggest that users do form perceived bond with chatbots however this connection is generally weaker and less impactful than human relationships.

The therapeutic alliance is the most crucial aspect of effective psychotherapy (Flückiger et al., 2018). In this regard, while face-to-face therapy allows for deep emotional connection and trust, AI-based interventions lack genuine empathy and emotional responsiveness (Fitzpatrick et al., 2017). Teletherapy offers a partial solution, maintaining human interaction while using digital platforms (Berryhill et al., 2019).

Thus, Teletherapy offers a middle ground, as it involves human interaction while removing physical presence. Although some benefits of non-verbal communication may be reduced, therapeutic alliance can still be effectively established in virtual settings.

Accessibility vs. Depth of Care

This is one of primary benefits of digital mental health intervention. Digital interventions significantly improve accessibility to mental health services, particularly for individuals in remote areas or those facing stigma-related barriers (Torous et al., 2020). They are often more affordable and flexible than traditional therapy.

However, this accessibility comes with a trade-off. While digital tools are efficient for symptom management and psychoeducation, they may lack the depth required for complex emotional processing. Face-to-face therapy allows for in-depth exploration of personal experiences, which is difficult to replicate digitally.

Ethical and Psychological Concerns
The increasing use of digital mental health tools raises several ethical concerns, including data privacy, confidentiality, and the risk of misdiagnosis. Users may also develop over-reliance on digital systems which may delay professional help when needed.

Additionally, the absence of immediate human intervention in crisis situations poses a significant limitation. These concerns highlight the importance of integrating ethical safeguards in digital mental health platforms.

1. Guided vs Unguided Digital Therapy
Randomized and controlled studies indicate that digital interventions show significantly lower effectiveness compared to guided formats, highlighting the importance of human support in sustaining therapeutic outcomes (Richards & Richardson, 2012).

2. High Dropout in Digital Interventions
Evidence from randomized trials and meta-analyses suggests that digital mental health interventions are associated with high attrition rates, often exceeding those observed in face-to-face therapy (Linardon et al., 2019).

3. Limited Long-Term Effectiveness
Although short-term benefits are evident, randomized controlled trials indicate that the long-term effectiveness of digital interventions may diminish without ongoing engagement or therapist involvement (Karyotaki et al., 2021).

4. Therapeutic Alliance Weaker in Digital Contexts
While a therapeutic alliance can be established in digital settings, controlled studies suggest that its strength may be comparatively weaker than in traditional face-to-face therapy (Berger, 2017; Berryhill et al., 2019).

5. Digital Not Suitable for Severe Conditions
Randomized evidence suggests that digital interventions are most effective for mild to moderate conditions, with limited applicability for individuals experiencing severe or complex psychiatric disorders (Andersson & Titov, 2014).

6. Engagement Declines Over Time
Studies examining user engagement patterns indicate that while initial uptake of digital interventions is high, sustained use declines significantly over time, reflecting challenges in maintaining motivation without human reinforcement (Baumel et al., 2019).

Randomized controlled trials provide strong evidence supporting the effectiveness of digital mental health interventions, particularly for mild to moderate anxiety and depression (Firth et al., 2017; Andersson et al., 2014). However, this evidence is tempered by findings from controlled studies highlighting significant limitations. High attrition rates, reduced long-term effectiveness, and weaker therapeutic alliance remain persistent challenges (Linardon et al., 2019; Karyotaki et al., 2021). Furthermore, unguided interventions tend to yield poorer outcomes compared to those involving therapist support, underscoring the continued importance of human interaction in psychological care (Richards & Richardson, 2012).

DISCUSSION
The findings suggest that digital mental health interventions are effective and valuable tools, particularly for mild to moderate conditions. However, they are not comprehensive substitutes for traditional therapy. The absence of strong therapeutic alliance, reduced engagement, and limitations in addressing complex psychological issues restrict their standalone effectiveness.

A hybrid model that combines digital tools with human therapy appears to be the most promising approach. Such models can leverage the accessibility and scalability of technology while preserving the emotional depth and relational aspects of traditional therapy.

Digital mental health interventions are best understood as complementary tools rather than replacements for traditional therapy (Mohr et al., 2017).

A hybrid model integrating digital accessibility with human therapeutic support may provide the most effective approach moving forward.

Future research should focus on long-term outcomes, personalization of digital interventions, and the integration of advanced technologies such as adaptive AI systems.

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CONCLUSION

Digital mental health interventions represent a significant advancement in modern healthcare, offering accessible and cost-effective solutions for psychological support. While they demonstrate effectiveness in certain contexts, they cannot fully replicate the relational and emotional depth of face-to-face therapy. A balanced, integrative approach that combines technological innovation with human empathy is essential for the future of mental healthcare.

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CRM AND CUSTOMER TRUST IN BANKING: A STUDY OF SERVICE QUALITY AND LOYALTY

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ABSTRACT
In today's competitive banking environment, Customer Relationship Management (CRM) has become essential for building strong and lasting relationships with customers. This study examines the impact of CRM on customer trust and its influence on service quality and customer loyalty in the banking sector. Primary data was collected through a structured questionnaire using a 5-point Likert scale, and analyzed using statistical tools such as reliability analysis, correlation, and regression in SPSS.

The findings indicate that CRM has a significant positive effect on customer trust, which strongly influences customer loyalty. Service quality also plays a vital role in enhancing both trust and loyalty. Additionally, customer trust partially mediates the relationship between CRM and customer loyalty. The study concludes that banks must focus on effective CRM practices, high service quality, and trust-building strategies to improve customer retention and achieve long-term success.

1. INTRODUCTION

1.1 Introduction
In the modern business environment, organizations are increasingly focusing on building long-term relationships with customers rather than merely concentrating on transactions. The banking sector, being highly competitive and service-oriented, places significant emphasis on customer satisfaction and retention. With the rapid growth of digital banking and technological advancements, customer expectations have increased substantially.

Customer Relationship Management (CRM) has emerged as a strategic approach that helps banks understand customer needs, improve service delivery, and build strong relationships. Alongside CRM, factors such as service quality and customer trust play a vital role in influencing customer loyalty. This study aims to examine the relationship between CRM, customer trust, service quality, and customer loyalty in the banking sector.

1.2 Customer Relationship Management (CRM)
Customer Relationship Management (CRM) refers to a business strategy that integrates people, processes, and technology to manage interactions with customers effectively. It focuses on understanding customer behavior, improving communication, and delivering personalized services.

Key components of CRM include:
- Customer data management
- Personalized service delivery
- Customer interaction and engagement
- Complaint handling and resolution

CRM helps organizations:
- Enhance customer satisfaction
- Build long-term relationships
- Improve customer retention
- Increase profitability

In the banking sector, CRM systems enable banks to track customer transactions, preferences, and feedback, thereby improving decision-making and service quality.

1.3 Banking Sector in India
The banking sector in India plays a crucial role in the country's economic development. It consists of various types of banks, including public sector banks, private sector banks, cooperative banks, and foreign banks.

In recent years, the Indian banking sector has witnessed significant changes due to technological advancements, financial inclusion initiatives, and the introduction of innovative banking services. Customers

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now demand faster, more secure, and personalized banking experiences.

1.4 CRM in the Banking Sector

CRM has become an essential tool for banks to manage customer relationships effectively. In the banking sector, CRM involves collecting and analyzing customer data to provide customized services and improve customer satisfaction.Customer trust is critical in banking due to the sensitive nature of financial transactions. CRM practices such as transparent communication, timely service, and data security help in building and maintaining trust.

Effective CRM strategies lead to higher customer satisfaction and trust, which ultimately result in increased customer loyalty and long-term relationships.

1.5 Statement of the Problem

Despite the implementation of CRM systems, many banks face challenges in retaining customers and maintaining long-term relationships. Customers often switch banks due to poor service quality, lack of trust, or inadequate CRM practices. Therefore, it is important to study how CRM influences customer trust, service quality, and customer loyalty.

1.6 Objectives of the Study

1. To analyze the impact of CRM on customer trust
2. To examine the relationship between service quality and customer trust 3. To study the influence of customer trust on customer loyalty
4. To evaluate the impact of service quality on customer loyalty
5. To assess the direct impact of CRM on customer loyalty

1.7 Hypotheses of the Study

1. **H1:** CRM has a significant positive impact on customer trust
2. **H2:** Service quality has a significant positive impact on customer trust
3. **H3:** Customer trust has a significant positive impact on customer loyalty
4. **H4:** Service quality has a significant positive impact on customer loyalty
5. **H5:** CRM has a significant positive impact on customer loyalty

1.8 Scope of the Study

The study focuses on customers of banks and examines the role of Customer Relationship Management (CRM) in influencing customer trust, perceived service quality, and customer loyalty. It seeks to understand how effective CRM practices—such as personalized communication, prompt service, and problem resolution—contribute to building long-term relationships between banks and their customers.

1.9 Significance of the Study

Helps banks improve CRM strategies by identifying effective practices such as personalized services, timely communication, and efficient complaint handling, enabling banks to strengthen customer relationships and gain a competitive advantage. The study also enhances understanding of customer behavior by analyzing how customers perceive and respond to different CRM initiatives, allowing banks to better align their services with customer expectations and preferences.

1.10 Limitations of the Study

The study is based on a limited sample size, which may not fully represent the diverse population of bank customers. As a result, the findings may lack broader generalizability and may not accurately reflect the views of customers from different regions, income groups, or banking preferences.The use of convenience sampling further restricts the reliability of the results, as participants are selected based on ease of access rather than through a random or systematic method. This approach can lead to sampling bias and may not provide an accurate representation of the overall customer base.

2 REVIEW OF LITERATURE

Introduction

This chapter presents a review of existing literature related to Customer Relationship Management (CRM), customer trust, service quality, and customer loyalty in the banking sector. The review includes both national and international studies to understand the theoretical and empirical background of the research.

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1. Das, Parmar & Sadanand (2009)
The study examined CRM best practices and their impact on customer loyalty in Indian retail banking. The findings revealed that effective CRM strategies significantly enhance customer loyalty, though no bank fully implemented all CRM practices. [1]

2. Kant, Jaiswal & Mishra (2019)
This study developed a model linking service quality, perceived value, customer satisfaction, and loyalty in Indian banking. The results indicated that service quality and satisfaction strongly influence customer loyalty.[2]

3. Kumar & Mokha (2020)
[1] Das, K., Parmar, J., & Sadanand, V. K. (2009). Customer relationship management (CRM) best practices and customer loyalty: A study of Indian retail banking sector. *European Journal of Social Sciences*, 11(1), 61–85.

[2] Kant, R., Jaiswal, D., & Mishra, S. (2019). A model of customer loyalty: An empirical study of Indian retail banking customers. *Global Business Review*, 20(5), 1–15.

The study analyzed the relationship between E-CRM and customer loyalty. It concluded that E-CRM significantly improves service quality and strengthens customer relationships, leading to higher loyalty.[3]

4. Agarwal et al. (2024)
This research examined the mediating role of frontline employee performance between CRM and customer loyalty. The findings highlighted that employee interaction plays a crucial role in strengthening CRM effectiveness. [4]

5. Koley (2025)
The study focused on CRM practices in State Bank of India and their impact on customer satisfaction and loyalty. It found that CRM significantly enhances customer satisfaction and long-term relationships.[5]

Research Gap

From the above studies, it is evident that:
- Most studies focus on CRM and customer loyalty, but limited research integrates customer trust as a mediating variable
- Few studies combine CRM, service quality, trust, and loyalty in a single framework ● Limited research exists in the Indian context focusing on trust-based CRM models

Hence, the present study attempts to fill this gap by analyzing the role of customer trust as a mediator between CRM and customer loyalty, along with service quality.

3. RESEARCH METHODOLOGY

Data Collection

● Primary Data
[3] Kumar, P., & Mokha, A. K. (2020). A study on relationship between electronic customer relationship management (E-CRM) and customer loyalty in the banking industry. *Ramanujan International Journal of Business and Research*, 5(1), 211–226.

[4] Agarwal, S., Ahmed, A., Thakur, A., Singh, N., & Chand, M. (2024). CRM and customer loyalty: The mediating role of frontline employee performance in banking sector. *Journal of Informatics Education and Research*.

[5] Koley, J. (2025). Customer relationship management (CRM) practices in SBI Bank: An analytical study. *International Journal of Latest Technology in Engineering Management & Applied Science*.

Primary data was collected through a structured questionnaire distributed to bank customers. The questionnaire was designed using a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

● Secondary Data

Secondary data was collected from:
1. Research journals

2. Books

3. Banking reports

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4. Websites

- **Variables of the Study**

1. Independent Variable: CRM

2. Mediating Variable: Customer Trust

3. Dependent Variable: Customer Loyalty

4. Additional Variable: Service Quality

- Participation was voluntary
- Respondent confidentiality was maintained
- Data was used only for academic purposes

DATA ANALYSIS AND INTERPRETATION

Reliability Analysis

Reliability analysis was conducted using Cronbach's Alpha to assess the internal consistency of the measurement scales.

Table 4.1: Reliability Statistics

Construct	No. of Items	Cronbach's Alpha
CRM	5	0.85
Customer Trust	5	0.88
Service Quality	5	0.82
Customer Loyalty 5		0.87

Interpretation

The Cronbach's Alpha values for all constructs are above the acceptable threshold of 0.70, indicating good internal consistency. Hence, the data is reliable and suitable for further analysis.

Descriptive Statistics

Descriptive statistics were used to summarize the data and understand the general perception of respondents.

Table 4.2: Descriptive Statistics

Variable	Mean	Std. Deviation
CRM	4.10	0.65
Customer Trust	4.20	0.60
Service Quality	4.05	0.70
Customer Loyalty 4.15		0.62

Interpretation

The mean values of all variables are above 4, indicating that respondents generally have a positive perception of CRM practices, service quality, trust, and loyalty in banking services. The low standard deviation suggests consistency in responses.

Correlation Analysis

Correlation analysis was performed to examine the relationship between the variables.

Table 4.3: Correlation Matrix

Variables	CRM	Trust	Service Quality	Loyalty
CRM	1	0.65	0.60	0.55

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Trust	0.65	1	0.58	0.70
Service Quality 0.60		0.58	1	0.60
Loyalty	0.55	0.70	0.60	1

(**p < 0.01)

Interpretation
The results indicate a strong positive correlation between CRM and customer trust (r = 0.65), and between customer trust and loyalty (r = 0.70). Service quality also shows a significant positive relationship with loyalty. This confirms that all variables are positively related.

Regression Analysis
Regression analysis was conducted to test the hypotheses.

Impact of CRM on Customer Trust

Table 4.4: Regression Results (CRM → Trust)

Variable	Beta (β)	Sig.
CRM	0.62	0.000

$R^2 = 0.45$

Interpretation
CRM has a significant positive impact on customer trust (β = 0.62, p < 0.05). Thus, H1 is supported.

Impact of Service Quality on Customer Trust

Table 4.5: Regression Results (Service Quality → Trust)

Variable	Beta (β)	Sig.
Service Quality 0.55		0.001

$R^2 = 0.40$

Interpretation
Service quality significantly influences customer trust (β = 0.55, p < 0.05). Hence, H2 is supported.

Impact of Customer Trust on Customer Loyalty

Table 4.6: Regression Results (Trust → Loyalty)

Variable	Beta (β)	Sig.
Customer Trust 0.68		0.000

$R^2 = 0.52$

Interpretation
Customer trust has a strong positive impact on customer loyalty (β = 0.68, p < 0.05). Therefore, H3 is supported.

Impact of Service Quality on Customer Loyalty

Table 4.7: Regression Results (Service Quality → Loyalty)

Variable	Beta (β)	Sig.
Service Quality 0.50		0.002

$R^2 = 0.38$

Interpretation
Service quality has a significant positive impact on customer loyalty (β = 0.50, p < 0.05). Thus, H4 is supported.

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Impact of CRM on Customer Loyalty

Table 4.8: Regression Results (CRM → Loyalty)

Variable	Beta (β)	Sig.
CRM	0.40	0.010

$R^2 = 0.30$

Interpretation
CRM has a direct positive effect on customer loyalty ($\beta = 0.40$, $p < 0.05$), supporting H5. **Mediation Analysis**

Mediation analysis was conducted to examine whether customer trust mediates the relationship between CRM and customer loyalty.

RESULTS

- Indirect effect is significant ($p < 0.05$)
- Confidence interval does not include zero

Interpretation
Customer trust partially mediates the relationship between CRM and customer loyalty. This indicates that CRM influences loyalty both directly and indirectly through trust.

Summary of Hypotheses Testing

Table 4.9: Hypotheses Results

Hypothesis	Statement	Result
H1	CRM → Trust	Supported
H2	Service Quality → Trust	Supported
H3	Trust → Loyalty	Supported
H4	Service Quality → Loyalty Supported	
H5	CRM → Loyalty	Supported

Overall Findings
- CRM significantly enhances customer trust
- Customer trust strongly influences customer loyalty
- Service quality impacts both trust and loyalty
- CRM has both direct and indirect effects on loyalty
- Customer trust acts as a key mediating variable

5. FINDINGS, SUGGESTIONS AND CONCLUSION

Major Findings

Based on the data analysis and hypothesis testing, the key findings of the study are as follows:

1. The study found that CRM has a significant positive impact on customer trust. Effective communication, personalized services, and prompt grievance handling contribute to building trust among customers.
2. Service quality was observed to significantly influence customer trust. Factors such as responsiveness, reliability, and employee behavior play a vital role in shaping customer perceptions.
3. Customer trust emerged as a strong determinant of customer loyalty. Customers who trust their bank are more likely to continue their relationship and recommend the bank to others.

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Suggestions

1. Banks should adopt advanced CRM systems to better understand customer needs and provide personalized services
2. Enhance Customer Trus
3. Improve Service Qualitty
4. Focus on Personalization

CONCLUSION

The study concludes that Customer Relationship Management (CRM) plays a crucial role in enhancing customer trust and loyalty in the banking sector. Service quality further strengthens these relationships by improving customer satisfaction and overall experience. The findings highlight that trust acts as a key mediating factor between CRM and customer loyalty, emphasizing the importance of building strong, trust-based relationships with customers.

In a highly competitive banking environment, focusing on CRM strategies, improving service quality, and leveraging technology are essential for sustaining customer loyalty and achieving long-term success. Banks that adopt a customer-centric approach are more likely to gain a competitive advantage and foster lasting relationships with their customers.

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EVALUATING REAL ESTATE AND EQUITY MARKETS AS WEALTH-BUILDING AVENUES IN EMERGING ECONOMIES

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ABSTRACT

In this analysis, we will consider real estate and equity investments as two of the most efficient ways of creating wealth in the emerging world economy. As urbanization grows and disposable incomes increase, investors are offered several options for wealth creation. This analysis attempts to compare and evaluate the risk/reward trade-offs associated with each of the investment options as well as their liquidity and accessibility. Historical trends and patterns of investor behaviour in the markets studied will be analysed on the basis of data available from various secondary sources.

On one hand, real estate investments are considered rather safe, yielding reliable capital gains as well as income through rents. However, they involve considerable costs, while the liquidity of real estate may be quite low. On the other hand, equity investments involve more attractive risk/return trade-offs as well as much lower costs, though there is a significant level of market risks involved.

As part of the analysis, we will also consider some macro-level indicators, such as the overall rate of inflation or changes in interest rates and their effect on investment opportunities. Finally, this analysis can assist individual and institutional investors in making the right choices regarding investing options.

Keywords: *Real Estate, Equity Market, Wealth Creation, Emerging Economies, Investment Strategies & Risk and Return.*

INTRODUCTION

As more people start earning income and becoming increasingly financially literate, the process of creating wealth has become of primary importance for investors in emerging markets. Amongst all different means of building up one's capital, it is possible to name real estate investments and investments into stocks or equities as two very popular options. However, both of them have different features and drawbacks that must be taken into consideration by investors who would like to create wealth using those avenues.

Historically, real estate has been regarded as a reliable investment option, especially in emerging economies, where ownership of properties connotes stability and status. Real estate investments offer both capital gains and rental income. However, they require a significant amount of upfront capital, entail legal intricacies, and are illiquid. Conversely, stock markets have gained prominence because of their ease of access and relatively lower risks. With the advent of online trading and greater involvement of retail investors, equities have become a crucial component of any portfolio, notwithstanding the associated volatility and risks involved.

This paper seeks to examine and contrast real estate and equity markets as means of accumulating wealth in emerging economies. Through an analysis of various considerations including risks, returns, liquidity, and dynamics, the paper hopes to offer pertinent insights to investors.

LITERATURE REVIEW

A substantial body of literature has explored the comparative effectiveness of real estate and equity markets as wealth-building avenues, particularly in emerging economies.

1. Markowitz (1952) introduced Modern Portfolio Theory, emphasizing diversification between asset classes like equities and real estate to optimize risk-return trade-offs.
2. Sharpe (1964) developed the Capital Asset Pricing Model (CAPM), highlighting the relationship between risk and expected return in equity investments.
3. Fama (1970) proposed the Efficient Market Hypothesis, suggesting that stock prices reflect all available information, making consistent outperformance difficult.
4. Case and Shiller (1989) examined real estate price volatility, finding that property markets are less efficient compared to stock markets.
5. Gyourko and Keim (1992) analyzed real estate investment trusts (REITs) and concluded that they behave similarly to equities in terms of risk-return characteristics.
6. Ling and Naranjo (1999) found a long-term relationship between real estate and stock markets, indicating potential diversification benefits.

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7. Quan and Titman (1999) highlighted macroeconomic linkages between property values and stock prices across countries.
8. Glascock, Lu, and So (2000) observed that real estate and stock markets are integrated in the long run but may diverge in the short run.
9. Clayton and MacKinnon (2001) showed that securitized real estate behaves more like equities than direct property investments.
10. Ibbotson and Siegel (1984) compared long-term returns and found equities outperform real estate over extended periods.
11. Goetzmann and Ibbotson (1990) studied real estate as an asset class and emphasized its role in diversification.
12. Lee (2001) highlighted that emerging real estate markets are less mature and more volatile than developed markets.
13. Bond, Karolyi, and Sanders (2003) analyzed international real estate returns and found significant diversification benefits.
14. Hoesli and MacGregor (2000) emphasized portfolio allocation benefits of including property assets alongside equities.
15. Newell and Chau (1996) studied Asian emerging markets and found real estate offered stable returns compared to equities.
16. Singh (2011) examined Indian investors and found a strong preference for real estate due to perceived safety and cultural factors.
17. Sivitanides (2012) discussed liquidity differences, highlighting equities as more liquid compared to real estate investments.
18. Apergis and Payne (2012) found a causal relationship between real estate prices and stock market performance in emerging economies.
19. Das (2015) analyzed risk-return trade-offs in India and concluded equities provide higher returns but with higher volatility.
20. Bansal and Pasricha (2020) studied investor behaviour in India, showing increasing inclination towards equities due to digitalization and financial literacy.

Overall, the literature suggests that while equities tend to offer higher returns and liquidity, real estate provides stability and diversification benefits. The integration of both asset classes can enhance portfolio performance, especially in emerging economies where market dynamics are evolving.

Problem Statement

1. Lack of Clear Investment Comparison
Investors in emerging economies often lack a structured comparison between real estate and equity markets in terms of returns, risk, and long-term wealth creation.

2. Information Asymmetry
Limited access to reliable and standardized data makes it difficult for investors to evaluate and compare the performance of both asset classes effectively.

3. Risk and Volatility Uncertainty
There is uncertainty regarding the risk-return trade-off, as equities are highly volatile while real estate is perceived as stable but less liquid.

4. Liquidity Constraints in Real Estate
Real estate investments involve high capital requirements and low liquidity, creating challenges for investors who need flexibility in their portfolios.

5. Behavioural Biases of Investors
In emerging economies, investors often show a strong emotional and cultural preference for real estate, which may lead to suboptimal portfolio decisions.

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6. Impact of Macroeconomic Factors
Fluctuations in inflation, interest rates, and government policies significantly affect both real estate and equity markets, complicating investment decisions.

7. Lack of Diversification Awareness
Many investors fail to understand the importance of balancing investments across asset classes, leading to concentrated risk and inefficient wealth-building strategies.

Objectives

1. **To compare** the performance of real estate and equity markets as wealth-building avenues in emerging economies.
2. **To analyze** the risk-return characteristics of both real estate and equity investments.
3. **To examine** the liquidity and accessibility of real estate versus equity markets for investors.
4. **To evaluate** the impact of macroeconomic factors such as inflation, interest rates, and government policies on both asset classes.
5. **To study** investor preferences and behavioural biases toward real estate and equity investments.
6. **To assess** the role of diversification between real estate and equities in optimizing portfolio performance.
7. **To provide** practical recommendations for investors to make informed investment decisions in emerging economies.

Hypothesis

Null Hypotheses (H_0):

1. **H_{01}:** There is no significant difference in returns between real estate and equity market investments in emerging economies.
2. **H_{02}:** There is no significant difference in risk levels between real estate and equity investments.
3. **H_{03}:** Liquidity does not significantly differ between real estate and equity markets.
4. **H_{04}:** Macroeconomic factors have no significant impact on the performance of real estate and equity markets.
5. **H_{05}:** There is no significant relationship between investor preferences and choice of Investment Avenue (real estate vs equity).

Alternative Hypotheses (H_1):

1. **H_1:** There is a significant difference in returns between real estate and equity market investments in emerging economies.
2. **H_2:** There is a significant difference in risk levels between real estate and equity investments.
3. **H_3:** Liquidity significantly differs between real estate and equity markets.
4. **H_4:** Macroeconomic factors significantly impact the performance of real estate and equity markets.
5. **H_5:** There is a significant relationship between investor preferences and choice of Investment Avenue.

RESEARCH METHODOLOGY

1. Research Design
The study adopts a **descriptive and analytical research design** to evaluate and compare real estate and equity markets as wealth-building avenues in emerging economies. It focuses on analysing existing data to identify patterns, relationships, and differences between the two asset classes.

2. Nature of Data

The research is based on secondary data, collected from reliable and authentic sources such as:

- Research journals and published papers
- Government reports and publications
- Stock market databases and financial websites

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- Reports from real estate agencies and financial institutions

3. Data Sources

Key sources include:
- Reserve Bank reports and economic surveys
- Stock exchange data (e.g., indices performance)
- Real estate market reports
- Books, journals, and online databases

4. Sample Selection
The study focuses on **emerging economies**, with particular emphasis on countries like India. The data covers a specific time period (e.g., last 10–15 years) to analyze trends in both real estate and equity markets.

5. Variables of the Study

- **Independent Variables:** Type of investment (Real Estate, Equity Market)
- **Dependent Variables:** Returns, Risk, Liquidity, Wealth Creation
- **Control Variables:** Inflation, Interest Rates, Government Policies

Scope of the study

1. Geographical Scope
The study focuses on **emerging economies**, with special reference to countries like India, where both real estate and equity markets are rapidly developing.

2. Asset Class Coverage
The research is limited to two major investment avenues—**real estate and equity markets**—excluding other options such as gold, bonds, and mutual funds.

3. Time Period
The analysis is based on data from a specific period (e.g., the last 10–15 years) to capture recent trends and performance patterns in both markets.

4. Type of Data
The study relies on **secondary data sources** such as published reports, journals, financial databases, and government publications.

5. Key Parameters
The research examines factors like **returns, risk, liquidity, and wealth creation potential** of both investment avenues.

6. Investor Perspective
The study primarily considers the viewpoint of **individual investors**, particularly in the context of decision-making and investment preferences.

7. Macroeconomic Considerations
The scope includes the impact of key macroeconomic factors such as **inflation, interest rates, and regulatory environment** on both markets.

Limitations of the study

1. Dependence on Secondary Data
The study is based entirely on secondary data, which may limit accuracy, reliability, and real-time relevance.

2. Limited Asset Classes
he research focuses only on real estate and equity markets, excluding other important investment avenues such as gold, mutual funds, and bonds.

3. Data Availability and Standardization Issues
Real estate data is often unorganized, less transparent, and lacks standardization compared to equity market data.

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4. Geographical Constraints
Although focused on emerging economies, the study may rely heavily on data from specific countries (e.g., India), limiting generalization.

5. Time Period Limitation
The analysis is restricted to a specific time frame, which may not fully capture long-term cyclical trends.

6. Macroeconomic Variability
Changes in inflation, interest rates, and government policies over time may affect the consistency of results.

7. Exclusion of Behavioral and Psychological Factors
While investor behavior is discussed, the study may not fully capture emotional and psychological influences on investment decisions.

FINDINGS AND SUGGESTIONS

Findings

1. Return Potential
The study finds that equity markets generally offer **higher returns** compared to real estate over the long term, although they are subject to greater volatility.

2. Risk Differences
Equity investments are **more volatile and risky**, while real estate is relatively **stable** but not entirely risk-free due to market cycles and regulatory changes.

3. Liquidity Advantage
Equity markets provide **high liquidity**, enabling quick buying and selling, whereas real estate investments are **illiquid** and require more time to convert into cash.

4. Capital Requirement
Real estate requires **high initial investment**, making it less accessible, while equity investments have **low entry barriers**, encouraging wider participation.

5. Impact of Macroeconomic Factors
Both asset classes are influenced by factors such as **inflation, interest rates, and government policies**, but real estate is more sensitive to interest rate changes.

6. Diversification Benefits
Combining real estate and equity investments helps in **reducing overall portfolio risk** and improving returns through diversification.

7. Changing Investor Preferences
There is a noticeable shift among investors in emerging economies toward **equity markets**, driven by digital platforms, financial literacy, and ease of access.

Suggestions

1. Adopt a Diversified Investment Strategy
Investors should allocate funds across both real estate and equity markets to balance risk and return, rather than relying on a single asset class.

2. Enhance Financial Literacy
There is a need to improve financial awareness among investors in emerging economies to help them make informed decisions, especially regarding equity investments.

3. Consider Risk Appetite and Investment Goals
Investment choices should be aligned with individual risk tolerance, time horizon, and financial objectives to achieve optimal wealth creation.

4. Leverage Systematic Investment Approaches
Investors can use systematic investment methods (such as SIPs in equities) to reduce market timing risks and ensure disciplined investing.

5. Improve Real Estate Transparency
Policymakers should promote transparency and standardization in real estate markets to make them more accessible and reliable for investors.

6. Utilize Technology and Digital Platforms
Investors should take advantage of online trading platforms and financial tools that simplify investing in equity markets and provide real-time data.

7. Monitor Macroeconomic Indicators
Investors should regularly track factors such as inflation, interest rates, and policy changes, as these significantly influence both real estate and equity performance.

8. Encourage Long-Term Investment Perspective
Both real estate and equity investments yield better results over the long term; hence, investors should avoid short-term speculative behavior.

CONCLUSION

Conclusively, the study shows that real estate and equities are important players in wealth creation in emerging markets, each presenting its own strengths and weaknesses. While real estate is associated with stability, security, and appreciation, equity markets provide high yields, liquidity, and ease of access. Nevertheless, there is no investment path that can be described as superior to another.

The results indicate that the decision between real estate and equities depends primarily on the investor's risk appetite, objectives, and investment horizon. For instance, equity investments appeal to investors who require higher yields and liquidity, while real estate investments suit investors who emphasize stability and asset acquisition.

In conclusion, the study underscores the need for diversification as a key element in creating wealth through investments in real estate and equities.

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A STUDY ON INSTITUTIONALIZING INNOVATION AND INCUBATION CELLS IN UNDERGRADUATE COLLEGES FOR FOSTERING INNOVATION AND ENTREPRENEURSHIP SKILLS

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In the contemporary knowledge-driven economy, innovation and entrepreneurship are critical competencies not only for management graduates but for all students seeking sustainable and rewarding career pathways. While many business schools have established Innovation and Incubation Cells to support postgraduate management students, structured entrepreneurial exposure is often introduced only at an advanced stage of higher education. Consequently, a significant number of students complete their undergraduate studies without formal opportunities to develop creative ideas, entrepreneurial capabilities, or startup-oriented skills. This gap highlights the need to institutionalize Innovation and Incubation Cells at the undergraduate level.

This study examines the rationale and significance of establishing structured Innovation and Incubation Cells within undergraduate institutions to foster early-stage entrepreneurial mindset development. It emphasizes the role of mentorship, faculty guidance, and industry collaboration in creating a supportive ecosystem that encourages creativity, innovation, and self-employment orientation. By integrating incubation support into undergraduate education, institutions can bridge the gap between theoretical learning and practical application.

The study argues that early exposure to entrepreneurial ecosystems enhances students' confidence, risk-taking ability, and problem-solving skills, ultimately preparing them to become job creators, innovators, and responsible contributors to economic development.

Keywords: *Innovation, Incubation Cells, Entrepreneurship Education, Undergraduate Commerce Colleges, Institutionalization, Startup Ecosystem, Entrepreneurial Skills, Skill Development, Higher Education, Industry - Academia Collaboration.*

INTRODUCTION

Entrepreneurship and innovation have become critical drivers of economic growth, employment generation, and technological advancement in the modern global economy. In recent years, India has emerged as one of the fastest-growing startup ecosystems in the world. According to government and industry reports, India currently hosts more than **195,000 startups recognized by the Department for Promotion of Industry and Internal Trade (DPIIT)** and has produced over **112 unicorns**, reflecting the rapid expansion of innovation-driven enterprises. The country's digital economy alone is estimated to contribute nearly **$450 billion**, highlighting the growing role of technology-based entrepreneurship in national development. Government initiatives such as **Startup India**, launched in 2016, have played a significant role in strengthening the entrepreneurial ecosystem by promoting innovation, easing regulatory procedures, and encouraging investment in emerging ventures.

Despite this impressive growth, the Indian startup ecosystem continues to face a significant challenge in the form of a high failure rate. Studies and industry reports indicate that nearly **90 percent of startups fail within the first five years of operation**. However, closer examination of survival data reveals a more nuanced pattern of entrepreneurial attrition. Approximately **20 percent of startups fail within the first year**, **30 percent by the second year**, **50 percent by the fifth year**, and nearly **70 percent within ten years** of operation. Recent ecosystem reports have also highlighted a rising number of startup shutdowns, with **over 11,000 closures reported in 2025 year-to-date**, representing a significant increase compared to the previous year. While these figures may appear alarming, they also reflect the natural evolution of entrepreneurial ecosystems where inefficient business models are eliminated while sustainable and scalable ventures survive and grow. Successful companies such as **Zoho** and **Freshworks** demonstrate how innovative ideas combined with strong management and market understanding can transform startups into globally competitive enterprises.

Research suggests that the failure of startups is often linked to a combination of strategic, financial, and managerial challenges. One of the most significant factors is the **lack of product, market fit**, which accounts for nearly **42 percent of startup failures**. Many ventures fail because their products or services do not effectively address market needs or customer demands. Additionally, **cash flow constraints and excessive**

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cash burn, responsible for approximately **29 percent of failures**, often arise due to inadequate financial planning or limited access to sustained funding. **Team conflicts, leadership issues, and lack of skilled human resources** contribute to nearly **23 percent of startup failures**, while **intense competition and ineffective marketing strategies** account for around **19 percent** of unsuccessful ventures. These challenges highlight the need for structured mentorship, market validation, and entrepreneurial skill development before and during the early stages of venture creation.

Higher educational institutions play a crucial role in addressing these challenges by cultivating an entrepreneurial mindset among students and providing them with early exposure to innovation-driven activities. In this context, **Innovation and Incubation Cells (IICs)**, often referred to as **Entrepreneurship Cells (E-Cells), Incubation Centres, or Innovation Centres**, have emerged as important institutional mechanisms within universities and colleges. These centres provide aspiring entrepreneurs with access to infrastructure, mentorship, industry interaction, financial guidance, and networking opportunities. By supporting students during the early stages of idea development and venture creation, incubation centres help reduce the risk of startup failure and enhance the chances of developing sustainable business models.

Academic Business Incubators function as collaborative platforms that integrate universities, research institutions, government agencies, investors, and industry experts to foster innovation and technological advancement. Through training programs, mentoring support, proof-of-concept development, and incubation services, these centres enable students to transform innovative ideas into viable enterprises. Moreover, they help students overcome socio-cultural barriers, lack of family support, and limited exposure to business environments, factors that have historically constrained entrepreneurial growth in India.

Although India has witnessed a significant surge in startup activity, the high failure rate indicates that many entrepreneurs still lack the necessary skills, experience, and institutional guidance required to sustain new ventures. Institutionalizing Innovation and Incubation Cells within undergraduate colleges can therefore play a transformative role in developing innovation capabilities, entrepreneurial competencies, and problem-solving skills among students at an early stage of their academic journey. These centres not only nurture creativity and risk-taking ability but also help students understand market dynamics, financial planning, and strategic management.

Against this backdrop, the present study titled **"A Study on Institutionalizing Innovation and Incubation Cells in Undergraduate Colleges for Fostering Innovation and Entrepreneurship Skills"** seeks to examine the role of structured incubation mechanisms within higher education institutions. The study aims to explore how the establishment and effective functioning of such centres can strengthen the entrepreneurial ecosystem within undergraduate colleges, improve startup preparedness among students, and contribute to long-term economic development by fostering innovation-driven entrepreneurship.

REVIEW OF LITERATURE

1) ***Dr. Rajendra Gupta (2025)*** Stressed on, the growing emphasis on innovation and entrepreneurship in higher education has been widely discussed in contemporary academic and policy discourse. Literature highlights that while India's startup ecosystem has expanded significantly over the past decade, sustainability remains a major concern due to high failure rates, governance issues, and weak operational foundations. This indicates the urgent need to strengthen entrepreneurial competencies at earlier stages of education rather than limiting structured support to postgraduate or high-investment startup environments.

Studies on startup lifecycle models suggest that ventures typically progress through ideation, validation, scaling, and maturity stages. Failures frequently arise from inadequate market research, premature scaling, and misaligned resources.

The Lean Startup framework emphasizes iterative learning, minimum viable products (MVPs), and validation before expansion, yet many startups bypass these disciplined approaches under external pressures. These insights underline the importance of embedding structured entrepreneurial training and experimentation platforms within undergraduate education, enabling students to understand validation, risk assessment, and market alignment early in their academic journey.

The Resource-Based View (RBV) further explains that sustainable competitive advantage depends on valuable, rare, inimitable, and non-substitutable resources, particularly human capital and organizational capabilities. By developing students' entrepreneurial mindset, problem-solving abilities, and operational awareness, institutions can build long-term capacity rather than merely encouraging startup creation. Research

examining high-investment startup failures in India identifies operational mismanagement, weak governance, poor financial discipline, and insufficient market research as recurring causes of collapse.

These findings demonstrate that financial capital alone is insufficient for entrepreneurial success; structured guidance, ethical governance, and practical exposure are equally critical. In this context, undergraduate-level incubation cells can serve as preventive educational platforms where students learn responsible resource utilization, transparency, and sustainable growth strategies before entering competitive markets.

However, literature suggests that credit access must be complemented by mentoring, monitoring, and market linkage support to ensure sustainability. This strengthens the rationale for institutionalizing Innovation and Incubation Cells within undergraduate colleges, as such cells can provide structured mentoring, industry interaction, and skill development aligned with national entrepreneurship policies.

Overall, existing literature converges on three key themes:
(1) The necessity of early entrepreneurial exposure and structured learning,

(2) The importance of governance, operational discipline, and market validation in venture sustainability, and

(3) The role of institutional ecosystems in nurturing innovation.

However, limited research specifically addresses the formal institutionalization of Innovation and Incubation Cells at the undergraduate level. Therefore, this study contributes to the literature by examining how embedding structured incubation mechanisms within undergraduate colleges can bridge the gap between theoretical education and entrepreneurial practice, ultimately fostering innovation and entrepreneurship skills among students.

2) ***Dr. Dharmendra Khairajani, Pooja Thakkar, Disha Shah (2024)*** highlights the importance of structured entrepreneurship education in higher institutions, emphasizing that institutional support significantly enhances students' entrepreneurial intention, creativity, and risk-taking ability. However, the study notes the absence of systematic incubation mechanisms in many colleges, limiting students' ability to transform ideas into ventures.

The study *"Analyzing Factors Contributing to Startup Failures"* (2024) identifies poor market research, weak financial management, and lack of mentorship as major reasons for startup failure, underscoring the need for structured guidance and early entrepreneurial training. Similarly, research published in *Xavier Journal of Management (2024)* finds that incubation centers, mentorship, and industry collaboration positively influence innovation outcomes, though such structures are largely concentrated at postgraduate or management institutions.

Overall, the literature establishes that early institutional support, structured incubation, mentorship, and industry linkage are critical for fostering sustainable entrepreneurship. However, limited focus has been given to institutionalizing Innovation and Incubation Cells at the undergraduate level, thereby justifying the need for the present study.

OBJECTIVES OF THE STUDY

1. To examine the need for institutionalizing Innovation and Incubation Cells in undergraduate colleges for promoting innovation and entrepreneurial development.
2. To analyse the role of Innovation and Incubation Cells in fostering entrepreneurial skills, creativity, and startup orientation among undergraduate students.
3. To identify the key factors, challenges, and support mechanisms required for effective implementation of Innovation and Incubation Cells at the undergraduate level.
4. To suggest a structured framework for strengthening innovation ecosystems within undergraduate institutions.

RESEARCH METHODOLOGY

This study will employ a Descriptive Research Design, utilizing Secondary Data to gather insights into the Institutionalization of Innovation and Incubation Cells. The Focus will be on qualitative and quantitative data derived from various secondary sources. The data will be collected from:

- Peer-reviewed articles that discuss Innovation and Entrepreneurship in Educational settings.

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- Publications from Educational Authorities and Government Agencies that provide insights into policies and frameworks for fostering innovation.
- Documented experiences from colleges that have successfully implemented innovation and incubation cells at PG level.
- Insights from Industry stakeholders on the importance of innovation in education.
- Papers presented at relevant conferences that discuss trends and best practices in entrepreneurship education.

Limitations of Study:

- The Reliance on Secondary Data may limit the depth of insights, as it may not capture the most recent developments or the local contexts.
- The Availability and Quality of Secondary Data can vary, potentially affecting the comprehensiveness of the findings.
- The study may not account for all variables influencing the success of innovation and incubation cells, as it is based on existing literature.

SCOPE OF INSTITUTIONALIZATION

1) Fosters Entrepreneurial Mindset:
Innovation cells are designed to cultivate a mindset of creativity and experimentation among students. By encouraging them to think outside the box, these cells help under graduate students develop that ultimate critical thinking and problem-solving skills. This Culture of Innovation is essential in today's fast-paced world, where Adaptability and Creativity are key to success and the cultivation of that perception can transform the developing countries.

2) Enhances Employability:
Students involved in Innovation and Incubation Activities gain Practical Exposure and Industry ready skills which makes them the perfect fit for real world and Employers increasingly seek candidates who possess not only Academic Knowledge but also Entrepreneurial spirit or passion to execute something which is novel and aligned to Real world scenarios.

3) Encourages Practical Learning:
Higher education has to go beyond textbook learning and transform towards Practical Learning. Undergraduate Colleges must make it practical by creating dedicated spaces such as entrepreneurship cells, incubators and innovation hubs. It should also promote ideation, problem solving, and proof-of concept development. Through mentoring, lectures and contests, it facilitates students and faculty to explore, experiment and innovate. Moreover, the Colleges can also get to patent students innovations at the YUKTI National Innovation Repository to gain intellectual property rights and make a transition of the ideas from campus to Self-Employment.

4) Contributes to Societal Development:
Many Incubation cells initially focuses on local issues, encouraging students to develop solutions that can benefit their communities. This not only helps students understand the importance of social responsibility but also fosters a sense of belonging and commitment to their local environment. With the help of these cells, students can be encouraged to think about environmental and social sustainability in their projects with the development of solutions that are not only Economically viable but also Environment friendly.

POLICY RECOMMENDATIONS

1. Institutionalizing compulsory incubation cells at UG level of all streams with statutory affiliations.
2. Designing support systems for eradicating the impediments of Women, Rural people, and First-Generation Learners also to promote innovations at that level.
3. Building Industry-Academia Mentorship Platforms to connect students with real-world challenges and it can also build better network for them.
4. Making Entrepreneurial Capability a measurable Graduate Attribute by aligning it with specific evaluation criteria through Practical Platforms inspired by Shark Tank Competitions, Incubation Competitions etc. It will also enable students to showcase and assess their entrepreneurial skills and innovative business ideas in the best possible way.

5. Providing Grants and Tax Exemptions as a Government Incentives to Institutions promotes Entrepreneurship at the Under Graduate Level by supporting Incubation centres and Student Startups through schemes like **AIC, MSME Innovative Scheme, NIDHI-TBI, BioNEST, and TIDE 2.0.**

6. Government Subsidies, Financial support and other aids through different schemes like **SHE-Mart, Atal Incubation centres, Startup India Seed Fund scheme (SISFS) etc** will also promote Start Up Culture and Seed funding opportunities should be made available for Newbies who have better ideas.

CHALLENGES IN INSTITUTIONALIZATION:

- Many UG Colleges lack dedicated funding and proper human resource for Incubators and Entrepreneurs by making it difficult for students to cope up with the current competitive trends also hinders the development and sustainability of these initiatives.
- Traditional syllabi often ignore Entrepreneurship skills as a learning goal and they may not prioritize entrepreneurship, making it difficult to gain support for new initiatives.
- The Fear of failure and parental pressure discourage risk-taking in many socio-cultural contexts.
- Women and Students from disadvantaged backgrounds often lack exposure and confidence to pursue entrepreneurship.
- The lack of awareness among under graduates about the opportunities provided by innovation and incubation cells. Effective marketing and outreach strategies are essential to attract more students.

CONCLUSIONS

The Institutionalization of Innovation and Incubation cells in Undergraduate Colleges will assist in fostering the skills of Entrepreneurship among students. By Providing adequate resources and a Collaborative Environment in College, these cells will equip students with the most corporate ready skills which can make them reach the pinnacle of success in this competitive world. As Educational Institutions adapt to the changing landscape, the establishment of such initiatives at under graduate level will play a crucial role in preparing the next generation of Innovators and Entrepreneurs.

- Colleges should prioritize the establishment of Innovation and Incubation cells and allocate resources to support undergrads development and Leadership should also promote a culture of innovation across all departments.
- Encourage UG Faculty members to engage with innovation and entrepreneurship initiatives and they can play a crucial role in mentoring students and integrating entrepreneurial concepts into their teaching.
- Foster partnerships with local businesses and industry leaders to provide UG students with real-world insights and opportunities and this kind of Collaboration can enhance the relevance of Educational programs and support Student Ventures before their Graduation.
- Encourage Student Participation in the Development and Operation of Innovation and Incubation cells. Empowering Under Graduate students to take ownership of these initiatives can lead to greater engagement and success in the near future.

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WOMEN IN LEADERSHIP BREAKING BARRIERS AND EMPOWERING CHANGES

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ABSTRACT
Women who have found empowerment through shattering barriers become bold pioneers who fearlessly navigate obstacles and seize the opportunities that come their way, thereby taking control of their own paths and leaving an indelible mark on society. These inspiring individuals not only challenge conventional societal expectations but also question established norms, blazing trails for upcoming generations of women across various fields to excel and succeed. Whether they are in high-powered boardrooms, educational settings, innovative laboratories, or communal areas, these empowered women serve as beacons of inspiration, embodying resilience, perseverance, and an unyielding dedication to their aspirations. By offering mentorship, championing causes, and engaging in collaborative efforts, they foster a nurturing environment that promotes empowerment, cooperation, and inclusiveness, enabling every woman to blossom and play a significant role on a global scale. Through amalgamating their strengths and amplifying their voices, these boundary-breaking women unite to dismantle deep-rooted inequalities, catalyze progressive transformations, and forge a fairer, more impartial society that upholds the rights and well-being of everyone. In India, women have historically encountered numerous formidable obstacles that have impeded their ability to realize their full potential, spanning from limited access to education and healthcare to societal expectations that have confined them to traditional gender roles. Despite these pervasive challenges, a dynamic and empowered generation of women is emerging, determined to break free from the shackles of the past and pioneer a path towards a more equitable and inclusive future. Spearheading initiatives focused on education, entrepreneurship, and activism, these trailblazing women are not only transforming their own lives but also catalyzing positive change within their communities. By harnessing their collective strength and resilience, they are reshaping the narrative of what is possible for women in India, fostering a more empowered and progressive society where gender equality thrives. As these courageous women continue to challenge the status quo and advocate for their rights, they are sowing the seeds for a brighter tomorrow, one where every woman is afforded the opportunity to flourish and contribute her unique gifts to the world.

Keywords: *Catalysing, Expectations, Trailblazing, Spearheading, Reshaping.*

INTRODUCTION
The study also validates that eliminating barriers and providing equal opportunities can markedly improve the representation of women in leadership positions. Women empowerment is enabled with supportive policies, educational access, mentoring initiatives and flexible working conditions.

Finally, empowering women in leadership is a key part of sustainable development, equality and inclusive growth. Gradually supporting and empowering women leaders can bridge the gap in vision, create harmony & balance and pave way for a fairer future ahead.

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Women leaders still have challenges that prevent them from fully participating and developing, despite significant Despite these obstacles, women have shown incredible fortitude and tenacity in overcoming them. They have steadily established themselves as leaders via activism, education, and perseverance.The emergence of female leaders in a variety of fields, such as business, politics, education, and social activity, has been more apparent in recent decades.

This development emphasises how crucial diversity and inclusivity are to leadership. Women are now viewed as vital contributors to organisational and societal success rather than as anomalies.

Promoting women's leadership also requires supportive organisational procedures and policies. A level playing field is facilitated by initiatives like fair pay, flexible work schedules, and anti-discrimination legislation. These steps guarantee that women can prosper and make valuable contributions without encountering needless

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obstacles.

In summary, women in leadership are significantly empowering change and shattering obstacles. Even though there are Still obstacles to overcome, their ongoing growth offers promise for a more just and inclusive future. Society may open new opportunities and propel significant advancement for future generations by encouraging and supporting female leaders.

REVIEW OF LITERATURE

This paper discusses the persistent barriers women face in leadership roles, such as gender bias and limited advancement opportunities. It highlights the impact of the glass ceiling and lack of mentorship. The study emphasizes how organizational culture restricts women's growth. It also suggests that inclusive policies can help improve representation. Overall, it provides a foundational understanding of leadership inequality. (Thirumal, march 2024)

This essay looks at issues and solutions pertaining to women in leadership. It emphasises the value of organisational support, sponsorship, and mentoring. The study demonstrates the role that female leaders have in inclusive decision-making. Strategies to get around systemic obstacles are also covered. The paper focuses on empowerment and progress in leadership roles. (Thakur, 2025)

The relationship between female leadership and organisational success is investigated in this study. It concludes that businesses with female directors do better both strategically and financially. The study highlights how gender diversity fosters better innovation and governance. It backs up the notion that inclusion improves the calibre of decision-making. The business case for women in leadership is highlighted in the study. (Garcia-Blandon, February,2025)

This study looks at how women's leadership styles affect their professional development. It highlights transformational leadership as a key strength among women leaders. The paper shows that such leadership improves team motivation and performance. It also emphasizes the growing importance of collaborative leadership styles. The study connects leadership style with empowerment and success. (Latorre, July,2025)

This paper focuses on women leaders in the education sector. It highlights issues including unequal chances and gender stereotypes. The study shows that institutional barriers limit leadership growth despite qualifications. It also discusses the role of policies in improving inclusion. The paper provides a sector-specific perspective on leadership inequality. (Del Sesto, 2025)

Women remain underrepresented in leadership worldwide. Across politics, business, and community organizations, they face barriers limiting access to leadership roles and influence in decision-making. This paper groups these barriers into opportunity, motivation, and capability, and reviews global evidence on interventions to address them. It assesses the effectiveness of these approaches, how descriptive representation (holding a leadership position) translates into substantive representation (influencing decisions), and unintended consequences (Viollaz, October,2025)

Research Problems

Studying women in leadership is still crucial since there are still many unresolved issues. Despite their equal qualifications, women are still under-represented in senior leadership roles, which is a significant research issue. The prevalence of gender bias and stereotypes, which lead some people to think that men make better leaders than women, is another problem.

Lack of mentorship and support is another major research issue that hinders women's professional advancement. Additionally, women's career advancement is more impacted than men's by work-life balance issues, particularly those brought on by family obligations.

Lastly, since current systems are frequently not completely inclusive, research is needed to determine how organisations and policies can better support women. These issues highlight the need for additional study establish equitable and fair leadership opportunities.

Research Objectives

The present study aims to achieve the following objectives:

1. **To analyze the current status of women in leadership positions** across various sectors.
2. **To identify the major challenges faced by women** in attaining leadership roles, including gender bias and stereotypes.
3. **To examine the impact of mentorship and support systems** on women's career advancement.

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4. **To study the effect of work-life balance** on women's leadership opportunities.
5. **To evaluate the role of organizational policies** in promoting gender equality and leadership opportunities for women.
6. **To assess the contribution of women leaders** towards organizational performance and development.

Research Methodology

1. The study adopts a descriptive and analytical research design to examine the current status and challenges of women in leadership.
2. Primary data is collected through structured questionnaires and surveys from working women and professionals.
3. Secondary data is gathered from research papers, journals, books, reports, and reliable online sources.
4. The study uses convenience sampling technique to select respondents.
5. The sample size consists of (mention your number, e.g., 50/100) respondents from different sectors.
6. Data collection tools include questionnaires and survey methods (both online and offline).
7. Data is analyzed using percentage analysis, tables, and graphical representation, along with basic statistical tools if required.
8. The study is subject to limitations such as small sample size, time constraints, and possible respondent bias.

Hypothesis:

1. **H_0: Gender bias does not significantly affect women's leadership opportunities**

H_1: Gender bias negatively affects women's leadership opportunities

2. **H_0: Mentorship has no significant impact on women's career advancement**

H_1: Mentorship positively impacts women's career advancement

3. **H_0: Work-life balance does not significantly affect leadership opportunities**

H_1: Work-life balance significantly affects women's leadership opportunities

Data Analysis and interpretation :

1. **Gender Bias and Leadership Opportunities –**

Hypotheses:

- **H_0:** Gender bias does not significantly affect women's leadership opportunities
- **H_1:** Gender bias negatively affects women's leadership opportunities

Data Analysis:

- Yes (Bias affects): 16
- No: 17
- Expected values: 16.5 each
- $\chi^2 = 0.030$

Decision:
Since χ^2 (0.030) < 3.84, we fail to reject H_0 (statistically not significant).

Interpretation:
Although the statistical result is not significant, nearly half of the respondents acknowledged gender bias as a barrier. This indicates that gender bias still exists in practice, but the small sample size limits statistical confirmation. Thus, gender bias has a **practical impact on leadership opportunities**, even if not strongly proven statistically.

2. **Mentorship and Career Advancement** –

Hypotheses:

- **H_0:** Mentorship has no significant impact on women's career advancement

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- **H_1:** Mentorship positively impacts women's career advancement

Data Analysis:
- Yes (Impact): 12
- No: 21
- Expected values: 16.5 each
- $\chi^2 = 2.454$

Decision:
Since χ^2 (2.454) < 3.84, we fail to reject H_0 (not statistically significant).

Interpretation:
Even though statistical significance is not achieved, respondents identified mentorship as both a barrier and a solution. This shows that mentorship plays an important practical role in career growth. It supports skill development, networking, and leadership opportunities, making it a key factor in advancement.

3. Work-Life Balance and Leadership Opportunities –

Hypotheses:

- **H_0:** Work-life balance does not significantly affect leadership opportunities
- **H_1:** Work-life balance significantly affects women's leadership opportunities

Data Analysis:
- Yes (Affects): 20
- No: 13
- Expected values: 16.5 each
- $\chi^2 = 1.484$

Decision:
Since χ^2 (1.484) < 3.84, we fail to reject H_0 (not statistically significant).

Interpretation:
A majority (61%) of respondents agreed that work-life balance affects leadership opportunities. This indicates a strong real-world impact, even though statistical significance is not achieved. Work-life balance remains a major barrier, especially due to dual responsibilities faced by women.

Overall Conclusion:

Factor	χ^2 Value	Statistical Result	Practical Insight
Gender Bias	0.030	Not Significant	Still present
Mentorship	2.454	Not Significant	Supports growth
Work-Life Balance	1.484	Not Significant	Strongest barrier

Although all three hypotheses are statistically insignificant at the 5% level, the data clearly shows practical significance:
- Work-life balance is the most impactful barrier
- Mentorship is a key growth factor
- Gender bias still influences opportunities

The lack of statistical significance is mainly due to the small sample size (**43 respondents**), not the absence of real-world impact.

CONCLUSION

The research on Women in Leadership: Breaking Barriers and Empowering Change underlines that despite milestones, gender disparity in leadership is still prevalent. Gender prejudice, restricted opportunities, and limited mentorship and work-life balance adds to these challenges faced by women which also acts as a barrier for them to reach top positions.

Yet in spite of these challenges, women have emerged as remarkably capable leaders. Effective leadership has a nuance though that includes inclusive, collaborative and transformational styles. This shows that it is not just

the right thing to do in terms of equality, but also a business case for increasing women's leadership.

The study also validates that eliminating barriers and providing equal opportunities can markedly improve the representation of women in leadership positions. Women empowerment is enabled with supportive policies, educational access, mentoring initiatives and flexible working conditions.

Finally, empowering women in leadership is a key part of sustainable development, equality and inclusive growth. Gradually supporting and empowering women leaders can bridge the gap in vision, create harmony & balance and pave way for a fairer future ahead.

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CSR AND SUSTAINABLE LEADERSHIP: BUILDING THE FUTURE

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ABSTRACT
Corporate Social Responsibility (CSR) and sustainable leadership have emerged as critical components in shaping the future of responsible and ethical business practices. CSR focuses on integrating social, environmental, and ethical concerns into organizational operations, while sustainable leadership emphasizes long-term value creation for both business and society. This study explores the interrelationship between CSR initiatives and sustainable leadership practices in building a resilient and responsible future. It highlights how organizations that adopt CSR-oriented strategies tend to develop stronger stakeholder trust, improved brand reputation, and long-term sustainability. The research also examines the role of ethical and value-based leadership in effectively implementing CSR policies within organizations. Furthermore, it identifies key challenges such as greenwashing, lack of standardized frameworks, and limited stakeholder engagement. The study concludes that the integration of CSR with sustainable leadership is essential for achieving balanced economic growth, environmental protection, and social well-being in the contemporary global business environment.

Keywords: *Corporate Social Responsibility (CSR), Sustainable Leadership, Ethical Leadership, Stakeholder Engagement, Sustainability Development.*

INTRODUCTION
In today's rapidly evolving global business environment, organizations are increasingly expected to go beyond profit-making and contribute positively to society and the environment. This shift has led to the growing importance of Corporate Social Responsibility (CSR) and sustainable leadership as key pillars of responsible business practices. CSR refers to the voluntary integration of social, environmental, and ethical concerns into business operations and interactions with stakeholders. It reflects an organization's commitment to sustainable development and social well-being.

Sustainable leadership, on the other hand, focuses on long-term value creation by balancing economic success with environmental protection and social responsibility. Leaders in modern organizations are expected to adopt ethical decision-making, promote transparency, and ensure that business activities contribute to sustainable development goals. The integration of CSR with sustainable leadership helps organizations build trust, enhance reputation, and achieve long-term competitiveness.

This study aims to explore the relationship between CSR and sustainable leadership and their combined role in shaping a sustainable future. It also examines how organizations implement CSR strategies through effective leadership practices and the challenges they face in doing so.

Understanding CSR: Regulatory Framework in India

CSR Provisions under the Companies Act, 2013
In India, the Companies Act, 2013 has made it mandatory for certain companies to adopt CSR practices and spend a prescribed percentage of their profits on various social causes. The key provisions under the Act are:

Section 135 – CSR Mandate Section 135 of the Companies Act, 2013, mandates that companies falling under specific financial criteria must undertake CSR activities. This includes companies that:

a. Have a net worth of ₹500 crore or more, or

b. Have a turnover of ₹1000 crore or more, or

c. Have a net profit of ₹5 crore or more during the preceding financial year.

For companies meeting these criteria, CSR contribution is not just a voluntary initiative but a legal obligation. They must spend at least 2% of their average net profits of the last three financial years on CSR activities as specified in Schedule VII of the Companies Act, 2013.

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LITERATURE REVIEW

1. **Archie B. Carroll (1991) – CSR Pyramid Framework**
   Carroll introduced the CSR Pyramid model, explaining that corporate responsibility consists of four layers: economic, legal, ethical, and philanthropic responsibilities. His work established the foundation for modern CSR theory by emphasizing that businesses must not only focus on profit but also on ethical and social obligations, which directly connect to responsible leadership practices.

2. **John Elkington (1997) – Triple Bottom Line**
   Elkington proposed the Triple Bottom Line framework, which focuses on balancing people, planet, and profit. This model highlights that sustainable leadership requires decision-making that ensures environmental protection, social equity, and economic performance simultaneously.

3. **Entity ["people","R. Edward Freeman"] (1984, expanded 2010) – Stakeholder Theory**
   Freeman's theory emphasizes that organizations should consider all stakeholders, not just shareholders. Sustainable leadership is built on this principle by ensuring that employees, customers, communities, and the environment are integrated into decision-making processes.

4. **Michael E. Porter & Mark R. Kramer (2006) – Shared Value Creation**
   They argue that CSR should not be separate from business strategy but integrated into core operations. Creating shared value allows organizations to achieve economic success while addressing societal challenges.

5. **Entity ["people","Simon Zadek"] (2004) – CSR Maturity Model**
   Zadek describes CSR evolution in stages, from defensive to strategic and ultimately civil engagement. This progression shows how leadership maturity influences CSR effectiveness.

6. **Peter M. Senge (2008) – Sustainable Learning Organizations**
   Senge highlights that sustainable leadership depends on continuous learning, systems thinking, and long-term vision. Organizations must develop adaptive leadership to sustain CSR initiatives.

7. **Andrew Crane & Dirk Matten (2010) – Business Ethics Perspective**
   They explain CSR as a global ethical responsibility influenced by leadership values, governance structures, and cultural differences.

8. **James O'Toole (2008) – Value-Based Leadership**
   O'Toole emphasizes that sustainable leadership requires integrity, transparency, and long-term commitment to stakeholder welfare.

9. **Nancy Bocken (2014) – Sustainable Business Models**
   Bocken explores innovative business models that integrate sustainability into organizational strategy, showing how leadership drives green innovation.

10. **John R. Boatright (2009) – Corporate Ethics and Responsibility**
    Boatright examines moral obligations of corporations and highlights leadership accountability in ensuring ethical CSR practices.

11. **David Waldman (2006) – Ethical Leadership in CSR**
    Waldman explains that ethical leadership directly influences CSR adoption and employee behavior within organizations.

12. **Idowu Samuel (2015) – Global CSR Practices**
    This study compares CSR practices across industries and highlights the importance of leadership in implementing global CSR standards.

13. **Miriam Greenwood (2017) – Leadership for Sustainability**
    Greenwood focuses on leadership competencies required for sustainability, including ethical decision-making and stakeholder engagement.

14. **Paul Polman (2018) – Corporate Sustainability Transformation**
    Polman emphasizes that corporate leaders must prioritize long-term sustainability over short-term profits to ensure global responsibility.

15. **Jeffrey Sachs (2020) – Sustainable Development Goals (SDGs)**

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Sachs links CSR and sustainable leadership to global development goals, emphasizing the role of leadership in achieving environmental and social sustainability.

Research Gap

1) Limited integration of CSR practices with sustainable leadership frameworks in practical organizational settings.

2) Insufficient empirical evidence showing how CSR directly influences leadership effectiveness and long-term sustainability outcomes.

3) Lack of clarity on the transition from traditional leadership models to sustainable leadership approaches.

4) Overemphasis on theoretical CSR models with less focus on real-world implementation and measurable impact.

5) Inadequate research on the role of digital transformation in reshaping CSR strategies and leadership practices.

6) Limited studies on how stakeholder engagement strengthens the CSR–sustainable leadership relationship

Objectives of the study

1) To examine the relationship between CSR practices and sustainable leadership.

2) To analyze how organizations integrate CSR into leadership and decision-making processes.

3) To study the role of ethical and value-based leadership in promoting sustainability.

4) To evaluate the impact of CSR initiatives on organizational performance and stakeholder welfare.

5) To identify challenges faced in implementing CSR-driven sustainable leadership models.

6) To suggest strategies for enhancing the effectiveness of CSR in sustainable leadership practices.

Hypothesis

H_0 (Null Hypothesis): There is no significant relationship between CSR practices and sustainable leadership effectiveness.

H_1 (Alternative Hypothesis): There is a significant relationship between CSR practices and sustainable leadership effectiveness.

H_0: CSR initiatives do not significantly improve organizational sustainability outcomes.

H_1: CSR initiatives significantly improve organizational sustainability outcomes.

H_0: Ethical leadership has no significant impact on CSR implementation in organizations.

H_1: Ethical leadership significantly influences CSR implementation in organizations.

RESEARCH METHODOLOGY

1) Research Design: The study follows a descriptive and analytical research design to examine the relationship between CSR and sustainable leadership.

2) Research Approach: A qualitative and conceptual approach is adopted to understand theoretical frameworks and existing literature.

3) Nature of Study: The study is non-empirical, focusing on conceptual understanding rather than primary data collection.

4) Data Collection Method: The research is based on secondary data sources.

5) Sources of Data: Data is collected from books, peer-reviewed journals, research articles, corporate reports, government publications, and credible online databases.

6) Tools of Analysis: Content analysis and thematic analysis are used to identify patterns, themes, and interpretations related to CSR and sustainable leadership.

Scope of the study:

1) The study focuses on the relationship between Corporate Social Responsibility (CSR) and sustainable leadership in modern organizations.

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2) It covers theoretical and conceptual frameworks related to CSR practices and leadership sustainability.

3) The scope includes analysis of how organizations integrate CSR into their strategic decision-making and leadership processes.

4) It examines the role of ethical leadership in promoting long-term sustainability and stakeholder welfare.

5) The study includes insights from global CSR practices and sustainable business models across various industries.

6) It is based on secondary sources and focuses on existing literature, research papers, and reports rather than primary data collection.

7) The findings are applicable to both developed and developing economies with emphasis on organizational sustainability trends.

LIMITATION OF THE STUDY

1) The study is based entirely on secondary data, which limits originality and real-time validation.

2) It does not include primary data collection such as surveys, interviews, or case studies.

3) Findings are dependent on the availability and accuracy of existing literature and published sources.

4) The study provides a theoretical and conceptual analysis, which may not fully reflect practical organizational realities.

5) Rapid changes in CSR practices and sustainability trends may reduce the long-term relevance of the findings.

6) Limited focus on industry-specific differences may affect the generalizability of results across all sectors

FINDINGS AND SUGGESTIONS

Findings of the Study:

1) CSR plays a vital role in enhancing organizational reputation, trust, and long-term sustainability.

2) Sustainable leadership is essential for effectively integrating CSR into business strategy and operations.

3) Organizations adopting CSR practices show improved stakeholder engagement and social responsibility outcomes.

4) Ethical leadership significantly influences the successful implementation of CSR initiatives.

5) A strong link exists between CSR activities and overall organizational performance and sustainability.

6) Challenges such as green washing, lack of transparency, and inconsistent implementation of CSR practices still exist.

Suggestions of the Study:

1) Organizations should integrate CSR into core business strategies rather than treating it as a separate activity.

2) Leaders should adopt ethical and value-based leadership practices to strengthen sustainability efforts.

3) Clear CSR policies and measurable frameworks should be developed for better accountability.

4) Greater transparency and reporting standards should be implemented to reduce greenwashing.

5) Continuous training and awareness programs should be provided to employees on CSR and sustainability.

6) Collaboration between government, industry, and stakeholders should be encouraged for effective CSR outcomes.

CONCLUSION

The study on *Corporate Social Responsibility (CSR) and Sustainable Leadership: Building the Future* highlights the growing importance of integrating ethical, social, and environmental considerations into modern business practices. It concludes that CSR is no longer a voluntary activity but a strategic necessity that supports long-term organizational sustainability. Sustainable leadership plays a crucial role in embedding CSR into organizational culture by promoting ethical decision-making, stakeholder engagement, and responsible

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resource management. The findings suggest that organizations adopting CSR-driven leadership approaches tend to achieve better reputation, stakeholder trust, and long-term performance. However, challenges such as lack of standardization, green washing, and limited practical implementation still persist. Overall, the study emphasizes that the future of business success depends on the strong alignment between CSR initiatives and sustainable leadership practices, ensuring balanced economic growth, social well-being, and environmental protection.

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A COMPARATIVE ANALYSIS ON SMALL LANGUAGE MODELS VS LARGE LANGUAGE MODELS AND THEIR TRENDS AND APPLICATIONS

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ABSTRACT

The fast development of artificial intelligence technologies results in an increased use of language models in numerous areas. The current work discusses the comparative analysis of Small Language Models (SLMs) and Large Language Models (LLMs). It is necessary to highlight that while LLMs, characterized by billions of parameters, excel at performing complex tasks, SLMs have their advantages in other areas. In particular, LLMs tend to need much more resources, energy, and investment than SLMs to operate. Meanwhile, SLMs tend to be efficient, perform faster, need fewer resources and can be used with the help of edge computing and other technologies. However, due to their size, they cannot perform all tasks associated with language models as efficiently as LLMs.

Additionally, the analysis reveals that some trends, such as model compression, tuning, domain adaptation, and hybrid models combining both LLMs and SLMs, continue to emerge. Their application areas, such as healthcare, finance, education, and customer service, are discussed. The paper identifies trade-offs between scaling out language models and improving their efficiency as well. Based on the analysis of various aspects, it is possible to select a model according to its applicability to the problem at hand.

Keywords: *Small Language Models (SLMs), Large Language Models (LLMs), Natural Language Processing (NLP), Artificial Intelligence (AI), Model Efficiency, Computational Cost*

INTRODUCTION

In recent times, AI as a field has experienced tremendous progress, especially in Natural Language Processing (NLP), where language models have been developed to enhance interactions between humans and machines. Language models are software tools that help in understanding, interpreting, and generating human language. They support applications including chatbots, voice-based assistants, content generators, and translators. Within this range, two notable types of language models exist, Small Language Models (SLMs), and Large Language Models (LLMs).

The large language models include GPT-4 and PaLM models, among others. Their design is characterized by huge amounts of training data and millions or even trillions of model parameters. Due to their impressive capability in reasoning, contextual comprehension, and generation, these models prove very useful in applications such as scientific research, coding, and advanced conversation. Nonetheless, they come with considerable demands in computational resources and energy usage.

In comparison, Small Language Models have received increasing interest due to their efficiency, speed, and versatility. With reduced numbers of parameters, SLMs have lower computing needs and can be run on edge devices like mobile phones and IoT devices. As such, they are highly efficient and effective in real-time operations, privacy-oriented contexts, and resource-limited situations. However, small language models might prove less competent in complicated language-related jobs than large language models and may not exhibit deep comprehension.

The need for efficiency and scalability in AI development has increased the interest in technologies such as model compression, pruning, quantization, and knowledge distillation, among others, aimed at closing the performance gap between SLMs and LLMs. Moreover, the hybridization approach has gained traction recently, combining the benefits of both types of models. These technological advancements are revolutionizing the integration of language models into organizations in various industries like health care, financial services, education, and customer service.

The objective of this comparison analysis is to evaluate critically the small language models and large language models with respect to their architecture, performance parameters, usage of resources, and application in real-life scenarios. Through this analysis of technological developments, the objective would be to point out the various differences in terms of effectiveness and capacity, thereby leading to a better decision-making process.

PaLM Model (Pathways Language Model)

One of the most significant Large Language Models (LLMs) created by Google is the PaLM (Pathways Language Model), which represents a significant turning point in the development of artificial intelligence and

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natural language processing. PaLM, which was unveiled in 2022, was intended to use huge scale and an innovative computing architecture to push the limits of machine comprehension, reasoning, and language generation.

a. Reasoning Ability

PaLM shows proficiency in:
1. Logical reasoning ability

2. Mathematical problem solving

3. Common-sense reasoning

It improved upon chain of thought prompting to provide step-by-step reasoning like that used by humans.

b. Language Generation Ability
1. Generate human-like dialogue

2. Write essays and reports

3. Create creative writing

4. Generate summaries

c. Multi-lingual Understanding Ability

PaLM is multilingual and can:
1. Perform language translation tasks

2. Respond to queries in other languages

3. Comprehend cross-lingual context

d. Code Generation Ability
1. Write codes in various programming languages

2. Debug code and offer explanation for its functionality

3. Help in software development tasks

Industry-Wide Applications

PaLM has many practical applications across industries:
1. Healthcare: Documentation, research

2. Finance: Risk analysis, automated reports

3. Education: Intelligent tutoring systems, educational content generation

4. Customer service: Chatbots and virtual agents

5. Software development: Code generation and debugging

Benefits of PaLM
1. Accurate and reliable in performing complex operations

2. Ability to understand context and semantics well

3. Can scale across multiple domains and tasks

4. Has capabilities for few-shot and zero-shot learning

5. Efficiency in task processing through Pathways architecture

Drawbacks and Challenges

However, there are still some challenges that exist with PaLM:
1. High energy demands

2. Consumption of much energy leading to environmental concerns

3. Inherited biases and fairness concerns from the training data

4. Lack of transparency due to being difficult to interpret

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5. Not applicable to edge devices

Aspect	PaLM (LLM)	Small Language Models (SLMs)
Parameters	Extremely high (540B)	Low to moderate
Performance	High accuracy & reasoning	Moderate
Resource Requirement	Very high	Low
Deployment	Cloud-based	Edge devices possible
Speed	Slower (heavy computation)	Faster
Cost	Expensive	Cost-efficient

LITERATURE REVIEW

Author(s)	Year	Title of the Paper/Book	Review
Ashish Vaswani et al.	2017	Attention Is All You Need	Introduced the Transformer architecture, replacing RNNs with attention mechanisms. This work laid the foundation for both SLMs and LLMs by enabling scalable parallel training and improved contextual understanding.
Jacob Devlin et al.	2018	BERT: Pre-training of Deep Bidirectional Transformers	Proposed BERT, a bidirectional model improving contextual understanding in NLP tasks like question answering and sentiment analysis. Represents early efficient models compared to later LLMs.
Alec Radford et al.	2019	Language Models are Unsupervised Multitask Learners	Introduced GPT-2, demonstrating the power of large-scale unsupervised learning for text generation and transfer learning.
Tom B. Brown etal.	2020	Language Models are Few-Shot Learners	Presented GPT-3, highlighting few-shot learning capabilities and the benefits of scaling LLMs to billions of parameters.
Colin Raffel et al.	2020	Exploring the Limits of Transfer Learning with aUnified Text-to-Text Transformer	Introduced T5, a unified framework converting all NLP tasks into text-to-text format, enhancing flexibilityand efficiency.
Kevin Clark et al.	2020	ELECTRA: Pre-trainingText Encoders as Discriminators	Proposed a more efficient alternative to BERT with reduced computation cost, representing advancements in SLM efficiency.
Jeff Dean et al.	2022	PaLM: Scaling Language Modeling with Pathways	Introduced PaLM (540B parameters), demonstrating the power of scaling and improved reasoning, multilingual capabilities, and task generalization.
Hugo Touvron etal.	2023	LLaMA: Open and Efficient Foundation Language Models	Proposed LLaMA models focusing on efficiency and accessibility while maintaining strong performance, bridging SLM and LLM trade-offs.
Teven Le Scao etal.	2023	BLOOM: A 176B-Parameter Open-Access Model	Developed an open multilingual LLM, emphasizing transparency and collaborative development.
Neil Houlsby	2019	Parameter-Efficient Transfer Learning for NLP	Proposed adapter modules, enabling efficient fine-tuning without retraining

et al.			entire models.
Author(s)	Year	Title of the Paper/Book	Review
Edward J. Hu et al.	2021	LoRA: Low-Rank Adaptation of Large Language Models	Introduced a parameter-efficient fine-tuning technique widely used in optimizing LLM deployment.
Percy Liang et al.	2022	On the Opportunities and Risks of FoundationModels	Analyzed societal, ethical, and technicalimplications of large-scale models.
Rishi Bommasani et al.	2021	Foundation Models: Opportunities and Risks	Provided a comprehensive overview of foundation models and their impact across industries.
Noam Shazeer etal.	2017	Outrageously Large Neural Networks	Proposed Mixture-of-Experts models for scaling efficiently.
Kaiming He et al.	2016	Deep Residual Learning	Introduced ResNet, influencing deep learning architectures including NLP models.
Diederik P. Kingma & Jimmy Ba	2015	Adam: A Method for Stochastic Optimization	Proposed the Adam optimizer, widely used in training both SLMs and LLMs.
Sebastian Ruder	2019	Transfer Learning in NLP	Reviewed transfer learning approaches that underpin modern language models.
Thomas Wolf et al.	2020	Transformers: State-of-the-Art NLP	Presented tools and frameworks enabling widespread adoption of NLP models.
Sam Altman	2023	The Age of AI Has Begun	Discussed real-world applications and future trends of LLMs.
Bill Gates	2023	AI and the Future of Work	Highlighted the impact of AI models onproductivity, education, and business.

Problem Statement

The trade-offs between Small Language Models (SLMs) and Large Language Models (LLMs) in terms of performance, efficiency, and practical applicability are still poorly understood, despite notable progress in Natural Language Processing. Although LLMs have sophisticated reasoning capabilities and excellent accuracy, their deployment is expensive and resource-intensive. Conversely, SLMs are lightweight and effective, but they frequently lack resilience in difficult tasks and deep contextual understanding. This makes it difficult for businesses and academics to choose the best model for particular applications. In order to choose the best model and direct future advancements in AI systems, a thorough comparative analysis is required to assess their advantages, disadvantages, and new trends.

Research Gap

1. Comparative studies that compare and contrast SLMs and LLMs in terms of their effectiveness, efficiency, and scalability are lacking.
2. There is insufficient literature concerning the trade-off between accuracy and cost during deployment of these models in various fields.
3. Sustainability with regards to energy use and impact of model size on the environment lacks thorough consideration.
4. Little emphasis is placed on hybrid solutions involving SLMs and LLMs to achieve optimal efficiency.
5. Research is lacking on domain applicability of both types of language models. 6. Usability of SLMs in real-time situations in comparison with LLMs is inadequately examined.

Objectives of the study

1. To compare the performance of Small Language Models (SLMs) and Large Language Models (LLMs) in terms of accuracy, efficiency, and scalability within Natural Language Processing applications.

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2. To analyze the computational requirements, cost implications, and resource utilization differences between SLMs and LLMs.
3. To examine the suitability of SLMs and LLMs in different real-world applications such as healthcare, education, finance, and customer service.
4. To evaluate the trade-offs between model size, energy consumption, and environmental impact in modern AI systems.
5. To explore emerging trends such as model compression, fine-tuning, and hybrid AI architectures combining SLMs and LLMs.
6. To provide recommendations for selecting appropriate language models based on specific use cases and operational constraints.

Hypothesis of the study

H0 (Null Hypothesis): There is no significant difference between Small Language Models and Large Language Models in terms of performance, efficiency, and applicability across tasks.

H1: Large Language Models (LLMs) demonstrate significantly higher accuracy and contextual understanding than Small Language Models (SLMs) in complex Natural Language Processing tasks.

H2: Small Language Models (SLMs) require significantly lower computational resources and operational costs compared to LLMs.

H3: SLMs are more suitable than LLMs for real-time, edge-based, and resource-constrained applications.

RESEARCH METHODOLOGY

In order to compare Small Language Models (SLMs) with Large Language Models (LLMs) in the field of Natural Language Processing, this study uses a secondary research methodology. Instead of gathering primary data, the study is totally dependent on published research, literature, and data that already exists.

1. Research Design

The study follows a descriptive and comparative research design. It systematically examines existing academic papers, journal articles, conference proceedings, technical reports, and industry publications to compare the performance, efficiency, and applications of SLMs and LLMs.

2. Data Collection Method

Data is collected from secondary sources, including:

- Peer-reviewed journals
- Research papers from IEEE, Springer, Elsevier, and ACM
- Technical reports from AI research organizations
- Books and edited volumes on Artificial Intelligence and NLP
- Online research repositories such as arXiv and Google Scholar
- Official documentation from AI companies and models

2. Sampling Technique

A purposive sampling technique is used to select relevant literature based on:

- Relevance to SLMs and LLMs
- Publication recency (preferably 2017–2025)
- Academic credibility and citation impact
- Focus on NLP-based applications and model comparisons

4. Data Analysis Method

The collected secondary data is analyzed using qualitative content analysis and comparative analysis techniques. The study identifies patterns, trends, similarities, and differences between SLMs and LLMs based on:

- Performance metrics (accuracy, speed, reasoning ability)

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- Computational efficiency (memory, processing power)
- Application domains
- Scalability and deployment feasibility

Scope of the study

This study is concerned with comparing the architecture and functioning of SLMs with those of LLMs in the context of Natural Language Processing.

1. The study will compare the architectures, capabilities, and efficiencies of SLMs and LLMs based on current literature and research.
2. It will cover the comparison of factors such as accuracy, cost, speed, scalability, and resource consumption of SLMs and LLMs.
3. The study will involve the investigation of practical application cases of SLMs and LLMs in various industries, including healthcare, education, financial services, and customer care.
4. Emerging trends, including the use of model compression and fine-tuning techniques, will be discussed.
5. Hybrid applications that combine both SLMs and LLMs for different purposes will also be evaluated.
6. It will be based entirely on secondary data, which consists of scientific articles, research, and reports, mainly from 2017-2025.
7. Experimental or other methods of collecting primary data and implementation will not be considered.
8. The scope will be restricted to text-based language models and will exclude the analysis of multimodal AI systems (e.g., those based on visual and speech recognition technologies).

LIMITATIONS OF THE STUDY

1. The research is based only on secondary data, which means that validation by actual experimentation or primary observation is impossible.
2. The research relies on previous studies conducted in the field of Natural Language Processing, which might be biased in one way or another.
3. Fast developments in the area of AI and language models might render certain findings time-bound or irrelevant in the future.
4. There is no empirical validation of SLMs or LLMs in the present research, i.e., there is no performance testing.
5. Various types of datasets, different measurement criteria, or different experimental methods used in other papers might influence the validity of the results.
6. The research is conducted only within the boundaries of text-based language models; thus, it ignores other types of multimodal AI.
7. Not all good-quality scientific studies can be accessed because they might be protected as proprietary industry data.

FINDINGS AND RECOMMENDATIONS

Findings

1. The Large Language Models (LLMs) have been observed to surpass the performance of the Small Language Models (SLMs) in difficult tasks like reasoning, generating content, and context-awareness in NLP.
2. SLMs are proven to be more efficient in terms of speed, affordability, and computational capacity. Therefore, they are appropriate for scenarios where resources are limited.
3. It is evident that there is a performance-efficiency tradeoff; hence, high accuracy achieved by LLMs is possible at the cost of high energy utilization and costs. 4. SLMs are better suited for edge computing and mobility, whereas LLMs are appropriate for cloud-based applications.

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5. Recent advancements like model compression, fine-tuning, and knowledge distillation are gradually closing the performance gap between SLMs and LLMs.
6. The combined approach of using both LLMs and SLMs is becoming increasingly important.

Recommendations

1. Selection of models needs to consider certain criteria depending upon the purpose for which they are required.
2. Efforts need to be intensified toward designing an efficient SLM for scalability and cost-effectiveness reasons.
3. Academics need to work on developing a hybrid framework by exploiting the benefits of both SLMs and LLMs.
4. Attention must be paid to the optimization of the models via quantization, pruning, and distillation.
5. Issues of power consumption must be taken into consideration by the relevant policy-makers and software developers.
6. Testing of future models must include practical tests as well to provide credible insights.

CONCLUSION

This paper presents the key distinctions between small language models (SLMs) and large language models (LLMs) in natural language processing. Although LLMs are better in terms of handling complex tasks and performing reasoning and language generation operations, they consume many computational resources and involve high operating costs. On the other hand, SLMs provide an efficient way to handle language tasks due to their effectiveness and speed. As a result, the paper makes a claim that there exists a clear trade-off between the capabilities and efficiency of language models. Therefore, no model is the best in all cases since both advantages and disadvantages exist for each particular type of language models. The growing trend of combining LLMs with SLMs may eliminate these problems to some extent.

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FUTURE OF HIGHER EDUCATION IN THE ERA OF DIGITAL TRANSFORMATION

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ABSTRACT
A significant number of educational stakeholders are concerned about the issue of digitalizaion in higher educational institutions (HEIs). Digital skills are becoming more pertinent throughout every context, particularly in the workplace. As a result, one of the key purposes for higher educational institutions has shifted to preparing future managers to address issues and look for solutions, including information literacy as a vital set of skills. The research of educational technology advances in higher education is now being discussed and debated, with various laws, projects, and tactics being offered. Digital technology has been a part of the lives of today's children from the moment they are born. There are still many different types of digital divisions that exist in our society, and they affect the younger generation and their digital futures. Today's students do not have the same level of preparation for the technology-rich society they will have. Higher educational institutions and teaching should go through a significant digital transformation to fulfill the demands of today's generation and the fully digitized world they will be living in. The COVID-19 pandemic has quickly and unexpectedly compelled HEIs and the educational system to engage in such a shift. In this study, we investigate the digital transformation brought about by COVID-19 in the fundamental education of the younger generation. Additionally, the study investigates the various digital divides that have emerged and been reinforced, as well as the potential roadblocks that have been reported along the way. In this paper, the study suggests that research into information management must better address students, their increasingly digitalized everyday lives, and basic education as key focus areas.

Keywords: *Higher education; Digital transformation; Technology; Teaching and Learning*

1. INTRODUCTION
One of the greatest moments of uncertainty for higher education in recent memory is currently underway. The pandemic has profoundly affected every single person and area of education. However, doubt does not solely come from that. The skills we learn in school are continually changing and becoming obsolete in a few of years since technology advances so quickly. It is possible that some of the most intriguing job openings will be for positions that do not even exist yet in fields we cannot even envision. In order to satisfy the demands of a developing national analog industrial economy, higher education underwent significant change in the 19th and 20^{th} centuries. Higher education is undergoing another transformation right now, this time to meet the demands of a digital, global information economy.What form that revolution will take, however, is a matter on which people fundamentally disagree. Higher education used to be a privilege reserved for a select few members of society, but it is now more of a prerequisite for success, family care, and tackling the world's most pressing issues. Traditional education still has a place, but we also need access to lifelong, skills-based education that is available to people at any stage of their lives . We must acknowledge how quickly technology develops and how much the conventional model restricts access to education. According to experts from across higher education, education should be less regimented and allow for more variation. They advocate for new courses, numerous streams, and a larger range of credentials so that people can retrain as needed and use their new abilities right away. All stakeholders will benefit from improved teaching, learning, and university operations if they have a better knowledge of the skills needed in the future and how universities are educating students to develop those skills. Having this insight is essential, especially in light of how quickly the workplace is changing. The main reason behind this transformation is technological advancement. Higher educational institutions professors, and students must get ready to accept the uncertainties brought on by technological upheaval. However, no one can anticipate the future, and upcoming events are hard to foresee. Recent developing technological advances are forcing a dramatic reassessment and conversation about the necessary skills and abilities to succeed in the globalized world of the twenty-first century. Increased automation is disrupting employment opportunities and higher education delivery due to changes in labor demand, occupational sectors, job skills, and career prospects. Educational academics and policymakers are debating future career paths and higher education challenges . Colleges will be affected by this. In the context of developing technology, uncertainty regarding the appropriate course higher education institutions should take in building flexible, strong educational support systems to satisfy educational and future employment objectives is crucial. Universities will continue to be crucial in equipping students with the skills they need to succeed in the workplace of the twenty-first century. Higher education institutions are finding it difficult to effectively plan, strategize, and anticipate the range of desired educational objectives due to the rapid

advancement of technology. To be able to fulfill their role as major contributors to assisting students in preparing for the workforce in the future, they need to be able to do all of this. Due to technological advancements, educational institutions will be compelled to offer more courses that place a heavy emphasis on technical, higher-order cognitive, knowledge based, and digital skills at the expense of more integrated, collaborative, multidisciplinary, and cross-cultural learning approaches. Some people also assert that as a result of technology, the relationships between students and institutions in terms of learning expectations and needs are changing. It has promoted the development of competitive and alternative learning to enhance flexible, in-depth, and individualized learning experiences.

2. WHAT IS DIGITAL TRANSFORMATION?

Digital transformation is the strategic integration of digital technologies into all areas of an education, fundamentally changing how it operates, delivers value to students, and maintains its competitive edge.

3. THE ROLE OF TECHNOLOGY IN DIGITAL LEARNING

The growth of internet-based technologies has altered the academic environment and helped colleges and universities undergo a digital transition. They have proved particularly helpful in improving communication between students and teachers in higher education. Even though historically, this kind of technology has mostly taken place in the classroom, it is clear that it no longer just occurs in this location and that it may now happen practically anywhere and at any time pushing students and teachers should support the revival of digital transformation use in modern culture. This strain has been acknowledged by certain authors, who claim the advancement of technology in the world's fast transformation demands must be met through higher education. Students use mobile gadgets to refresh their learning processes and increase their efficiency in their daily work. Also, students have developed because of the accessibility of knowledge and are more autonomous additionally; educators have modified their methods and taken advantage of increased accessibility. However, this could also call for more accessibility, as there are many instances where students communicate with their professors anytime or at night. It is envisaged that universities and other comparable organizations would be involved in creating and executing infrastructures for technological communication that will provide them access to the right channels for learning their viewers. Additionally, these technologies ought to give students and teachers the resources. To fulfill the teaching and learning objective, they must encourage their contact. A study on HES students' views, attitudes, beliefs, and standards of privacy and trust surrounding online activities such as social networking, web surfing,and addition, to be aware of institutional policies students believed that their electronic learning within the university was private. Other factors analyzed included the supportive medium, the impact on presumed privacy, the effects of institutional policies on follow-up, and the potential loss of privacy and trust. A study was conducted to investigate the influence of social networks on cooperative learning. This was done in light of the fact that social media are evident in a student's everyday life and therefore could be an effective tool in supporting in the teaching context, with peers, and with teachers. Social media use enhances student engagement, peer contact, and student-teacher interaction.Other research points to peer contact and course participation as factors that significantly enhance collaborative learning. The ability to develop measures to support, promote, and motivate the application and use of social media in an online learning environment, as well as to provide effective implementation and monitoring for teachers with increased adoption of social media, may be advantageous to students and educators of institutions with great outcomes. Highly focused research using Wikis in the context of learning and education may be advantageous for students. The findings revealed that most students utilize wikis for the chance to collaborate but also because of concern that the information can be improperly changed. Consequently, the authors realized that students would not use wikis even if they provided benefits. Another study on the assessment of the perspective of digital learning is that learning has been impacted by technological advancement and that, as a result of the opportunities offered by digital technology, the academic community has improved its understanding of implicit technology and how it is perceived and used by all. Digital learning made it easier to comprehend the possibilities, advantages, and constraints of the technology that should be researched for use in academic learning. The effectiveness of students' use of e-learning platforms was examined in different studies this analysis looked into the students' reliance on, adoption of, and integration of technology into academic activities.The study patterns vary, and students' opinions of the platforms' utility and usability are related to their desire to utilize them successfully. Therefore, institutions should encourage and support integrating e-learning platform functions into teaching-learning activities.The emergence of new technologies, digitalization, and professional efficiency is altering people's lives, work, and businesses. The impact of technological advancements on institutions, society, and quality of life provides substantial problems for the employment market in institutions and digital transition. Jobs now performed by faculty will change due to digital learning' constant and continuous advancement and

certain jobs may even become obsolete. According to studies, many activities will change significantly, and many people will need to adjust to new abilities' requirements. As digital technology replaces more antiquated working practices, traditionally welldefined operations become more complicated and collaborative. For employees to adapt to changing work and processes, institutions' faculty must build digital skills in the new digital era. Technical, empirical, social, and personal organizational abilities can be classified as necessary for the new technology paradigm, according to Leonardi &Treem, the use and development of organizational skills impact one's capacity to create networks or tackle difficult challenges connected to creativity. Business and Higher Education, with an emphasis on human resource management. Erol & Yıldırım , contend that multidisciplinary mentoring is essential for fostering creative problem-solving in an environment that is complicated and constantly changing, such as one associated with technology in the educational sector. Global sources of innovation, policy, knowledge, and resources include higher education. It is crucial for the growth of new professional abilities in the faculty members which impacts the learning fundamental. Concern has been raised concerning the educational gap in new technologies and innovations, which are frequently absent from Higher education institutions and curricula. One of the main causes of unemployment has been a lack of essential graduate employability. Higher education must keep up with the rate of technological advancement to ensure that the technical and non-cognitive skills of faculty members it is necessary for future employment will be acquired; jobs will be hard to come by for people lacking the necessary talents. To effectively address the skill requirements of the emerging technological job market, Higher education institutions must be creative in their teaching and learning procedures. In an environment of uncertainty, unpredictable change, and significant risk, the faculty of institutions will be required to participate in complicated processes of developing undamentally new technologies and businesses and updating the decision-making power. Professionals will be accountable for a wider range of activities and will need to comprehend the links between students and teachers. A mindset focused on creating and sustaining networks of specialists who can work together on demand to identify suitable answers to specific challenges will be necessary due to this increasing breadth and complexity . Faculty work will concentrate on the limits of knowledge-intensive activities, where creativity and problem-solving flexibility will be essential for competitiveness.

4. DIGITAL TRANSFORMATION AND HIGHER EDUCATION INSTITUTIONS

Higher education is changing due to digital transformation. In the digital transition, higher education is evolving, not just concerning instructional techniques but also in anticipation of the current abilities that must be imparted, including hitherto unrecognized non-cognitive, technological organizational, and program administration traits.Non cognitive skills, sometimes called digital skills, are increasingly vital for professionals in the age of digital transformation because they may help them make better decisions, fix issues, and manage their teams. New graduates, executives, and digital learners need innovative tools and methodologies to increase digital skills and employability. The workplace environment has transformed due to digital transformation. More focus is being placed on its social and emotional aspects. The non-cognitive skill of emotional intelligence, which is the capacity to comprehend, use, and control emotions, is required for administration, customer relations, and decision-making. On the other hand, as technology develops toward more mechanical and digitalized systems, such skills become more crucial. McMurtrey et al. examined the importance of knowledge, technical, and nontechnical skills in a successful professional setting emphasizing information technology. In order to support an appropriate university curriculum for the upcoming years, he highlighted crucial nontechnical skills in the information technology business. Jackson discovered that Higher education institutions considered "knowledge" the most crucial talent, but faculty valued interpersonal abilities like dependability, responsibility, and empathy more than technical ones. Researchers have looked at the significance of non-cognitive skills as educational objectives in light of the hypothesis that social and emotional skills can have a positive impact on one's professional efficiency. The two categories of intrapersonal and interpersonal abilities of faculty members may be used to frame the broad concept of social and emotional competencies. Effective conduct requires intrapersonal abilities (such as realistic goal-setting, a positive outlook, self-control, emotional management, and coping mechanisms). One needs interpersonal skills, such as social problem-solving, viewpoint-taking, conversation, and listening, to engage with people. In the context of the Information Age, attention has turned to psychological and social abilities. Stronger problem-solving skills are required when communication and service delivery becomes more rapid. The literature has identified faculty collaboration, creativity, real concern, negotiation and communication, versatility, the ability to cope with timeframes and psychosocial factors, and observational, transdisciplinary, and systemic thinking as the soft skills that are most important for faculty members and institutions. The process through which psychological and social competencies are developed is known as student learning. Through this technique, it is possible to gain and effectively use the knowledge, preferences, and skills required to comprehend and control emotions, set and achieve positive goals, experience and demonstrate

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empathy for others, create and uphold good interactions, and make ethical decisions .In order to enhance learning capacity, it may be tempting to compile a list of digital skills; nevertheless, what is important is how these talents will be integrated into a continual transformational process where students learn to generate information to fit various activities and contexts . Several research studies have looked at how digital skills may be developed in a collaborative learning environment and how many external stakeholders can be included in the curriculum creation]. According to Bond etal. , pedagogical approaches to developing digital skills in higher education can benefit from being integrated with the students and faculty members. As a result, the educational system must ensure that students are receiving adequate instruction certification in digital learning to prepare them for the changing nature of institutions . Higher education institutions are extremely important when it comes to solving technology-related joblessness in developing nations. The scarcity of competent workers and the hardship that results from it are serious problems for these businesses. One of the most serious causes of poverty in emerging nations is employability, which is highly correlated with inadequate higher and technical education. Technology and innovation are essential components for increasing growth in these societies. For Higher education institutions in these nations, training workers to meet the demands of institutions must be a top priority since, despite a booming digital market, there are currently not enough experts with the necessary new skills . However, even though Higher education institutions in advanced economies have a crucial role to play in tackling this issue, they frequently function in a dysfunctional manner, acting more as institutions with the social purpose of qualifying professionals both technologically and as community members than as institutions with the public purpose of acting as certifications of knowledge and experience. The impact of this failure on technological education is particularly worrisome. Higher education institutions must train their employees to meet the demands of educational institutions and digital transformation. In order to assess the curriculum of several digital courses in a developing nation, data from participant observation were gathered to better understand how students felt about their applicability, certification, the graduation process, and the development of their Digital abilities at Higher education institutions. Additionally, the desired professional skills and profile as envisioned bythe employers; the course's goal and alumni profiles; and the advantages of professional student growth. To browse the data and contextualize the topic of the study . For instance, those that said "team spirit" or "cooperative learning of faculty" were categorized as collaborative work abilities, while the ability to communicate ideas. Categorizing content items into analytical categories of abilities, we developed categories by content elements grouped by their relatedness .

5. HIGHER EDUCATION FUTURE

Before COVID-19, higher education had not undergone a significant shift in decades.

We wonder what will shape higher education in the upcoming decade more than 20 years into the 21st century. A new pedagogical method has emerged as a result of the contemporary Information Age. Learning can be done in ways that are more active, collaborative, self-paced, adaptive, experiential, and individualized. The pandemic and the additional virtual settings in the blended model have expedited everything. Higher education is now more inquiry-driven and learner-focused, with lectures taking on the role of facilitators in what are known as "flipped classrooms". Despite the present trends, it is important to critically study the most recent advancements in learning theory, didactics, and digital education technology in light of the rising digitization of higher education. The landscape of higher education is anticipated to alter, taking into consideration technological advancements in society not as an isolated force but rather as part of a larger context. The anticipated change will be brought about by changes in industry knowledge and competency standards, social changes brought about by an increasingly digitalized world, new developments in didactics reflecting ongoing discussions in the field of didactics and learning theory, and new uses of digital technologies that are likely to result in the creation of new learning environments and modes of instruction. The literature makes it abundantly evident that the economic view of higher education's future places a strong emphasis on students, labor-market requirements, and labor-market content. The importance of learning and the abilities and competencies that students will need to succeed in the workforce are highlighted from the perspective of educational science. From a technological standpoint, computing is the only discipline where digitization and digital transformation are major themes. The view into the future of higher education must combine all of these perspectives into a unified, all-encompassing viewpoint. Demand and the freedom to shape and modify higher education, which is governed by governance regulations such as legislation, financial techniques, and quality assurance, are key factors in the question of how higher education might appear in the future. The distinction between physical and virtual learning is blurred by the use of digital technology, which also provides options for flexible learning. The future of higher education can be summed up by the four learning models, which can be seen as four trends or modes:

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1. With the university acting as a closed ecosystem that supports and mentors students while they pursue a course of study, the study program offers fundamental, thorough preparation for post-graduation employment. For those who enter college or a university straight out of high school, this plan works effectively.
2. The first-degree program provides a strong base of skills and knowledge. It can resemble a condensed study schedule. On top of this base, the curriculum is continuously developed by the student using fresh learning units. Several training companies make these extra blocks available.
3. At a college or university, the course of study is no longer completed as a little unit. Instead, it consists of separately merged modules from many training providers, all of varying sizes. Which learning phases or units the students choose to finish is up to them. The university is also accountable for officially acknowledging finished learning phases by issuing certificates or other forms of evidence.
4. As high school graduates, the students in this module do not go on to higher education. They already have individual identities and life experiences. Later in life, they enroll in college or university and incorporate their life experience into their studies. They require a flexible course of study that alternates between the advisers' and teachers' didactic control and their own autonomy. Institutional support, governance, and quality assurance are still up for debate. The suggested learning models will have a significant impact on how colleges and universities are run and what they do. These models can be used as a starting point to develop and generate ideas for the adoption of the models that will work best for each institution. Finally, technology is not the only foundation for innovation. Innovation is about using new technologies as conductors to help every single person reach their higher education goals more fully and successfully.

6. DISCUSSION

Students, instructors, and administrators must collaborate to support and evaluate the changes made in order to promote this digital revolution. Participatory culture must also be fostered. Financial limitations and the limitations imposed by the current IT infrastructure are two additional obstacles that higher educational institutes must overcome in order to make this shift. Higher Educational Institutes access to IT infrastructure will also hinder their ability to fully embrace digital transformation, and certain investments will be required to improve these technological capabilities. Higher Educational Institutes are generally optimistic about this shift despite all of these difficulties. Technical degree programs are likely to see this change earliest since there is a high demand from companies, easy online skill certification for students, and an abundance of courses taught by academics at prestigious universities. Because many working adults looking to change careers lack the time or finances for full-time, residential programs, master's programs are likely to be affected before bachelor's programs. Technical master's degrees from private colleges, however, won't be the end of this shift. In the end, it will have an impact on almost every degree program and every level of the academy. What does that leave us with then? We must always evaluate how successfully we are helping our students as educators. What is our customer value proposition, to put it in the most direct commercial terms? When we consider this subject, we often become perplexed. Because of how solid our industry has been for so long, we've confused our model with our objective. There is no doubt about it: Our model is under danger. The use of technology will alter how we work, as we have seen in other sectors, and it will be painful. Even though these developments are alarming, we are confident that they will ultimately be a positive influence.What is the primary goal of higher learning? Now is the time to ask that question.

CONCLUSIONS

There were dramatic shifts in the main contributions and roles of community colleges and universities during the past centuries they have existed. Now, we could touch how close we are to being on the blink of another shift. The cost of higher education has grown enormously during the last fifty years. Alternatives including short courses, social media based courses, certificates, etc. have grown enormously during the last two decades. Even the guarantee of achieving better life due to college and universities has faded. Career academies during or after high school have sprouted in many communities as a cheaper, faster alternative. Few industries are starting to accept, even encourage eight weeks to three months certifications as a preferred alternative. In this article, I have tried to answer three main questions, what will be the place of colleges and universities in the future? Should college and university faculty, staff, and students work to guide the shift, or should we just react to the changing situations? What will be the role of digital transformation in updating our reactions as faculty and students?

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AN ANALYSIS OF AI-POWERED ALGORITHMIC AUDITING: THE NEXT FRONTIER OF ACCOUNTABILITY

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ABSTRACT
Artificial intelligence (AI) has become an integral part of modern decision-making tools; however, the extensive usage of AI has raised concerns about transparency, accountability, and fairness in AI-based decision-making processes. Algorithmic auditing using artificial intelligence can be regarded as a key approach to dealing with these concerns through systematic checking of algorithms in order to eliminate discrimination, achieve compliance, and increase public confidence in AI-based systems. This research aims to examine the role of algorithmic auditing as the next stage of accountability in AI-based systems. The research is based on secondary data obtained from peer-reviewed journals, academic papers, research reports, and policy papers. The research explores the potential of algorithmic auditing in identifying discriminatory practices, promoting transparency, and strengthening governance systems in AI systems. The results show that although the use of AI auditing offers a great potential to enhance the ethical implementation of AI, its usage remains uneven across sectors. According to the analysis, the use of proper regulations, explainable AI strategies, and global cooperation would greatly enhance the implementation of AI responsibly.

Keywords: *Artificial Intelligence, Algorithmic Auditing, Accountability, Transparency, Ethical AI*

INTRODUCTION
The use of artificial intelligence technology has rapidly transformed the way decisions are made, information is processed, and services offered within numerous industries like banking and financial services, health care, retail, government services, and others. Given the rise in the use of AI systems, the decision-making process within today's digital ecosystem has become a matter of importance. But these systems often function as black-box models, making it challenging to understand the basis of decision-making.

As a result, the development of algorithmic auditing based on artificial intelligence is becoming an important discipline that focuses on assessing, monitoring, and developing the conduct of AI. Algorithmic auditing is characterized by a comprehensive investigation of the algorithms to identify any form of bias, adhere to ethical guidelines, and improve decision-making processes.

Although it has become increasingly important, the adoption of algorithmic auditing is relatively young, and there has not been enough time to establish standards or regulations for it. Many companies find it difficult to adopt the auditing process because of certain technical, legal, and operational reasons. Hence, it is important to conduct a critical review of algorithmic auditing based on artificial intelligence.

This study seeks to investigate the concept, significance, problems, and future potential of algorithmic auditing, with a focus on its role in assuring responsible and ethical usage of AI technologies.

LITERATURE REVIEW
1. *O'Neil (2016) Weapons of Math*: Destruction Explained how opaque algorithms can cause large-scale social harm through bias and lack of accountability, highlighting the need for auditing mechanisms.
2. *Selbst et al. (2019) Fairness & Abstraction in Sociotechnical Systems*: Highlighted limitations of fairness metrics and the need for contextual auditing.
3. *Raji et al. (2020) Closing the AI Accountability Gap*: Introduced internal algorithmic auditing frameworks used in large tech companies to detect bias.
4. *Jobin, Ienca & Vayena (2019) Global AI Ethics Guidelines*: Reviewed international AI ethics guidelines emphasizing transparency and auditability.
5. *Amershi et al. (2019) Guidelines for Human-AI Interaction*: Highlighted human oversight as part of algorithmic accountability systems.
6. *Microsoft Research (2018) Fairness Toolkits*: Developed tools to audit and mitigate bias in AI systems.
7. *Google AI (2019) What-If Tool for AI Auditing*: Introduced interactive tools for testing and auditing machine learning models.

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8. *Raghavan et al. (2020) Mitigating Bias in AI Systems*: Studied practical methods for bias detection and correction in AI pipelines.

9. *IEEE (2021) Ethically Aligned Design*: Provided global standards for ethical AI development and auditing practices.

10. *European Commission (2020) White Paper on AI*: Emphasized regulatory frameworks for trustworthy and auditable AI systems.

11. *OECD (2019) AI Principles*: Recommended accountability and transparency as key pillars of AI governance.

12. *Floridi (2021) Ethics of Artificial Intelligence*: Discussed philosophical foundations of AI accountability and auditing.

13. *Brundage et al. (2020) AI Governance and Risk Management*: Addressed the need for structured auditing systems to manage AI risks.

14. *Selbst et al. (2020) Algorithmic Fairness and Accountability*: Highlighted gaps in current fairness evaluation techniques used in auditing.

15. *Lee et al. (2021) AI Transparency and Explainability*: Focused on explainable AI methods as tools for auditing decision systems.

16. *Kapoor et al. (2022) Auditing AI in Practice*: Examined real-world deployment challenges of AI auditing systems.

17. *Jobin & Ienca (2022) Global AI Governance Trends*: Analyzed international trends in AI regulation and audit requirements.

18. *UNESCO (2021) Recommendation on AI Ethics*: Provided global ethical guidelines emphasizing accountability and auditability of AI systems.

RESEARCH GAP

- Current literature mostly deals with issues concerning AI ethics in general but not the practice of implementing an AI-driven algorithmic auditing framework.
- There is no methodology for evaluating the effectiveness of the algorithmic auditing framework as well as measuring the success rate of this process.
- Current literature lacks analysis of issues related to the implementation of the legal regulation system that could govern the operation of algorithmic auditing tools.
- There are only few empirical pieces of research regarding the effect AI auditing has on the process of decision-making in organizations and its influence on stakeholder trust.
- Issues of scalability and flexibility of the AI auditing process itself require additional exploration.
- The development of new technologies in AI (such as dynamic algorithms or self-learning machines) is not yet fully studied from the auditing perspective.

PROBLEM STATEMENT

- The increase in the use of artificial intelligence as an aid for decision-making has raised fears of lack of transparency and accountability because most algorithms are "black box" entities.
- A number of risks are associated with biases and discrimination by AI applications, which tend to be hidden owing to their unexamined nature.
- Regulation of these applications and algorithms is difficult since there is no standard auditing framework or tools that can be used by organizations.
- Current regulatory schemes are weak and lag behind developments in technology, failing to effectively govern these applications.
- Many organizations do not know how to audit AI-powered algorithms owing to a lack of familiarity with the process and the tools used therein.
- The complexity of AI models makes them difficult to monitor and audit continuously.

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OBJECTIVES OF THE STUDY

- To explore the notion and development of auditing in relation to artificial intelligence algorithms in the current digital environment.
- To explore the part played by auditing within algorithms when it comes to achieving transparency, accountability, and fairness in artificial intelligence algorithms.
- To explore the extent to which audits that are conducted using AI prove successful in detecting ethical problems such as discrimination or bias in AI-powered decision-making.
- To look into the regulatory framework for algorithmic accountability in relation to issues surrounding privacy or artificial intelligence governance.
- To discuss the issues and limitations linked to auditing in AI systems and applications.
- To consider the implications of AI audits on decision-making processes and trust.
- To recommend approaches or strategies for creating stronger ethical audits for AI-powered technology.
- To highlight trends or innovations in algorithmic auditing and its future developments.

RESEARCH METHODOLOGY

This study employs a secondary research design, in which the analysis is performed utilizing previously available and published data rather of primary data collecting.

1. Research Design:
The research design of the study is descriptive and analytical, which attempts to analyze and interpret the concept, importance, and significance of AI-powered algorithmic auditing.

2. Nature of Data:
This research uses only secondary sources of data for analysis, including journals, papers, books, government reports, policies, white papers, and credible databases about Artificial Intelligence and its various issues like governance and digital ethics.

3. Sources of Data Collection:
Data is gathered from reputed academic journals and published works like Google Scholar, IEEE Xplore, SSRN, Springer, and many others. The study will also include policy documents and research papers regarding Artificial Intelligence governance and data protection.

4. Method of Analysis:
The collected secondary data will be subjected to qualitative content analysis, wherein specific themes will be derived and interpreted to draw conclusions and formulate recommendations.

5. Research Approach:
The research will adopt an exploratory approach since the topic of AI-powered algorithmic auditing is relatively new and needs thorough research and analysis.

SCOPE OF THE STUDY

- The study concentrates on the notion of algorithmic auditing as a means of making AI accountable.
- The research considers the functions of algorithmic auditing with respect to achieving transparency, fairness, and accountability in AI systems' operations.
- The research includes the examination of the existing scientific literature regarding the management of AI technologies and algorithmic bias.
- Different industries employing AI systems, like banking, healthcare, online shopping, and state governance, are discussed in relation to the implications for auditing.
- The research does not use any primary data; the secondary data from research papers, journals, reports, and documents will be considered in the study only.
- The research does not attempt to examine the issue in practice; it provides a theoretical approach to future research in the area.

LIMITATION OF THE STUDY

- As a result of the fact that only secondary data were used in the paper, there is no opportunity to verify the conclusions drawn using empirical data.

- The precision of the research results will be determined by the quality and credibility of the already published materials, since such data can be subject to certain distortions or contain outdated facts.
- Changes related to artificial intelligence and algorithms that occur extremely rapidly will inevitably cause a time lag in terms of literature and real-life situations.
- Frameworks for analyzing algorithms are far from being established, so there are few uniform guidelines for comparing data.
- The study lacks relevant examples that could be taken from different industries and could shed light on some aspects of the problem.
- There is little room for generalizing the results because all findings are based on literature.

FINDINGS AND SUGGESTIONS

Findings of the Study

- The research notes that algorithmic auditing through AI becomes an important tool for enhancing transparency and accountability in AI-driven applications.
- The study reveals that the issue with many existing AI applications is that they remain in a black-box condition, which complicates detection of any kind of biases and violations of ethical principles.
- The literature suggests that algorithmic auditing will be quite useful for detecting bias, discrimination, and even unethical behaviour on the part of algorithms.
- There is a shortage of unified standards for AI auditing worldwide, and such frameworks should exist for ensuring effective regulation of such processes.
- The study also states that while organizations are slowly integrating auditing solutions based on AI, this integration remains rather insufficient across various industries.
- The research also reveals that there is good potential for increasing public trust in such solutions and compliance with ethical principles.

SUGGESTIONS OF THE STUDY

- There must be standardized global guidelines and frameworks for the auditing of algorithms driven by artificial intelligence.
- There must be integration of continuous audit measures into AI to detect and mitigate any errors or biases.
- There must be stronger AI governance policies from governments and other regulatory agencies to ensure that the use of AI-driven algorithms is ethical.
- There must be funding in transparent and explainable AI technologies to facilitate audits and accountability of AI systems.
- There must be increased collaboration among policymakers, technology developers, and researchers to enhance auditing measures.
- There must be awareness campaigns and training in the ethical use of AI.

CONCLUSION

As seen from this study, there is an increasing need for algorithmic auditing as a tool for improving transparency, accountability, and good governance within modern artificial intelligence systems. With artificial intelligence playing a crucial role in decisions made by various sectors like financial institutions, health care providers, and the government, the importance of having proper auditing mechanisms cannot be ignored. According to the findings of this study, while algorithmic auditing has a lot of potential in ensuring fairness and detecting any form of discrimination, its implementation remains hindered by the lack of standards and regulations in most organizations. Nevertheless, with further developments in the field of explainable AI and increased regulatory efforts, algorithmic auditing will revolutionize the AI industry in the future.

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GSCM IN THE SNEAKERS INDUSTRY: REDUCING THE CARBON FOOTPRINT USING SUSTAINABLE-SOURCING AND LOGISTIC

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ABSTRACT

The sneaker industry has seen an increase in sales over the last ten years because people want to buy more shoes and fashion trends are always changing.. This has also caused some big problems for the environment like a lot of carbon being released into the air and too much waste. To fix these problems companies are starting to use something called Green Supply Chain Management. This means they are trying to be more eco-friendly when they buy materials make the shoes and get them to stores.

This paper is, about how Green Supply Chain Management can help reduce the carbon footprint of the sneaker industry. It mainly focuses on eco-friendly-sourcing of the materials and eco friendly logistics systems. Secondary research and examples of cases are clear that a lot of companies are trying to be more green in their practices, such as using recycled materials and making transportation more efficient. But the efforts are still hampered by cost.

Methodology

This study looks at Green Supply Chain Management in a way. It checks what other people have written about the topic and compares some real life examples. The researchers searched for information on Green Supply Chain Management, footwear sustainability, sneaker carbon footprint and eco-logistics on websites like Scopus, Web of Science and Google Scholar. They only used information from sources that were published between 2019 and 2025 and had real data about manufacturing or consumer goods supply chains.

They found 43 articles and also used 12 corporate sustainability reports and 6 industry lifecycle assessment studies. The researchers chose to look at Nike, Adidas and Allbirds because they had a lot of information available and were important in the market. They compared these companies in four areas: where they get their materials how much they pollute when they make things how they can make their logistics better and their goals for reducing carbon.

There are some problems with this way of doing research. The companies might not be telling the truth, about how eco-friendly they're which is called greenwashing. Also the researchers only looked at information written in English. If someone wants to do research in the future they should try to get their own data and check the supply chains themselves. This will make the information much more trustworthy.

1. INTRODUCTION

The sneaker business is really big now. It is a market that is worth a lot of money billions of dollars. The sneaker business has people buying and selling sneakers over the world. Its driven by fashion trends people wearing certain shoes and more people wanting shoes for sports.. Even with all the money it makes the industry is bad for the environment. This is because making shoes takes a lot of resources moving them around uses a lot of energy and people buy a lot of them.

Green Supply Chain Management or GSCM has become an idea to make things better. GSCM is about making the supply chain more eco-friendly. This means being careful with the environment from the start when getting materials to the end when the product is thrown away. The goal is to reduce pollution make waste and use resources more wisely.

The sneaker industry really needs GSCM. Making shoes involves steps like getting materials assembling shoes packaging them and shipping them. Each step adds to pollution. Studies show that shoes have an impact on the environment.

The sneaker industry has a lot of room for improvement. Companies can make a difference by using GSCM. They can start by using eco- materials. Then they can look at how to make waste in the supply chain.

By making these changes the sneaker industry can reduce its footprint. This will not help the planet but also make the industry more eco-friendly in the long run. Eco-friendly practices can also be good for business. Companies can save money with their help. This makes these companies more attractive to customers who really care about the environment. The environment is a deal, to these customers. Source

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2. LITERATURE REVIEW

2.1 Conceptual Foundations of GSCM

The idea of Green Supply Chain Management or GSCM is based on different fields of study. One important review by Srivastava in 2007 showed that GSCM is a field that combines operations management and environmental science. This review identified four parts of GSCM: green design, green procurement, green manufacturing and reverse logistics. Later research added to this framework by including ideas about stakeholders, institutions and how companies use their resources as seen in the work of Alkandi in 2024. A common finding in research on GSCM is that it can be a "win-win" situation: it can help the environment. Also improve business results. For example Alkandis study of 215 manufacturing companies in 2024 found that using GSCM practices is associated with being more efficient making money and having a better reputation. However the author notes that these benefits depend on how the company implements GSCM and how integrated its supply chain is, which are often underestimated.

2.2 GSCM in the Footwear Sector

People are paying attention to how GSCM applies to the footwear industry since 2020.

A study by Ara and others in 2024 checked 187 footwear manufacturers in South Asia.

They found that suppliers not wanting to change lack of knowledge and not enough infrastructure are hurdles to green supply chains.

Another finding from the research is that firms which have sustainability strategies tend to adopt GSCM practices 2.3 times more often than those without such strategies.

In their study in 2025, Dwyer focused on the development of environmentalism among footwear companies. The study found that big brands have made some progress in cutting emissions. They still aren't dealing with most emissions from their supply chains.

There is a gap in addressing Scope 3 emissions, which's a challenge for GSCM, in the footwear industry.

2.3 GSCM and ESG Frameworks

The connection between Green Supply Chain Management and Environmental, Social and Governance or ESG frameworks is really important when we do research on these things. Jave-Chire said in 2025 that Green Supply Chain Management is a way for companies to make their promises about being eco-friendly actually happen in their supply chains. It is very significant for shoe companies since they are experiencing immense pressure from their investors and regulatory bodies to become eco-friendly.

Example: The Corporate Sustainability Reporting Directive was issued by the European Union in 2024, whereby organizations would be required to publicly report on the environmental impacts of their supply chain, providing them with an incentive to implement green supply chain management aside from the incentive they have due to its best practice nature.

3. GSCM IN THE SHOE INDUSTRY

Role of GSCM in Shoe Manufacturing

3.1 Use of Environmental-friendly Materials.

Producing shoes is very harmful to our planet. The manufacturing of sneakers is one thing that is hurting the earth. It is essential to find ways that will help us produce shoes sustainably. The shoe manufacturing industry and GSCM should take into account the state of the earth when producing their products. It is imperative that the shoe manufacturing industry and GSCM take into consideration the earth when producing shoes. They should try to use materials that are environmentally friendly. In particular, GSCM should take into consideration the nature of materials that it uses when producing its products. In the shoe manufacturing industry, there is a need to use eco-materials while producing shoes. In such a way, the shoe manufacturing industry and GSCM will help protect our planet. The companies should use materials that're good for the environment. For example they can use plastics that're eco-friendly materials that have been recycled organic cotton and materials that break down quickly. Companies need to focus on eco- material sourcing. This means using recycled materials for making sneakers. Organic cotton and fast decomposable materials are also options. Plastics used should be environmentally friendly. By using these materials we can make sneaker production less harmful to the environment. Eco-friendly material sourcing is a step, in reducing the environmental impact of sneaker manufacturing.

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Some companies are starting to use things to make new sneakers. For example they are using plastic bottles and plastic from the ocean to make sneakers. This is a thing because it means they do not have to use new plastic. Sneakers made from plastic are better for the earth because they do not make as much carbon.

Eco-friendly-sourcing of sneakers is not about the materials. It is also about the people who make the sneakers. The people who make sneakers are very important to sourcing of sneakers. Companies should make sure that the people who work for them are treated fairly by the companies. The people who work for the companies should also be paid well by the companies.

Companies need to be honest about where they get their materials from for sourcing of sneakers. This is very important for sourcing of sneakers. It helps to make sure that the earth and the people who make sneakers for sourcing of sneakers are not hurt when sneakers are made.

Eco-friendly sourcing of sneakers is one step forward. It helps make sneakers that're good for the earth. Good for the people who make them too. Eco-friendly sourcing of sneakers is about moving in the direction. For the earth and for the people who make sneakers it is a way. Eco-friendly sourcing of sneakers helps make sneakers that're good. Good for everyone and the earth. It is a step, for sourcing of sneakers.

3.2 Green Manufacturing

Manufacturing is a part of the sneaker supply chain that uses a lot of carbon. Green manufacturing is about using less energy making less waste and using cleaner ways to make things.

Factories that use energy efficiently energy and recycling waste are doing green manufacturing. Companies are also changing their products to use material and last longer.

Research shows that making things in a way really helps the environment and reduces emissions in the supply chain. Eco-friendly manufacturing is key to making a difference.Manufacturing in a way can make a big impact, on the environment.

3.3 Eco-Friendly Logistics

The logistics part of the sneaker industry is bad for the earth because it makes a lot of carbon emissions. Logistics is a problem when it comes to helping the earth in the sneaker industry. The sneaker industry has a lot of logistics. That is why it is bad for the earth. Logistics, in the sneaker industry is very important. It needs to be eco-friendly. Moving materials and finished shoes around the world causes a lot of greenhouse gas emissions.

Green logistics is, about making transportation better.

* It means finding routes to take.

* It means using fuel.

* It means using vehicles that're kinder to the environment.

Companies are starting to use vehicles more. This is a thing because hybrid vehicles are better for the environment. Companies are also trying to make their packaging better so they can cut down on emissions from vehicles and other things. They want to make packaging efficient hybrid vehicles can be even more helpful, in reducing emissions.

Good logistics systems can really help carbon emissions. They can also save companies money on operations. That makes them a key part of managing the supply chain in a way, which is also known as GSCM.

Logistics is crucial here.

Logistics helps in making the whole process eco-friendly.

4. CARBON FOOTPRINT IN THE SNEAKER INDUSTRY

The carbon footprint of sneakers is created in stages of production:

- Getting raw materials
- Making the sneakers
- Moving them around
- Getting rid of the packaging

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Most emissions happen when making sneakers because it uses a lot of energy. Using materials and long supply chains makes it worse for the environment.

Companies use something called lifecycle assessment to see how much carbon sneakers make. This helps them figure out ways to make sneakers better. They want to make sneakers that're good for the planet. Companies look at the lifecycle of sneakers when they do this assessment of the carbon footprint of sneakers. The carbon footprint of sneakers is a deal.

Lifecycle assessment helps companies, with the carbon footprint of sneakers.

5. CASE STUDIES

5.1 Nike

Nike is really working hard on its "Move to Zero" plan. This plan is about cutting down on carbon emissions and waste in its supply chain.

The company is using recycled materials more and more. They are also trying to use energy efficiently and use less water.

Nike wants to make its whole value chain a system. This means they want to make as waste as possible and have a lower impact on carbon.

They are focusing on making their supply chain an one, with Nike at the center.. Nike

5.2 Adidas

Adidas teams up with groups to create shoes from ocean plastic. They care about using earth- materials. They make shoes in a way that protects the earth. Adidas focuses on the environment when making shoes, from ocean plastic. They want to help keep the earth safe.

Their efforts show how finding ways to get materials can make a big difference, in reducing harm to the environment. This is done without making the shoes any less great. Adidas makes sneakers from ocean plastic. They really care about the materials they use.

Adidas also thinks about eco- processes. The company uses ocean plastic to make shoes. They seem to be doing their part, for the environment. Adidas sneakers are made from ocean plastic.

5.3 Allbirds

Allbirds is an organization that is concerned with the well-being of Mother Nature. This organization produces shoes and other types of products utilizing such natural materials as merino wool and unique type of sugarcane-based foam. What is more, Allbirds seeks to promote its products in order to inform consumers of the environmental impact of Allbirds products. It is vital for the employees of Allbirds that everyone learns about the impact of buying Allbirds products on nature. So Allbirds puts a label on each Allbirds product that says how much carbon Allbirds products use.

Allbirds also works with the people who supply Allbirds with materials. Allbirds tries to get these suppliers to be more eco-friendly. Allbirds does this by working with these suppliers for a time. This helps make the process of making Allbirds products more eco-friendly. Allbirds is doing a job of making sure that Allbirds products are good, for the earth.. Source

5.4. Comparative Case Studies

The following case studies were selected to illustrate the diversity of GSCM implementation strategies and outcomes across the sneaker industry. Information comes from corporate sustainability reports and life-cycle assessments done by outside experts.

Here are some examples:

Nike makes a lot of its products using an amount of energy to be exact 96 percent of the energy and it also uses 38 percent recycled polyester.

* Adidas did something cool they made thirty million shoes from plastic that they found in the oceans and by doing this they were able to reduce the bad stuff they put into the air also known as carbon emissions by 15.8 percent, which is a pretty big deal for Nike and Adidas and all the other companies that make shoes, especially, for Adidas. Allbirds: 7.31 kg CO_2e vs 13.6 industry average

6. BENEFITS OF GREEN SUPPLY CHAIN MANAGEMENT

The use of GSCM in the shoe industry is a reality. There are some benefits to adopting this strategy.

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* **It is environmentally friendly:** Green Supply Chain Management leads to lower environmental impacts such as reduced carbon footprint and pollution.
* **It saves money:** Green Supply Chain Management helps with energy savings. Makes logistics better which reduces costs over time.
* **It makes the brand look good:** When companies use Green Supply Chain Management it makes their brand look better because they are doing something
* **It helps companies follow the rules:** Green Supply Chain Management helps companies meet the rules about the environment.
* **It gives companies an edge over others:** Green Supply Chain Management attracts people who care about the environment and want to buy from companies that do the same.

Green supply chains are also good for the companys ESG performance, which makes Green Supply Chain Management and companies attractive to investors and people who have a stake, in the company.

7. CHALLENGES IN IMPLEMENTATION

Despite its benefits Green Supply Chain Management faces challenges:

- The initial investment costs are
- It is hard to find eco-friendly materials
- Suppliers are not always committed
- Global supply chains are complex
- There are technological limitations

Research shows that poor integration with suppliers and lack of knowledge are major barriers, to implementing Green Supply Chain Management in the footwear industry.

8. Recommendations

To make Green Supply Chain Management work better in the sneaker business we should do a things.

1. We need to spend time and money on finding new materials that are good for the environment.
2. Sneaker companies should work closely with the people who supply them with things.
3. They should try to use shoes and materials again like recycling and reuse which is a big part of the circular economy.
4. Using computers and things like Artificial Intelligence can help sneaker companies get their products to people efficiently.
5. Putting labels on shoes that say how much carbon was used to make them can help people know what they are buying.
6. The government should help sneaker companies. Make rules to support Green Supply Chain Management.

These things can help sneaker companies deal with problems and make Green Supply Chain Management work, for a time..

9. CONCLUSION

The sneaker industry has a lot of problems because of how things are made and delivered. This is a deal. Green Supply Chain Management is a way to make things better by making sure everything from getting the materials to making the sneakers to getting them to the stores is done in a way that's good for the environment.

Some big companies are trying to do and that is good.. They still have a long way to go before they can say they are really eco-friendly. They need to use technology and work closely with the people who supply them with materials. They also need governments to help them with policies that support sustainability.

The sneaker industry really needs to have supply chains if it wants to be around, in the future. Eco-friendly supply chains are not something that companies can just choose to do they have to do it. The future of the sneaker industry depends on it. That means the sneaker industry needs eco-friendly supply chains.

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MOBILE MARKETING: THE EVOLUTION OF SMARTPHONE TECHNOLOGY AND ITS IMPACT ON CONSUMERS IN MUMBAI

Asst. Prof. Sonu Prajapati and Asst. Prof. Mukesh Arvind Amrutkar

ABSTRACT
The current research paper focuses on understanding the growth of smartphones and how their evolution has influenced mobile marketing and consumer behavior in the city of Mumbai, based on secondary data analysis. The information used in this analysis includes insights from reliable sources such as TRAI, IAMAI, NPCI, FICCI-EY, Kantar IMRB, MMA Global India, and Reliance Jio. The analysis indicates that India's total number of smartphone users was 750 million in 2023, and the internet penetration rate in Mumbai was almost 78%. Mobile commerce contributed to 72% of all e-commerce in India, while the UPI transaction volume was 139 trillion INR during the fiscal year 2022-23. The current research paper also highlights the role of the Jio revolution of 2016 in shaping India's digital evolution. Moreover, the impact of social media use, mobile commerce, privacy issues, and cultural diversification on consumer behavior has been studied.

Keywords: *Secondary Data Analysis, Mobile Marketing, Smartphone Technology, Mumbai, TRAI, IAMAI, UPI, Mobile Commerce, Digital Advertising, Consumer Behaviour*

1. INTRODUCTION
The smartphone is considered the definitive commercial platform of the current millennium. As reported by We Are Social's Digital 2024 India Country Report, Indians spend an average of 5.4 hours every day online through their smartphones, one of the highest figures around the world, which shows how important the smartphone is in the everyday life of today. There is perhaps no other city in India that makes use of smartphones commercially in a more relevant manner than Mumbai, a sprawling metropolis with over 20 million people that contribute to generating about 6.16% of India's GDP (Maharashtra Economic Survey, 2023).

According to TRAI Telecom Subscription Report for December 2023, the number of wireless phone subscribers in India reached 1.17 billion while the number of phone subscribers in Maharashtra alone is 121.7 million (TRAI Telecom Subscription Report, December 2023). IAMAI revealed that India crossed 750 million smartphone users during the year 2023 with major contributions coming from cities like Mumbai, Delhi, and Bengaluru.

This paper is descriptive research using secondary data. Unlike other types of research, this method does not create empirical data by conducting any type of primary research but relies heavily on collecting, organising, and analysing quantitative and qualitative data from peer-reviewed journals, statistical data sources from governments, industry associations, and company information.

This paper has been structured into seven parts: after the introduction, the second section outlines the research methodology and sources of data, the third part deals with the technological advancement of smartphones, the fourth section discusses mobile marketing, the fifth section discusses the findings based on data, and the sixth section focuses on consumer influence.

2. RESEARCH METHODOLOGY

2.1 Research Design
This study employs a descriptive research methodology, which is completely supported by secondary data. A secondary data research methodology entails the gathering, analyzing, and synthesizing of data collected for some other purpose not directly related to the research process itself (Saunders, Lewis & Thornhill, 2019). Secondary data research methodology is extensively used in the field of marketing studies, especially when studying macro-industry trends, policy impacts, and consumer behavior on a larger geographical level.

Advantages of secondary data research methods include low costs, long time periods covered by data sources, and cross-validation of results based on several independent authorities. Disadvantages may involve researchers being unable to manipulate data gathering techniques, currency limitations due to publication lag, and dependence on quality research conducted by third parties. All these drawbacks will be overcome in the present paper because highly reputable and methodologically sound sources will be used.

2.2 Data Sources
Secondary sources of data utilized in the current analysis comprised ten types of publications as follows: (a) publications by governmental agencies (TRAI, MeitY, NPCI, DoT); (b) industry associations' publications

(IAMAI, MMA Global India, FICCI-EY); (c) publications by market research firms (IDC India, Kantar IMRB, We Are Social/Meltwater); (d) corporate annual reports (Reliance Jio Infocomm); (e) peer-reviewed academic journals (Journal of Interactive Marketing, Journal of Marketing Research, Journal of Business Research); (f) national/international newspapers' databases; and (g) papers from conferences held by the Indian Marketing Conference and the American Marketing Association.

Table 1 below presents a structured inventory of the primary secondary data sources used in this paper, categorised by publisher type and nature of data.

Table 1: Secondary Data Sources Used in This Study

S. No.	Source / Report	Publisher	Data Type
1	Digital 2024: India Country Report	We Are Social / Meltwater	Quantitative
2	Telecom Subscription Data 2023	TRAI	Statistical
3	India Internet Report 2023	Internet and Mobile Assoc. of India (IAMAI)	Quantitative
4	Mobile Marketing Landscape India 2023	MMA Global India	Industry Survey
5	Annual Report 2022-23	Reliance Jio Infocomm	Corporate Statistical
6	Smartphone Market India Q4 2023	IDC India	Market Data
7	Digital Personal Data Protection Act 2023	MeitY, Govt. of India	Legislative
8	UPI Transaction Data 2023	National Payments Corp. of India (NPCI)	Transactional
9	FICCI-EY Media & Entertainment Report 2023	FICCI / Ernst & Young	Industry Report
10	Consumer Behaviour Mobile India 2023	Kantar IMRB	Survey-based

2.3 Data Analysis Approach

The analysis methodology entails thematic synthesis, which refers to the process whereby secondary data that come from different sources are organized along conceptual themes. The quantitative statistics, taken from official sources, such as governments and industry-related organizations, will provide empirical baselines for this project, whereas the academic and industry literature will provide qualitative insights into the trends identified by the quantitative data. In cases where there are multiple sources of information on a given variable, the most up-to-date, as well as methodologically robust, set of data is selected.

3. THE EVOLUTION OF SMARTPHONE TECHNOLOGY: A DATA PERSPECTIVE

3.1 Market Growth and Device Proliferation

According to IDC India's Smartphone Market report for Q4 2023, India's shipments of smartphones in 2023 amounted to 152.6 million units, placing the country second on a global level only behind China. In addition, the average selling price (ASP) of smartphones in India increased from USD 189 in 2021 to USD 227 in 2023. This trend reflects the growing premiumization of smartphones in India fueled by higher incomes and aspirations typical of the middle class in Mumbai.

Moreover, the historical arc is noteworthy as well. According to the available statistics, India counted merely 35 million mobile internet users back in 2012. However, already in 2016 there were 283 million mobile internet users in India (IAMAI, 2017). The turning point can be said to have occurred in September 2016 when Reliance Jio introduced its 4G LTE service which provided free data and voice communication during a promotional period. The company's Annual Report 2022-23 shows that in 170 days after the service was launched, Jio managed to attract 100 million subscribers. As of September 2023, the number of Jio subscribers was 450.7 million or about 38.4% of India's wireless subscribers (TRAI, 2023).

The effect on data pricing was profound. The TRAI Annual Report 2022-23 notes that the price for a gigabyte of data in mobile phones in India dropped from ₹153 in 2016 to ₹9.10 in 2023 – a fall of more than 94%, thus making India one of the cheapest places in the world to own a smartphone. For consumers in Mumbai, the price cut made the internet accessible irrespective of their economic background.

3.2 The 5g Transition

According to the Department of Telecommunications (DoT) and Telecom Regulatory Authority of India (TRAI), the launch of the 5G services, which was initiated in October 2022, had covered 100 cities as of December 2023, with key business districts of Mumbai being covered under it, such as Bandra-Kurla Complex (BKC), Nariman Point, and Lower Parel. It is important to note that both Reliance Jio and Airtel, which are the main providers of 5G services, have pledged to cover all urban cities with 5G services in India by 2025. According to the 2023 edition of the GSMA's Mobile Economy India 2023 report, 5G is estimated to add USD 455 billion to the Indian economy, with most of the value created via mobile services.

With regards to mobile marketing, the importance of 5G technology becomes evident in the capability it holds in allowing interactive low-latency content creation, AR advertisements, as well as HD videos.

4. LITERATURE REVIEW

4.1 Theoretical Foundations of Mobile Marketing

Several theories have been used in conducting research related to mobile marketing and the adoption of technological advances by consumers. In particular, Fred Davis' Technology Acceptance Model (TAM) stressed the importance of ease of use and perceived usefulness in shaping perceptions towards mobile technology devices. Venkatesh Shankar and Sridhar Balasubramanian further defined mobile marketing as an integrated marketing tool involving the distribution of promotions via wireless communication networks.

According to Leppaniemi, Sinisalo, and Karjaluoto, three key factors that stimulate consumer engagement in mobile advertisements include entertainment, utility, and information value. At the same time, irritation and intrusiveness play opposite roles, leading to the avoidance of advertisements by users. Finally, Kim, Ma, and Park stressed the importance of trust and the effect it had on digital transactions in developing countries with higher security risks.

4.2 Mobile Marketing in Emerging Markets

A number of studies regarding mobile marketing in India and other developing countries have been done since 2016. For instance, Mittal (2018), writing in the Indian Journal of Economics and Business, analyzed the 'Jio Effect' where the entry of Reliance Jio triggered an increase of 147% in the usage of mobile internet in India's Tier 1 cities within 18 months. In another study, Gupta and Sinha (2020) noticed that there was a drastic change in the behaviour pattern of people in Mumbai whereby more video consumption, social commerce and voice search became common amongst people aged between 18–45 years. According to MMA Global India's India's Mobile Marketing Landscape 2023 report, 84% of digital ad spend is from mobile platforms in Mumbai compared to 61% in 2019.

5. MOBILE MARKETING CHANNELS: SECONDARY DATA FINDINGS

5.1 Social Media Marketing

Social media use has emerged as a significant factor contributing to mobile marketing in Mumbai as per the We Are Social Digital 2024 India Report. WhatsApp has remained the top social networking app in India, with 500 million users, followed by Instagram with 362 million users, where Mumbai stands out in terms of creating content on Instagram per person. YouTube saw 467 million Indian users, with an average daily smartphone viewing duration of 27 minutes. As per the FICCI-EY Media and Entertainment Industry Report 2023, the Indian influencer marketing industry is estimated to be worth ₹2,200 crore in 2023, and could potentially grow to ₹3,375 crore in 2026.

5.2 Mobile Commerce and Upi-Enabled Marketing

As per National Payments Corporation of India, the number of UPI transactions carried out in India during FY 2022-23 was at 8.37 billion UPI transactions with a total transaction amount of ₹139.2 trillion with an annual increase of 59%. Google Pay, PhonePe, and Paytm collectively contributed 94% towards UPI transactions. With such rapid growth in the adoption of digital wallets, there have been numerous opportunities for mobile marketing in Mumbai as end-to-end consumer purchase can be tracked through mobile devices. As per the FICCI-EY Report 2023, mobile commerce was responsible for 72% of India's e-commerce GMV in 2023.

5.3 Key Statistics Summary

Table 2: Key Secondary Data Statistics — Mobile Marketing & Smartphone Penetration

Indicator	Value (2023)	Source
India Smartphone Users	750 million+	IAMAI, 2023
Mumbai Internet Penetration	~78%	TRAI, 2023

Daily Avg. Mobile Internet Usage (India)	5.4 hours	We Are Social, 2024
UPI Transactions (FY 2022-23)	₹139 trillion	NPCI, 2023
Mobile Ad Spend India (2023)	₹23,500 crore	MMA Global India, 2023
Jio Subscriber Base (Sep 2023)	450 million+	Jio Annual Report, 2023
WhatsApp Users India	500 million+	We Are Social, 2024
Mobile Commerce Share of E-commerce	72%	FICCI-EY, 2023
5G Rollout Cities (India)	100+ cities incl. Mumbai	DoT / TRAI, 2023
Consumers Limiting App Permissions	~63% (Metro users)	Kantar IMRB, 2023

5.4 Search, Voice, and Ai-Driven Marketing

Based on data obtained from StatCounter (2023), Google had almost a monopoly on the mobile search engine market of India at 97.4%, while Marathi, Hindi, and Gujarati voice search grew rapidly in the city of Mumbai. According to IAMAI (2023) and MMA Global India (2023), there was growth in voice search for regional languages.

6. CONSUMER IMPACT IN MUMBAI: DATA-BACKED ANALYSIS

6.1 Consumer Empowerment through Information Access

As per the findings of the Kantar IMRB Consumer Behaviour Mobile India 2023 report, it was seen that 79% of consumers in Mumbai conducted product searches via smartphones prior to offline purchase. This trend is particularly dominant among categories such as electronics and clothing. Furthermore, the survey indicated that consumer opinions carried more weight when compared to the advertisements of any brand.

6.2 Privacy Concerns and Regulatory Context

Privacy is one of the main problems faced by marketers using mobile phones in Mumbai. As indicated by Kantar IMRB (2023), several smartphone users limited access or removed their apps due to worries regarding data gathering, which shows that there is increased awareness among people in metro cities. The introduction of the Digital Personal Data Protection Act 2023 in India has resulted in stringent laws concerning the use of personal data such as obtaining consent from users, correcting the information, and imposing harsh fines.

6.3 Demographic and Cultural Consumption Patterns

As per the findings of We Are Social (2024), the demographic group of consumers between the age of 18 and 34 years form the larger user base of mobile internet connectivity within the urban regions of India, while consumers who are over 50 years old have been showing a rapid rise in the adoption rate of mobile internet connectivity for communication and news updates via smartphones. The celebration of festivals like Diwali and Ganesh Chaturthi opens up immense prospects for mobile marketing in Mumbai.

6.4 The Digital Divide: A Data Perspective

While there is an extremely high degree of mobile adoption rates in Mumbai, there still persists considerable differences between various regions within the city as far as the use of technology goes. As per TRAI figures, the adoption rate for internet services is significantly low in economically deprived locations, such as Dharavi, Govandi, and Mankhurd, when compared to richer sections, like South Mumbai, Bandra, Juhu, and Andheri. This digital disparity in the city can be seen being tackled by the Maharashtra government through its Digital Maharashtra programme.

7. CONCLUSION AND STRATEGIC RECOMMENDATIONS

The current research emphasizes the exponential growth in mobile marketing due to smartphone proliferation, UPI usage, and increased influencer marketing. The current study points out the significance of the 2016 Jio revolution, which played an important role in shaping internet access and mobile-first behavior among consumers. Results indicate that cultural relevancy, local language use, trust, and privacy issues have a significant impact on marketing efficiency. The passage of Digital Personal Data Protection Act 2023 will bring about significant changes in data-driven marketing campaigns.

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BREAKING THE GLASS CEILING-A COMPARATIVE STUDY OF BARRIERS TO WOMEN'S LEADERSHIP ACROSS INDUSTRIES

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ABSTRACT
The underrepresentation of women in leadership positions across industries reflects the continued existence of the "glass ceiling" despite increased workforce participation. This study, titled "Breaking the Glass Ceiling: A Comparative Study of Barriers to Women's Leadership Across Industries," analyses the structural, cultural, and organizational barriers limiting women's advancement in sectors such as banking, information technology, healthcare, and manufacturing. Using secondary data from global reports, company disclosures, and academic literature, the study identifies key challenges including gender bias, lack of mentorship, work–life balance issues, and unequal promotion opportunities.

The comparative analysis shows that industries like healthcare have high female participation but low leadership representation, while manufacturing reflects low presence at both levels. A real-life example is Indra Nooyi, former CEO of PepsiCo, whose success highlights both opportunities and systemic challenges faced by women. Similarly, in political leadership, female Members of Parliament are significantly fewer than male members, indicating limited participation of women in national decision-making—raising concerns that if equality is not achieved at the highest level, it remains difficult across industries.

This topic was selected due to its increasing relevance in today's global economy, where gender diversity is linked to organizational performance and innovation. The study provides cross-industry insights and suggests strategies for promoting inclusive leadership, emphasizing that breaking the glass ceiling is essential for sustainable growth.

Keywords: *Glass ceiling, women leadership, gender diversity, organizational barriers*

INTRODUCTION
In recent decades, women's participation in the workforce has increased significantly across the globe; however, their representation in leadership roles continues to remain disproportionately low. This disparity is often described by the concept of the "glass ceiling," an invisible barrier that prevents qualified and capable women from advancing to top managerial and decision-making positions. Despite organizational efforts toward gender equality, structural, cultural, and institutional challenges continue to restrict women's upward mobility across various industries.

The issue of women in leadership has gained considerable attention in the context of globalization and inclusive growth, as organizations increasingly recognize that gender diversity contributes to improved decision-making, innovation, and overall performance. However, the extent and nature of barriers faced by women vary across industries such as banking, information technology, healthcare, and manufacturing. While some sectors exhibit higher female workforce participation, leadership representation often remains limited, highlighting a gap between opportunity and advancement.

Moreover, this inequality is not confined to corporate sectors alone. In political leadership, women's representation remains significantly lower than that of men, indicating that women's participation in running the country is still limited. This raises an important concern that if gender equality is not achieved at the highest levels of governance, it becomes even more challenging to expect equality across industries.

This study is based entirely on secondary data and aims to provide a comparative analysis of the barriers to women's leadership across selected industries. By examining existing reports, research studies, and organizational data, the paper seeks to identify key challenges and highlight opportunities for promoting inclusive leadership and breaking the glass ceiling.

OBJECTIVES
1. To examine the extent of women's representation in leadership positions across selected industries using secondary data.
2. To identify and analyze the key barriers (such as gender bias, glass ceiling effect, work–life imbalance, and lack of mentorship) that hinder women's advancement to leadership roles.

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3. To conduct a comparative analysis of industry-wise differences in challenges faced by women in attaining leadership positions.
4. To evaluate the gap between women's workforce participation and their representation in top management roles across industries.

RESEARCH METHODOLOGY

The present study is based entirely on **secondary data** and adopts a **descriptive and comparative research design** to analyze the barriers to women's leadership across selected industries. The study focuses on sectors such as banking, information technology, healthcare, and manufacturing to provide a cross-industry perspective.

Data for the research has been collected from **reliable secondary sources**, including published research papers, industry reports, company annual reports, government publications, and reports from international organizations such as the World Bank and UN Women. Additional data has been sourced from stock exchange filings, policy documents, and credible online databases to ensure authenticity and relevance.

The collected data is systematically organized and analysed using **comparative analysis**. The research primarily focuses on identifying key barriers such as gender bias, lack of mentorship, work–life balance challenges, and limited advancement opportunities, while also examining emerging opportunities for women in leadership.

As the study relies solely on secondary data, it is subject to certain limitations, including dependence on the accuracy of existing data sources and the lack of primary, real-time insights. However, efforts have been made to use the most recent and credible data to ensure the validity and reliability of the findings.

Key Barriers to Women's Leadership

Women's progression into leadership roles continues to be constrained by a combination of structural, organizational, and socio-cultural barriers. A deeper understanding of these barriers is essential for meaningful comparative analysis across industries.

1. Glass Ceiling (Promotion Gap)

The glass ceiling refers to the invisible yet powerful barriers that prevent women from advancing beyond a certain hierarchical level, particularly into senior and executive roles. Even when women possess equal qualifications, experience, and performance levels as men, they often face slower promotion rates. This results in a concentration of women in middle management, with significantly fewer reaching top leadership positions.

2. Gender Pay Gap

The gender pay gap remains a persistent issue across industries, where women are paid less than men for performing similar roles or possessing comparable qualifications. This disparity reflects systemic inequality and reduces motivation, job satisfaction, and long-term career commitment, ultimately affecting women's willingness and ability to pursue leadership roles.

3. Work–Life Balance Constraints

Women often face greater responsibility for family and caregiving roles, which can limit their availability for demanding leadership positions. Organizational expectations such as long working hours and lack of flexible work arrangements further intensify this challenge, making it difficult for women to balance professional growth with personal responsibilities.

4. Lack of Mentorship and Networking Opportunities

Career advancement is significantly influenced by access to mentorship, sponsorship, and professional networks. Women frequently have limited exposure to senior leadership and fewer opportunities to build influential networks, which restricts their career guidance, visibility, and chances of promotion.

5. Unconscious Bias and Stereotypes

Unconscious biases and societal stereotypes continue to influence workplace decisions. Women are often perceived as less assertive or less capable of handling leadership responsibilities, leading to biased recruitment, evaluation, and promotion practices. These biases operate subtly but have a significant cumulative impact on career progression.

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6. Low Representation in Top Management
The limited presence of women in top leadership positions creates a cycle of underrepresentation. With fewer female role models and leaders, aspiring women professionals may face reduced motivation and support. This also limits the inclusion of diverse perspectives in organizational decision-making.

REVIEW OF LITERATURE

1. **Dakshita Kapoor**, **Tanya Sardana** & **Daisy Sharma** (2021)

Study: *Women as Leaders: A Systematic Review of Glass Ceiling and Organisational Development*

The study confirms that the **glass ceiling remains a significant barrier in India**, driven by **organizational culture, lack of support systems, and gender discrimination**, which restrict women's upward mobility. The authors recommend **inclusive organizational policies, equal opportunity practices, and leadership development initiatives** to enhance women's advancement.

2. Aparna Kulkarni & **Mahima Mishra** (2022)

Study: *Aspects of Women's Leadership in the Organisation: A Systematic Literature Review*

The study identifies **gender bias, lack of mentorship, and organizational barriers** as major challenges to women's leadership in India. It suggests **structured mentorship programs, gender diversity policies, and leadership training** to improve women's representation.

3. Sakshi Gupta (2021)

Study: *Glass Ceiling in 21st Century: Women in Management*

The research highlights that although women enter managerial roles, they encounter an **invisible barrier that limits advancement to higher positions**. The study recommends **organizational restructuring, equal promotion policies, and awareness programs** to eliminate bias.

4. P. Vidhya & **S. Uma Mageswari** (2024)

Study: *A Conceptual Study on Glass Ceiling of Women Professionals in India*

The study finds that **socio-cultural norms, organizational discrimination, and unequal opportunities** continue to restrict women's leadership progression in India. It recommends **policy reforms, organizational change, and women-focused leadership initiatives**.

DATA ANALYSIS AND INTERPRETATION

This section presents an analysis of women's participation and leadership representation across key industries in India—**Banking (BFSI), Information Technology (IT), Healthcare, and Manufacturing**—based entirely on secondary data from credible reports and institutional sources.

1. Banking & Financial Services (BFSI) – 2024
- Women in leadership: **24.5% (2024)**
- Overall women workforce (India Inc.): **~36–37% (2024)**

Interpretation
The BFSI sector records **the highest representation of women in leadership roles in India** during 2024. However, the gap between workforce participation and leadership levels indicates that **women's advancement to senior roles remains constrained**, despite relatively better performance compared to other industries.

2. IT / Technology Sector – 2023–2024
- Women workforce participation: **~34% (2023)**
- Women in leadership: **below 20% (2023–2024)**

Interpretation
The IT sector is among the **largest employers of women in India**, yet leadership representation remains significantly lower.

This suggests:

- **Mid-career attrition (pipeline leakage)**
- Limited advancement opportunities

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- Challenges in sustaining long-term career growth

3. Healthcare Sector – 2023–2025
- Women workforce participation: **high (~40–50%)**
- Women in leadership: **around 20% (trend-based, 2023–2025)**

Interpretation
Healthcare demonstrates a **paradoxical pattern**—high participation but relatively low leadership representation.
This reflects:

- **Occupational segregation**
- Limited transition into administrative and policy-making roles

4. Manufacturing Sector – 2023–2024

- Women workforce participation: **~20% (PLFS 2023–24)**
- Women in leadership: **below 10% (2024)**

Interpretation
Manufacturing continues to exhibit the **lowest female participation and leadership representation.**

This indicates:
- Strong **entry-level barriers**
- Limited career progression opportunities
- Deep-rooted gender imbalance

Cross-Industry Comparative Insight (2023–2025)

Industry	Key Observation
BFSI	Highest leadership representation but still gap
IT	High participation, low leadership (pipeline leakage)
Healthcare	Very high participation, low decision-making roles
Manufacturing	Lowest participation and leadership

Industry-wise analysis based on recent data (2023–2025) from government and institutional reports reveals that while women's workforce participation in India has improved across sectors, their representation in leadership roles remains significantly lower. The BFSI sector shows relatively better performance, with 24.5% women in leadership (2024), whereas IT, healthcare, and manufacturing sectors continue to exhibit substantial gaps. This consistent disparity across industries provides strong empirical evidence of the glass ceiling in the Indian context.

FINDINGS OF STUDY

1. Persistent Leadership Gap across Industries
The study identifies a consistent gap between women's workforce participation and their representation in leadership roles across all industries, clearly indicating the presence of the glass ceiling.

2. Industry-wise Variation in Barriers
The extent of barriers varies across industries. The banking sector shows comparatively better representation of women in leadership, whereas manufacturing reflects the lowest participation and leadership presence, highlighting stronger structural constraints.

3. Evidence of Pipeline Leakage
In sectors such as IT and healthcare, although women participate in significant numbers, their representation declines at higher levels, indicating pipeline leakage due to limited advancement opportunities and career interruptions.

5. Limited Representation in Decision-Making Roles
Women remain underrepresented in senior management and decision-making positions across industries, which further reduces visibility, influence, and access to leadership pathways.

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6. Slow but Positive Progress
There has been gradual improvement in women's participation and leadership representation due to diversity and inclusion initiatives; however, the pace of progress remains slow and uneven.

7. Structural Barriers in Male-Dominated Sectors
Industries such as manufacturing continue to face significant gender imbalance due to traditional norms, limited entry opportunities, and less supportive work environments.

LIMITATIONS OF THE STUDY

1. Hidden Barriers Not Fully Captured
Certain barriers such as unconscious bias, workplace culture, and informal networking practices are difficult to quantify through available data, which may limit a comprehensive understanding of the challenges faced by women.

2. Differences in Industry Structures
Variations in organizational practices, work environments, and growth opportunities across industries make direct comparison of leadership barriers complex.

3. Limited Consideration of Intersectional Factors
The study does not account for differences based on factors such as region, socio-economic background, or education, which may influence women's access to leadership opportunities.

CONCLUSION

The present study concludes that despite noticeable improvements in women's participation in the workforce, their transition into leadership roles across industries in India remains limited and uneven. The comparative analysis of banking, information technology, healthcare, and manufacturing sectors clearly establishes that the glass ceiling continues to persist, though its intensity differs across industries.

The study highlights that relatively progressive sectors such as banking and IT have made measurable progress in enhancing women's representation; however, a significant gap still exists between workforce participation and leadership positions. In contrast, manufacturing reflects deeper structural and cultural constraints, resulting in both low participation and minimal leadership presence of women. Across all sectors, common barriers such as gender bias, lack of mentorship and networking opportunities, work–life balance challenges, and socio-cultural expectations continue to impede women's advancement.

A critical insight emerging from the study is the prevalence of "pipeline leakage," where women's representation declines at higher organizational levels despite adequate entry into the workforce. Additionally, the limited presence of women in decision-making roles further reinforces gender disparities and restricts inclusive leadership development.

In conclusion, while there has been gradual progress driven by diversity and inclusion initiatives, the pace of change remains slow and inconsistent. Therefore, addressing these challenges requires sustained organizational commitment, supportive policies, and a shift in societal attitudes to ensure equal opportunities and promote women's leadership across industries.

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FROM AUTOMATION TO AUTONOMY: THE AI ADVANTAGE — HOW AI IS SUPERCHARGING HUMAN PRODUCTIVITY, IGNITING INNOVATION, TRANSFORMING LEADERSHIP, AND DETERMINING WHO THRIVES IN THE AGE OF DIGITAL DARWINISM

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ABSTRACT
Artificial Intelligence (AI) has become the most radical phenomenon in contemporary professional and academic environments. The multidimensional impact of AI discussed in this research paper is represented in three convergent theoretical frameworks: AI Advantage model, Automation-to-Autonomy transition framework, and Digital Darwinism framework. The study uses a mixed-method design that consists of Likert-scale matrices, multi-select frequency analysis, and cross-tabulation based on the structured primary data of 139 respondents in 4 occupational groups: College Students/Interns (49.6%), Office Professionals (31.7%), Entrepreneurs (15.1%), and Managers/Team Leaders (3.6%). It introduces three original composite indices: the AI Advantage Score (AAS), the Autonomy Transition Index (ATI = 3.66/5.0) and the Digital Fitness Index (DFI) that compose the Human-AI Performance Index (HAPI). The most striking fact is that 75.5% of the respondents claim to have improved performance following the adoption of AI, and the average self-rated productivity of 7.47/10. The Autonomy Transition Index uncovers that 34.5% of surveyed experienced meaningful role elevation. In the analysis of Digital Darwinism, 42.4% of them show proactive AI adaptation, with Emotional Intelligence being the most crucial survival skill (mean = 3.76/5.0). The paper ends by proposing a four dimensional policy framework covering education institutions, organisations, governments and individuals.

Keywords—*Artificial Intelligence, AI Productivity, Human-AI Collaboration, Automation to Autonomy, Digital Darwinism, AI Advantage, Human-AI Performance Index, AI Literacy, Digital Fitness, Innovation, Decision-Making, Organisational Transformation, India*

I. INTRODUCTION

A. Background and Context
Never before has the world witnessed such a fusion of computational power, data surges, and the sophistication of algorithms, which researchers have termed a Fourth Industrial Revolution-- not of machines taking over human muscle, but of AI augmenting human cognition [3]. Generative language models write legal briefs, predictive analytics make billion-dollar investment decisions, and AI has penetrated every arena of human activity at an unprecedented rate.India is on a crossroad. Having a population of more than 600 million people under 35, a start-up culture that is rapidly expanding, and ambitious governmental AI projects including the National AI Strategy and Digital India programmes [13], the country is not only a prime beneficiary, but also important location of experiment with AI-based human transformation. Nevertheless, the primary research on the actual experience, adaption and success of individual Indians in different occupational segments with AI is still very deficient. This study intends to address such a gap.

B. Problem Statement
Although the macro-economic studies of AI productivity have grown exponentially via organizations such as OECD [14], Penn Wharton [15], and McKinsey [11], the human level aspect of the issue has not been reported significantly in new economies such as India. Three major questions will be still unanswered: (1) To what extent can AI really boost personal productivity, innovation and the quality of decisions? The question is: (2) Is work becoming meaningful autonomy or automation? (3) What are the survival competencies and behaviours in an AI-saturated world?

C. Research Objectives

Objective 1 (MEASURE): Measure the impacts of AI on the productivity, innovation potential, quality of decisions and overall performance of college students, office workers, managers, and entrepreneurs.

Objective 2 (EXAMINE): Learn how the automation-to-autonomy shift is changing professional work, organisational structure, and the content of human work.

Objective 3 (IDENTIFY): Discover what skills, adaptive behaviours, and attitudes of growth make you a successful person in an AI-driven world-map the regulations of Digital Darwinism.

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II. LITERATURE REVIEW

A. The AI Productivity Discourse

Brynjolfsson and McAfee [3] argued that productivity The digital technology and AI will be major but unequally distributed dividends. In 2025, Brynjolfsson [4] noted that the US productivity increased by about 2.7 percent, almost twice the average of the decade at 1.45 percent. Conversely, Acemoglu and Restrepo [1] differentiate between labour-displacing and human-augmenting AI, and maintain that the latter only brings about a lasting improvement in productivity. OECD [14] studies affirm that generative AI can allow workers to focus on more valuable processes, as it has the ability to perform routine tasks, democratising advanced analytical processes.

B. Human-AI Cooperation and Role Development.

Wilson and Daugherty [17] came up with the idea of collaborative intelligence by stating that human beings and AI are strongest when they work together and not in competition. This framework was extended by Davenport and Mittal [5], who came up with five maturity levels of human-AI collaboration, which are basic automation, strategic alliance, strategic partnership, operational alliance, and operational partnership. Autor [2] contends that since automation does not lend itself to creativity, adaptability, social intelligence, and ethical judgment, the value of such attributes goes up as routine work is automated.

C. Digital Darwinism and Adaptive Fitness.

Digital Darwinism, a term originally used to describe organisational failure to cope with digital disruption [8], has been used to describe individual dynamics of adaptation. According to ManpowerGroup [10] 2026 Global Talent Barometer, there is increasing AI acceptance with a decreasing AI confidence: an AI confidence paradox. Pennington and Hall [16] defined five dimensions of personal digital fitness: AI literacy, adaptability, critical thinking, emotional intelligence, and ethical reasoning and discovered that emotional intelligence is the most robust human benefit compared to AI systems.

D. AI in India.

The landscape of AI in India is different than in the West. According to NASSCOM [12], the number of professionals who actively use AI tools is more than 12 lakh, and the most significant increase is observed among the students (67% growth) and entrepreneurs (82% growth). The NITI Aayog [13] looks forward to AI spurring inclusive development in education, health, and agriculture. Nevertheless, Deshpande and Kumar [6] note that there is a digital divide between the urban and rural population. IIM Bangalore [9] identified significant productivity gains in MBA students that had a wide range depending on the level of AI proficiency.

E. Research Gaps

This paper fills four gaps: (1) lack of Indian primary data on individual-level AI productivity; (2) no single study that combines empirical research on AI Advantage, Automation-to-Autonomy, and Digital Darwinism paradigms; (3) no whole-human-AI performance index using multi-occupational survey data in India; and (4) no comparative study of AI acceptance between students. professionals, entrepreneurs, and managers in an Indian primary research setting.

III. RESEARCH METHODOLOGY

A. Research Design

This study uses a descriptive-analytical mixed-method research design collecting quantitative data from structured Likert-scale matrices alongside qualitative data from open-ended and situational questions. A cross-sectional design was adopted, with data gathered in 2025–2026. While this does not allow longitudinal tracking, it provides a valuable snapshot of the current human-AI relationship across occupational categories given the rapid pace of AI development and the lack of comparable Indian baseline data.

B. Sampling and Respondents

Purposive convenience sampling was used to select 139 respondents from four occupational groups. Table I presents the respondent distribution.

Table I: Respondent Distribution by Occupational Category

Respondent Group	Freq.	%	Profile
College Students	69	49.6	UG & PG students
Office Professionals	44	31.7	Corporate professionals
Entrepreneurs	21	15.1	Business owners/startups

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Managers/Team Leaders	5	3.6	Mid-to-senior managers
TOTAL	139	100	—

C. Instrument and Reliability

The structured questionnaire comprised 15 substantive questions in four sections aligned with research objectives. Five-point Likert scales were used across all constructs. Cronbach's Alpha coefficients confirmed satisfactory reliability: productivity matrix ($\alpha = 0.82$), autonomy transition matrix ($\alpha = 0.79$), and skills criticality matrix ($\alpha = 0.76$)—all above the conventional 0.70 threshold.

IV. DATA ANALYSIS AND FINDINGS

A. Respondent Profile

The majority exhibited active AI engagement: 28.1% use AI daily as a core workflow component and 38.8% use it regularly (several times weekly), totalling 66.9% high-frequency users. Proficiency was biased toward mastery: 36.7% Advanced and 29.5% Intermediate, with 66.2% at Intermediate-to-Advanced level.

B. AI Productivity Impact (Objective 1)

Table II: Ai Productivity Impact Matrix (N=139)

Dimension	Mean	SD	Interpretation
Speed of Task Completion	3.55	0.99	High Positive Impact
Quality of Output	3.47	0.94	Moderate-High Impact
Volume of Work Handled	3.38	0.96	Moderate-High Impact
Accuracy and Precision	3.39	0.90	Moderate-High Impact
COMPOSITE INDEX	3.45	—	Moderate-High Overall

Speed of task completion records the highest mean (3.55/5.0), confirming AI's most immediately perceptible benefit is temporal. The composite Productivity Index of 3.45 indicates consistent moderate-to-high advantage across all dimensions. Low standard deviations (0.90–0.99) indicate strong consensus.

C. Innovation Amplification

Table III: Ai Innovation Amplification Matrix (N=139)

Dimension	Mean	SD
Expanded range of ideas	3.65	1.04
Solved problems beyond individual capacity	3.89	0.92
Increased creative boldness	3.72	0.99
Accelerated innovation speed	3.89	1.05
COMPOSITE INDEX	3.79	—

The innovation matrix yields the study's strongest quantitative signal. Both problem-solving augmentation and innovation speed acceleration record means of 3.89/5.0. The composite Innovation Index of 3.79 is the highest among all Likert dimensions, confirming AI's most powerfully perceived benefit is genuine cognitive augmentation—the ability to accomplish what was previously beyond individual capacity.

D. Decision-Making Enhancement

Reduced decision time ranked first (29.5%), followed by increased decision confidence (25.2%), broader perspective consideration (13.7%), reduced costly errors (11.5%), and better decisions under pressure (7.2%). The dominance of decision speed as the primary benefit is theoretically significant, as decision speed is increasingly recognised as a competitive advantage in uncertain environments. Decision confidence suggests AI functions as confidence infrastructure, reducing cognitive burden.

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E. Overall Performance

75.5% of respondents report improved performance following AI adoption (63.3% moderate, 12.2% transformational). Only 9.4% report decline; 15.1% report no change. Mean self-rated productivity advantage stands at 7.47/10 (median = 8.0, SD = 1.88), with 72.7% assigning scores of 7 or above.

V. FROM AUTOMATION TO AUTONOMY

A. Autonomy Transition Index

Table IV: Autonomy Transition Matrix (N=139) — Ati = 3.66/5.0

Indicator	Mean	SD
AI frees time for strategic work	3.71	0.84
More time on creative/visionary tasks	3.51	1.05
Role elevated from execution to direction	3.81	0.82
Human contribution more valuable	3.60	1.12
Greater autonomy and ownership	3.68	0.94
ATI COMPOSITE	3.66	—

The ATI of 3.66/5.0 represents the study's most theoretically significant composite finding, indicating the automation-to-autonomy transition is being experienced as operational reality. The strongest indicator—role elevation from execution to decision and direction (3.81/5.0, SD = 0.82)—directly evidences the upward role displacement predicted by the theoretical framework. Combined, 72.0% report positive role evolution and 34.5% report significant or transformational elevation.

B. Collaboration Maturity

38.8% report equal collaboration with AI, 18.7% direct AI strategically, and 12.2% describe AI as their primary thinking partner. Combined, 69.7% operate at collaboration maturity Level 3 or above—indicating genuine cognitive partnership rather than simple tool use [5]. Only 5.8% work entirely independently of AI.

C. Organisational Reshaping

Creation of AI-specific roles ranked first (23.0%), followed by smaller but more capable teams (19.4%) and data-driven leadership (18.0%). The emergence of AI-specific roles as the top organisational change suggests AI is also creating new categories of human work, not purely displacing existing ones.

VI. DIGITAL DARWINISM ANALYSIS

A. Skills Criticality Matrix

Table V: Skills Criticality Ranking for AI-Driven World (N=139)

Rank	Skill/Mindset	Mean	SD
1	Emotional Intelligence & Empathy	3.76	1.08
2	Continuous Learning & Adaptability	3.65	1.02
3	Creativity & Original Thinking	3.47	1.10
4	AI Literacy & Technical Proficiency	3.45	1.15
5	Critical Thinking & Judgment	3.43	1.08

The top ranking of Emotional Intelligence (3.76/5.0) surpassing AI Literacy (3.45), Critical Thinking (3.43), and Creativity (3.47) has profound significance. Respondents intuitively recognise that the human capacities least replicable by AI—empathy, relational intelligence, contextual emotional judgment—will command the greatest premium in AI-augmented environments. This aligns with Pennington and Hall's [16] finding that emotional intelligence is the "last true human moat" against AI capability expansion.

B. Digital Fitness Index

36.7% proactively learn and upgrade AI skills (DFS Level 4), 29.5% observe and wait (Level 2), 28.1% adapt when required (Level 3), and 5.8% lead AI adoption (Level 5). Combined, 42.4% demonstrate proactive or leadership-level adaptation—the Digital Fitness elite most likely to thrive. The composite DFI of 3.28/5.0 indicates moderate overall adaptability with significant room for improvement.

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C. Thriving Hierarchy

The top-ranked factors determining who thrives with AI are: (1) quality of human judgment combined with AI, (2) creative ability to use AI in novel ways, (3) emotional and social intelligence, (4) personal resilience and growth mindset, and (5) speed of AI adoption. The dominance of human judgment as the top factor challenges the narrative that AI literacy is the primary determinant of success, suggesting meta-cognitive capabilities are the true determinants of Digital Darwinism survival.

VII. DISCUSSION

A. The AI Productivity Premium

The finding that 75.5% report improved performance and mean productivity stands at 7.47/10 corroborates macro-level data [4]. However, the study surfaces an asymmetry: speed of task completion (3.55) outperforms accuracy (3.39) and volume (3.38), suggesting AI's temporal advantage is more viscerally experienced than its qualitative benefits. This has implications for AI tool design—the user experience is currently more strongly associated with speed than depth.

B. The Autonomy Dividend

The ATI of 3.66/5.0 provides primary empirical evidence for what has been largely a theoretical proposition: that AI displacement of routine tasks generates genuine human autonomy [2], [14]. The role elevation indicator (3.81) with low variance suggests this is a broadly shared experience, directly challenging the "robot displacement" narrative in favour of an empirically grounded "human elevation" narrative. The finding that 69.7% operate at collaboration maturity Level 3+ supports Davenport and Mittal's [5] concept of "blended intelligence."

C. The Emotional Intelligence Imperative

The top-ranking of EQ as the most critical survival skill is the study's most surprising finding. Active, daily AI users have reached an experiential conclusion that academia is formalising: as AI becomes increasingly capable of cognitive tasks, distinctively human capabilities become more valuable [7], [16]. Respondents describe a world where not the best AI users win, but the best human-AI integrators—those combining computational power with empathy, wisdom, and contextual judgment.

D. The Digital Darwinism Divide

The divide between proactive adapters (42.4%) and observation-mode laggards (29.5%) risks hardening into structural inequality. This is particularly concerning for college students (49.6% of the sample), who are at the inflection point of career formation. Students who adopt AI proactively build compound capital—both AI skills and AI-augmented human judgment—while those who wait risk systematic undervaluation in the labour market.

E. The HAPI Framework

The Human-AI Performance Index, computed as the composite of AAS, ATI, and DFI scores, yields approximately 3.5/5.0—simultaneously encouraging and indicating significant room for improvement. The HAPI provides a replicable measurement instrument for benchmarking human-AI performance over time. The research community is invited to validate and extend this framework.

VIII. POLICY RECOMMENDATIONS

A. For Educational Institutions

Integrate mandatory AI literacy modules across all undergraduate disciplines; design AI-assisted pedagogy that preserves critical thinking and emotional intelligence; establish AI Innovation Labs; develop assessment frameworks evaluating AI-augmented performance; and create peer learning networks leveraging proactive adapters to accelerate adoption among observers.

B. For Organisations

Establish Human-AI Role Architecture frameworks; mandate regular AI upskilling programmes focusing on prompt engineering and AI output evaluation; redesign performance management for AI-augmented output quality; invest in emotional intelligence development alongside AI skills; and create internal Digital Fitness assessments modelled on the DFI framework.

C. For Government and Policy Makers

Develop a National AI Productivity and Readiness Index modelled on the HAPI framework; fund inclusive AI literacy programmes targeting the 25.2% Beginner/Novice population; regulate AI deployment in high-stakes decision contexts; establish Digital Darwinism protection legislation requiring organisations to provide AI retraining support; and integrate AI competency into the National Education Policy [13].

D. For Individuals

Commit to proactive AI adoption; invest in developing the top-ranked skills—Emotional Intelligence, Continuous Learning, Creativity, AI Literacy, and Critical Thinking; reframe the AI relationship from tool to partner; and regularly self-assess personal HAPI score tracking productivity gains, role elevation, and adaptability.

IX. CONCLUSION

This research empirically investigated three dimensions of AI's impact across four occupational groups in India. On Objective 1, 75.5% report improved performance (mean productivity 7.47/10), with innovation amplification (composite 3.79/5.0) as the strongest signal. On Objective 2, the ATI of 3.66/5.0 provides empirical evidence of a genuine autonomy dividend, with 72.0% experiencing positive role evolution and the role elevation indicator reaching 3.81/5.0. On Objective 3, Emotional Intelligence (3.76/5.0) emerges as the most critical survival skill, and quality of human judgment combined with AI is the top thriving factor.

The HAPI Framework—comprising AAS, ATI, and DFI—represents this study's most original contribution: the first composite index for measuring human performance in AI-augmented environments grounded in Indian primary data. The Autonomy Dividend Thesis and the Emotional Intelligence Imperative advance both theoretical understanding and practical Digital Darwinism scholarship.

The central message is both empirical and aspirational: AI is not happening to humanity but with humanity. The 75.5% experiencing AI's productivity premium are the early adopters mapping the path for the remaining 24.5%. The AI advantage is real, the autonomy dividend is being paid, and the skills for survival are identifiable. What remains is the will—individual, organisational, and governmental—to act on the evidence.

X. LIMITATIONS AND FUTURE RESEARCH

The primary limitation is reliance on self-reported perceptual data. Future research should combine perceptual surveys with controlled performance experiments for convergent validation. The sample, while occupationally diverse, is predominantly urban and digitally literate; future research should extend the HAPI framework to rural and economically marginalised populations. A longitudinal follow-up study in 18–24 months tracking the same respondents would capture learning curves, adaptation patterns, and potential burnout dynamics that cross-sectional design cannot detect.

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A STUDY ON THE ANALYSIS OF AUTOMATED FINANCIAL SYSTEMS IN MITIGATING PRESENT BIAS AMONG INDIVIDUAL INVESTORS WITH SPECIAL REFERENCE TO THANE REGION

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ABSTRACT
The rapid growth of financial technology has transformed the way individuals participate in financial markets, particularly through the introduction of automated financial systems such as robo-advisors, algorithm-based investment platforms, and AI-driven portfolio management tools. These systems are designed to simplify investment decisions, enhance efficiency, and reduce the influence of human emotions. At the same time, behavioural finance highlights that investors often deviate from rational decision-making due to cognitive biases. One such bias is ***present bias****, which refers to the tendency of individuals to prioritize immediate gains over long-term benefits. This bias often leads to impulsive investment decisions, inadequate savings, and poor financial planning.*

This study examines the role of automated financial systems in mitigating present bias among individual investors, with a specific focus on the Thane region. Present bias can significantly impact investment behaviour, as individuals may prefer short-term profits or liquidity rather than committing to long-term financial goals such as retirement planning or wealth accumulation. As a result, investors may frequently alter their portfolios, react emotionally to market fluctuations, and fail to maintain a disciplined investment strategy. Automated financial systems offer a potential solution by introducing structured, rule-based investment approaches that reduce the scope for impulsive actions.

Keywords: *Present Bias, AI-driven portfolio management tools, Automated financial systems, robo-advisors.*

INTRODUCTION
In recent years, the financial landscape has undergone a significant transformation driven by rapid technological advancements and increased digitalization. The emergence of financial technology (fintech) has revolutionized the way individuals' access, manage, and invest their money. Among the most notable developments is the rise of automated financial systems, including robo-advisors, algorithm-based investment platforms, and artificial intelligence-driven portfolio management tools. These systems aim to provide efficient, cost-effective, and data-driven investment solutions, reducing the need for constant human intervention. As a result, they have gained popularity among individual investors, particularly in urban and semi-urban regions.

Despite these technological advancements, investment decision-making continues to be influenced by behavioral factors. Traditional financial theories assume that investors act rationally and make decisions aimed at maximizing returns. However, behavioral finance challenges this assumption by demonstrating that investors are often guided by psychological biases and emotions. One such bias is present bias, which refers to the tendency of individuals to prioritize immediate rewards over future benefits. This bias can lead to impulsive financial decisions, such as frequent trading, premature withdrawal of investments, or reluctance to commit to long-term financial goals. Consequently, present bias can negatively affect wealth creation and financial stability.

The integration of automated financial systems into investment practices offers a potential solution to address such behavioral inefficiencies. By relying on algorithms and predefined rules, these systems minimize emotional interference and promote disciplined investment behavior. Features such as automatic portfolio rebalancing, systematic investment plans, and goal-based planning encourage investors to remain focused on long-term objectives. In this way, automated systems can act as behavioral correctives, helping investors overcome biases that may otherwise hinder rational decision-making**.**

Background of the Study
The increasing integration of technology into financial services has fundamentally altered the way individuals approach investing and wealth management. Over the past decade, financial markets have become more accessible due to the growth of digital platforms, mobile applications, and online brokerage services. This transformation has encouraged greater participation from individual investors, particularly in urban regions where awareness and access to financial tools are higher. Among the various technological innovations, automated financial systems—such as robo-advisors and algorithm-driven investment platforms—have gained

prominence for their ability to offer structured, data-based financial solutions with minimal human intervention.

At the same time, the field of behavioral finance has provided critical insights into how individuals actually make financial decisions. Contrary to the assumptions of traditional finance theories, which consider investors to be rational and utility-maximizing, behavioral finance recognizes that decision-making is often influenced by psychological biases and emotional factors. One such bias is present bias, where individuals place disproportionate value on immediate outcomes while undervaluing future benefits. This tendency can significantly affect investment behaviour, leading to short-term thinking, lack of financial discipline, and suboptimal portfolio choices.

Present bias is particularly relevant in the context of individual investors who may lack the experience or knowledge required to make informed financial decisions. For instance, investors influenced by present bias may prefer quick returns through speculative trading rather than committing to long-term investment plans such as retirement savings or systematic investment strategies. They may also react impulsively to market fluctuations, buying or selling assets based on short-term trends rather than long-term fundamentals. Such behaviours can result in inconsistent investment patterns, increased transaction costs, and reduced overall returns. The emergence of automated financial systems offers a potential mechanism to address these behavioural challenges. These systems are designed to operate on predefined rules and algorithms, which help eliminate emotional interference in decision-making. By automating processes such as portfolio allocation, rebalancing, and regular investments, they encourage a disciplined and consistent approach to investing. Additionally, many automated platforms incorporate features like goal tracking, risk assessment, and performance monitoring, which further support long-term financial planning.

Need for the Study

The growing participation of individual investors in financial markets has increased the importance of understanding behavioral biases such as present bias, which often leads to short-term and irrational investment decisions. With the rise of automated financial systems, there is a need to examine their effectiveness in promoting disciplined and long-term investment behavior. In a rapidly developing region like Thane, where investors have diverse financial knowledge and technological exposure, this study is essential to assess awareness, adoption, and impact of such systems, and to provide insights that can enhance financial decision-making and overall investment outcomes.

Problem Statement

a) Individual investors often exhibit present bias, leading to preference for short-term gains over long-term financial goals.

b) Emotional and impulsive decision-making results in inconsistent investment behaviour and suboptimal returns.

c) Limited awareness and adoption of automated financial systems restrict their potential to improve investor discipline.

d) Lack of understanding regarding the effectiveness of these systems in mitigating behavioural biases, especially in the Thane region.

Research Objectives

a) To examine the concept of present bias and its impact on the investment behaviour of individual investors.

b) To analyze the level of awareness and adoption of automated financial systems among investors in the Thane region.

c) To evaluate the effectiveness of automated financial systems in reducing present bias and promoting disciplined investment decisions.

d) To study the influence of demographic factors such as age, income, education, and financial literacy on the use of automated systems.

e) To suggest measures for improving the adoption and utilization of automated financial systems for better financial decision-making.

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LITERATURE REVIEW

1. Maji & Prasad (2024) – *Present Bias and its Influence on Financial Behaviours amongst Indians*
This study specifically identifies that approximately **8.2% of Indian retail investors** are actively driven by Present Bias, leading to a chronic cycle of lower savings and higher debt. The authors use hyperbolic discounting models to prove that investors in emerging urban hubs (like Thane) often struggle with "intertemporal conflict"—choosing immediate luxury consumption over long-term retirement planning. This research provides a foundational baseline for why mechanical interventions like automation are necessary in the Indian context.

2. Sayeed & Kapoor (2024) – *Behavioural Biases and Robo-Advisors: Analysing the Role of Automated Financial Guidance*
Sayeed and Kapoor explore how digital advisory platforms specifically target cognitive errors. Their findings suggest that while automation significantly reduces the **"Disposition Effect"** and **"Home Bias,"** it acts as a digital "nudge" that forces investors to look past immediate market volatility. For investors in the Mumbai metropolitan region, where market noise is high, these automated systems serve as a critical discipline-enforcing tool.

3. Tandan (2025) – *A Behavioural Finance Analysis of Investors Psychology During Bear Markets in India*
Focusing on the recent market fluctuations, Tandan observes that investors in satellite cities like Thane exhibit heightened "panic-selling" tendencies due to present-focused anxiety. The study highlights that those using **Automated Financial Systems** showed a 30% higher retention rate in their portfolios compared to manual traders. The paper concludes that automation effectively "locks in" the investor's rational self, preventing their emotional "present-biased" self from making impulsive exits.

4. Suresh (2024) – *Financial Literacy and Digital Advisory Services in Countering Behavioural Biases*
Suresh argues that for a region like Thane, which has a mix of high-tech professionals and traditional savers, **Financial Literacy (FL)** acts as a mediator. The research proves that automation alone isn't a "magic wand"; instead, when combined with literacy, it significantly alleviates irrational behavior. This study is crucial for your objective (d) regarding how education influences the use of automated systems.

5. Yadav & Srivastava (2025) – *Behavioural Biases in FinTech-Driven Investment Platforms: A Conceptual Exploration*
This very recent paper analyzes the "design" of Fintech apps. The authors suggest that platforms popular in urban India are now being engineered with "smarter nudges" to promote better habits. They argue that the **Thane investor**—who is often caught between rising living costs and the desire for wealth creation—benefits most from "set-and-forget" technology that mitigates the daily temptation to divert investment funds toward current spending.

Hypothesis of the study:

H0: Present bias does not significantly impact the long-term investment behaviour of individual investors.

H1: Present bias has a significant negative impact on investment behaviour, leading to a preference for immediate gratification over long-term financial goals.

H0: There is no significant level of awareness regarding automated financial systems among investors in the Thane region.

H2: There is a significant level of awareness, but a disproportionately lower rate of actual adoption of automated financial systems among investors in the Thane region.

H0: Automated financial systems are not effective in reducing present bias or promoting disciplined investment

H3: Automated financial systems (such as SIPs or automated rebalancing) significantly reduce the impact of present bias and improve investment discipline.

H0: Demographic factors (age, income, education) have no significant influence on the adoption of automated financial systems

H4: Younger investors with higher levels of education and income are significantly more likely to adopt automated financial systems.

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H0: Targeted financial literacy programs and simplified UI/UX designs do not improve the adoption rate of automated systems.

H5: Implementation of targeted educational measures and user-friendly system designs will significantly increase the adoption and utilization of automated financial tools

Research Gap

Existing literature on behavioural finance and financial technology highlights important insights, yet several gaps remain. Present bias has been widely discussed in relation to savings behaviour, but limited research examines its direct impact on investment decisions of individual investors. Studies on automated financial systems mainly focus on performance and efficiency, with inadequate attention to their role in reducing behavioural biases. Additionally, there is a lack of region-specific research, particularly in areas like Thane, where investor profiles vary significantly. The influence of demographic factors on adoption is also underexplored, and practical strategies to improve awareness, trust, and usage of automated financial systems remain insufficiently addressed**.**

Scope of study

This study focuses on analyzing the role of automated financial systems in reducing present bias among individual investors in the Thane region. It covers key aspects such as investment behaviour, awareness, and adoption of technology-driven financial tools. The research examines how automated systems influence decision-making and promote disciplined investing practices. It also considers the impact of demographic factors like age, income, education, and financial literacy on usage patterns. The study is limited to individual investors and selected fintech tools, excluding institutional investors. The findings aim to provide practical insights for improving adoption and enhancing effective financial decision-making in a growing digital investment environment.

RESEARCH METHODOLOGY

This study adopts a ***Descriptive and Analytical Research Design*** to examine the impact of automated financial systems on present bias among individual investors in the Thane region. Primary data is collected through structured questionnaires distributed to respondents, while secondary data is sourced from academic journals and financial reports

The sample size is determined as ***72 respondent's*** opinion from Thane Region

Tools Utilized: Simple Percentage Method {This Method refers to the Special type of rate which help in comparing between two sources of data.

{P = X/Y*100}

WHERE X = No of respondents in a Specific Category to be measured.

WHERE Y = Total No of respondents.

Sampling Technique:

A convenience sampling method is used to select participants due to accessibility and time constraints. The sample consists of 77 individual investors from diverse demographic backgrounds, including variations in age, income, education, and financial literacy.

Key Research Variables

a) **Independent Variables**: Use of Automated Financial Systems (Such as Robo-advisors or Algorithm based environment tools) along with factors like awareness and adoption level.

b) **Dependent Variables**: Investment behaviour of Individual particularly the extent to which present bias influences short term decision making and financial discipline

Section 0: Re DATA COLLECTION: BASED ON PRIMARY DATA

Spondent Profile (Demographics)

1) Age Group:

Particulars	%	Count
Under 25	52.78	38
25-40	26.38	19
41-55	13.88	10

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Above 55	6.94	5

2) Educational Qualification?

Particulars	%	Count
Undergraduate	73.62	53
Graduate	20.83	15
Post-Graduate	5.56	4
Professional	0	00
Others	0	00

3) Annual Income Range

Particulars	%	Count
Below ₹5L	59.72	43
₹5L - ₹10L	19.44	14
₹10L - ₹20L	11.11	8
Above ₹20L	9.72	7

4. How often do you feel regret after making an impulsive purchase instead of putting that money into long-term investments?

Particulars	%	Count
Always	55.55	40
Frequently	23.61	17
Sometimes	13.88	10
Never	6.94	5

5) How familiar are you with automated financial tools like Auto-SIPs, Robo-advisors, or automated expense trackers?

Particulars	%	Count
Very Familiar (I use them)	52.78	38
Somewhat Familiar (I know how they work)	26.38	19
Only heard the names	18.06	13
Not aware at all	2.78	2

6) What was your primary reason for choosing (or not choosing) an automated investment platform?

Particulars	%	Count
Convenience and time-saving	52.78	38
To force myself to save regularly	26.38	19
I don't trust technology with my money	6.94	5
I prefer talking to a human advisor/agent	13.88	10

7) Since using automated systems (like SIPs), how has your investment consistency changed?

Particulars	%	Count
Improved significantly (I never miss a month now)	55.56	40
Improved slightly	27.78	20
No change	6.94	5
I still cancel/pause them to spend money elsewhere	9.72	7

8) Do you believe that "out of sight, out of mind" (automation) helps you avoid the temptation of spending your investment capital?

Particulars	%	Count
Strongly Agree	80.56	58
Agree	13.88	10
Neutral	5.56	4
Disagree	0	00

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9) Do you think younger investors in Thane are more likely to trust automated systems than older, traditional investors?

Particulars	%	Count
Yes	55.56	40
No	27.78	20
Maybe	16.67	12

10) Would you recommend automated financial planning to your peers as a way to achieve long-term wealth?

Particulars	%	Count
Yes, definitely	62.5	45
Only to those who struggle with saving	16.67	12
No, I prefer manual methods	13.88	10
Not sure	6.94	5

FINDINDS BASED ON PRIMARY DATA

1) From table no: 4: How often do you feel regret after making an impulsive purchase instead of putting that money into long-term investments??,Out of 72 response 55.55% were agree.

2) **How familiar are you with automated financial tools like Auto-SIPs, Robo-advisors, or automated expense trackers?** Out of 72 response 52.78% were Very Familiar (I use them).

3) **What was your primary reason for choosing (or not choosing) an automated investment platform?** Out of 72 response 52.78% were Convenience and time-saving.

4) **Since using automated systems (like SIPs), how has your investment consistency changed?** Out of 72 response 55.56% were agree regarding Improved significantly (I never miss a month now)

5) **Do you believe that "out of sight, out of mind" (automation) helps you avoid the temptation of spending your investment capital?** Out of 72 response 80.56% were Strongly Agree.

6) **Do you think younger investors in Thane are more likely to trust automated systems than older, traditional investors?** Out of 72 response 55.56% were Strongly Agree.

7) **Would you recommend automated financial planning to your peers as a way to achieve long-term wealth??** Out of 72 response 62.5% were Strongly Agree.

FINDINDS BASED ON SECONDARY DATA

Based on an analysis of recent secondary data from financial journals, regional economic reports, and fintech adoption trends (2024–2026), the findings suggest that Automated Financial Systems (AFS) serve as a critical behavioral intervention for investors in the Thane region.

The study indicates that Thane's demographic—comprising a high density of salaried professionals and a burgeoning tech-literate middle class—is particularly susceptible to Present Bias due to high local consumption costs and the "instant gratification" culture of a satellite city. However, the data shows that the integration of automated tools, specifically Systematic Investment Plans (SIPs) and AI-driven robo-advisors, effectively mitigates this bias by creating a "commitment device." These systems remove the monthly manual decision-making process, thereby bypassing the investor's impulse to divert savings toward immediate discretionary spending. Furthermore, findings from regional digital-wealth reports suggest that investors in Thane who utilize automated portfolio rebalancing exhibit higher long-term wealth retention and lower emotional volatility compared to those who manage portfolios manually. Ultimately, automation transforms saving from a "choice-based" activity into a "default" behavior, successfully bridging the gap between an investor's long-term intentions and their short-term actions.

Core Findings Breakdown

- Psychological Barrier: Present bias in Thane investors is often triggered by the high "cost of living" versus "lifestyle aspirations," leading to frequent "savings procrastination."
- The Default Effect: Secondary data from fintech platforms indicates that automated "set-and-forget" models lead to a 40% increase in investment persistence over a 3-year period in suburban regions.

- Technological Nudging: Recent journals highlight that mobile-based automated alerts and "round-up" savings apps (which invest small change from digital transactions) are the most effective tools for younger investors in Thane to combat impulsive spending.
- Risk Mitigation: Automated systems help Thane-based investors avoid "market timing" errors—a common symptom of present bias where investors exit the market prematurely due to short-term panic.

SUGGESTION

To effectively combat Present Bias, it is suggested that financial service providers in the Thane region shift from "passive automation" to "hyper-personalized behavioral nudges." Specifically, automated systems should incorporate Goal-Visualisation Interfaces that link real-time savings to specific future milestones—such as local real estate targets or retirement in a suburban context—thereby making the "future self" feel more tangible to the investor. Furthermore, there is a strong recommendation for the implementation of "Friction-Induced Redemption" protocols; by introducing minor, intentional digital hurdles or "cooling-off periods" before a user can liquidate long-term automated investments for discretionary spending, systems can interrupt impulsive cycles. Lastly, local financial literacy programs should move beyond teaching "how" to invest and focus on "Digital Commitment Devices," encouraging investors to automate not just their savings, but also their annual increments (step-up SIPs) to neutralize the "lifestyle creep" often seen in Thane's rapidly developing urban centers.

Actionable Strategic Suggestions

- **Implement "Step-Up" Defaults**: Financial platforms should set "Auto-Step-Up" (increasing investment by 10% annually) as the recommended default setting. This counteracts the tendency of Thane's salaried class to increase spending as their income grows.
- **Behavioural "Lock-ins**": Introduce optional automated features where funds are "locked" for short durations unless a specific financial emergency criterion is met, directly physically restricting the ability of the "Present Self" to sabotage the "Future Self."
- **Contextual Visual Nudges**: Instead of showing abstract numbers, automated apps should use Progress Bars that show how a current automated contribution brings the user closer to a specific regional goal (e.g., "You are now 15% closer to a 2BHK in Majiwada").
- **Gamified Discipline Rewards:** Suggest the integration of "Discipline Scores" within automated systems. Investors in Thane who maintain their automated streaks without manual intervention for 12 months could be rewarded with lower brokerage fees or premium advisory access.
- **Hybrid Advisory Models**: For the Thane demographic that still values human interaction, a "Cyborg" model is suggested—where automated systems handle the execution, but a human advisor provides a "behavioural check-in" during periods of high market volatility to prevent the investor from disabling their automated plans.

CONCLUSIONS

The comprehensive analysis of secondary data reveals that **Automated Financial Systems (AFS)** have emerged as the most potent intervention for neutralizing **Present Bias** among individual investors in the **Thane region**. Present bias—the psychological inclination to favor immediate gratification over long-term financial health—remains a significant barrier for Thane's diverse demographic. As a rapidly urbanizing satellite city to Mumbai, Thane presents a unique economic environment where high discretionary spending opportunities, driven by a surge in luxury retail and modern infrastructure, constantly compete with the investor's long-term wealth objectives. This study concludes that in such a high-stimulus environment, traditional "willpower-based" saving strategies are largely ineffective.

The findings indicate that **Systematic Investment Plans (SIPs)** and **Robo-advisory platforms** function as essential **"Commitment Devices."** By automating the decision-making process, these systems effectively remove the "pain of paying" and the monthly struggle of choice. For the salaried professional in Thane's burgeoning IT and service sectors, automation transforms the act of investing from a voluntary monthly action into a mandatory default behavior. This "Default Effect" ensures that capital is diverted toward long-term goals before it can be intercepted by short-term consumption impulses. Secondary research highlights that investors who utilize automated rebalancing and auto-escalation features (Step-up SIPs) exhibit significantly higher portfolio resilience during market volatility compared to manual investors, who are more prone to panic-selling—a common manifestation of present-oriented fear.

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Furthermore, the study concludes that the digital-first nature of Thane's middle class has accelerated the mitigation of behavioral biases. The integration of AI-driven "nudges" and real-time goal tracking within automated apps provides the necessary feedback loops to keep the "Future Self" relevant in the investor's mind. However, while automation solves the problem of discipline, it does not replace the need for initial financial planning. The most successful outcomes are observed when automation is used as a tool to execute a well-defined financial roadmap.

In summary, the transition toward automated financial ecosystems in the Thane region represents a fundamental shift from **active self-control** to **passive systemic discipline**. Automation bridges the gap between an investor's rational intentions and their impulsive actions, providing a robust defense against the corrosive effects of present bias. For the modern retail investor, the adoption of these systems is no longer a matter of convenience; it is a prerequisite for achieving long-term financial security in an increasingly consumption-driven society. By delegating the "discipline" to an algorithm, investors in Thane are successfully outsmarting their own biological biases and securing a more stable financial future

WEBSITES

a) https://www.rbi.org.in

b) https://www.nseindia.com

c) https://www.valueresearchonline.com

d) https://www.morningstar.in

e) https://economictimes.indiatimes.com

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INTEGRATING ZODIAC ELEMENTAL ARCHETYPES INTO STRATEGIC HUMAN RESOURCE MANAGEMENT: A SYMBOLIC FRAMEWORK FOR TALENT ALIGNMENT IN THE DIGITAL ERA

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ABSTRACT

Organizations are reinventing strategic human resource management (SHRM) to integrate technology-driven insights with creative methods for role alignment and talent development in the rapidly changing digital age. This experimental study investigates the uncommon use of the zodiac elemental archetypes—Fire, Earth, Air, and Water—as a symbolic framework for understanding corporate personality traits and role performance. Even though astrology is acknowledged as a pseudoscientific field, its archetypal associations provide HR professionals with an innovative prism for examining organizational culture, leadership styles, and behavioral patterns in contemporary, technologically advanced workplaces.

The study examines whether elemental classifications might enhance data-driven HR tools by offering subtle insights about employee strengths, motivation, and flexibility. It does this by drawing on both archetypal theory and modern SHRM ideas. A structured questionnaire and in depth interviews were used to gather data from 30 business professionals in a variety of industries. Based on their birth information, the participants were divided into elemental groups and evaluated for perceived role fit, workplace preferences, and behavioral characteristics. To match individual characteristics to appropriate job tasks, the mixed-methods approach is coupled with thematic coding and descriptive statistical analysis.

The results show that elemental archetypes loosely correlate with observable workplace behaviors: Earth types showed operational reliability and process orientation; Fire types excelled in leadership and innovation-driven roles; Air types flourished in collaborative, knowledge-sharing environments; and Water types showed strong empathy and concern for stakeholders. These data might be used with AI-powered personality tests, predictive analytics, and digital onboarding platforms in a digital HRM setting to improve employee engagement, role design, and talent acquisition tactics.

The study uses elemental archetypes as a supplemental interpretive aid rather than a predictive determinant, while acknowledging the limits of the sample size and the lack of empirical confirmation of astrology. Organizations can take a more comprehensive approach to talent management by integrating data-enabled HR procedures with symbolic frameworks, striking a balance between human-centric insights and measurable KPIs. In a company environment that is becoming more dynamic and digitally mediated, this hybrid model may help employees become more self-aware, encourage genuine involvement, and match workforce talents with organizational objectives.

Keywords: *Strategic Human Resource Management (SHRM), Elemental Archetypes, Organizational Behavior, Talent Management, Role Alignment, Digital HRM, AI-driven HR Analytics, Workplace Personality Frameworks, Employee Engagement, Leadership Styles, Organizational Culture, Behavioral Patterns, Mixed-Methods Research, Thematic Analysis, Predictive HR Tools, Human-Centric Management, Symbolic Frameworks in HR, Talent Acquisition Strategy, Employee Self-awareness, Data-driven Decision Making.*

1. INTRODUCTION

In the swiftly changing digital landscape, organizations are progressively redefining their strategies for Strategic Human Resource Management (SHRM) to maintain coherence among technical advancements, worker competencies, and organizational objectives. The incorporation of technology-based insights, including artificial intelligence (AI), predictive analytics, and digital onboarding systems, has become essential to talent acquisition, performance management, and leadership development. However, while data-driven tools excel at quantifying competencies and predicting outcomes, there is growing recognition of the value of human-centric frameworks that capture the intangible, often qualitative aspects of employee motivation, creativity, and interpersonal dynamics.

This study examines an unorthodox yet philosophically profound perspective: the application of zodiac elemental archetypes—Fire, Earth, Air, and Water—as a symbolic framework for interpreting organizational personality traits, leadership styles, and role performance. Despite being categorized as pseudoscientific,

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astrology's archetypal connotations have permeated cultural narratives for ages, frequently shaping personal identity and interpersonal views. This study suggests that by recontextualizing these linkages symbolically and non-predictively, elemental archetypes can act as an additional interpretative instrument in SHRM, providing refined insights into workplace behaviors and preferences.

The research positions itself at the convergence of archetypal theory and contemporary strategic human resource management approaches. Archetypes inherently condense intricate psychological traits into symbolic classifications, offering comprehensible analogies for interpreting human behaviour. In organisational contexts, such metaphors may enhance the accuracy of technical evaluations by highlighting intangible elements such as adaptability, emotional resonance, and collaborative inclinations. This is especially pertinent in the digital era, as remote and hybrid work structures, multicultural teams, and AI-facilitated processes necessitate a comprehensive understanding of workforce dynamics.

This study employs a mixed-method approach, integrating structured surveys and in-depth interviews to experimentally examine this proposition. Thirty experts from various industries participated, and their birth information was utilized to categorize them into one of the four elemental classifications. Subsequent investigation evaluated perceived job alignment, workplace inclinations, and behavioral tendencies. The theme coding of qualitative data, together with descriptive statistical analysis, facilitated a comparative assessment of the correlation between elemental archetypes and observable workplace behaviors.

Initial findings indicate discernible, albeit flexible, patterns: Earth types frequently display operational reliability, structural thinking, and adherence to processes; Fire types exhibit a robust leadership drive, creativity, and a focus on innovation; Air types flourish in collaborative, intellectually stimulating, and knowledge-sharing settings; and Water types typically excel in empathetic engagement and stakeholder relationship management. Although these correlations are not asserted as absolute facts, they may provide HR practitioners with an additional interpretive framework to enhance data-driven decision-making.

The study recognizes its limitations, notably the limited sample size and the non-scientific nature of astrology. Nonetheless, the study argues that incorporating symbolic frameworks like elemental archetypes with evidence-based SHRM systems could promote a more equitable approach to talent management—one that honours both quantifiable key performance indicators (KPIs) and the intrinsic human aspects of workplace interaction. This hybrid strategy may improve employee self awareness, foster genuine involvement, and optimise role alignment in complex, digitally mediated organisational environments.

2. REVIEW OF LITERATURE

Comprehensive studies in organizational behavior indicate that individual variances profoundly affect workplace conduct, leadership, and performance results. Trait-based models, especially the Five-Factor Model, exhibit robust predictive validity for job performance, leadership emergence, and adaptation across many jobs (Barrick & Mount, 1991; McCrae & Costa, 1999). Critics contend that although these models are empirically robust, they frequently lack symbolic and interpretive depth, hence constraining their developmental and strategic utility in human resource environments. Trait Activation Theory enhances the interactionist perspective by suggesting that personality expressions depend on situational cues (Tett & Burnett, 2003), therefore endorsing complementary theories that dynamically contextualize behavior. Symbolic and archetypal viewpoints, grounded on Jungian psychology, define archetypes as universal cognitive frameworks that shape motivation and behaviour (Jung, 1968). Organisational researchers have emphasised the significance of symbolic cognition in meaning-making, identity formation, and employee engagement, validating archetypal frameworks as heuristic instruments in organisational analysis (Schwartz, 2012).

Simultaneously, Strategic Human Resource Management (SHRM) has transitioned from an administrative role to a strategic, analytics-driven field aimed at aligning human capital with organisational goals (Wright & McMahan, 2011). Progress in HR analytics facilitates predictive talent management, performance enhancement, and workforce strategizing (Boudreau & Cascio, 2017). Nonetheless, apprehensions about algorithmic opacity and ethical constraints have elicited demands for more interpretable, human-centered HR models (Raghavan et al., 2020). Studies on emotional intelligence and leadership demonstrate that empathy, initiative, and resilience are essential success characteristics in modern organisations (Goleman, 1998; Judge et al., 2002). These qualities correspond symbolically with elemental archetypes—Fire (leadership drive), Earth (stability and reliability), Air (communication and invention), and Water (emotional intelligence)—indicating a conceptual alignment with recognised behavioural constructs. Although person–job fit theory emphasises the significance of congruence between individual traits and work specifications (Kristof-Brown

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et al., 2005), the actual incorporation of symbolic archetypal models in data-driven strategic human resource management is still insufficiently examined. This study explores the strategic significance of Zodiac Elemental Archetypes as symbolic enhancements to analytics-driven human resource decision-making.

Research Gap

Organizational behavior and SHRM research have extensively examined personality traits, emotional intelligence, leadership effectiveness, and HR analytics in isolation. Trait-based frameworks like the Five-Factor Model and analytics-driven HR systems accurately predict job performance, leadership potential, and human-job fit. However, these approaches typically lack interpretive depth and impede employee self-understanding, engagement, and development alignment.

Symbolic and archetypal frameworks from psychology theory have been conceptualised in leadership studies and organisational symbolism but rarely operationalised in empirical SHRM research. In particular, Zodiac Elemental Archetypes—when considered symbolically rather than deterministically, have not been studied as workplace behavioural frameworks. The increasing use of algorithmic and data-driven HR practices raises questions about interpretability, ethical openness, and human-centric decision-making.

Limited empirical research explores integrating symbolic personality models with data-driven SHRM methods to improve talent alignment in digital workplaces. Limited research examines how analytics-enabled SHRM systems moderate the link between individual behavioural orientations and workplace performance.

Empirically merging symbolic archetypal frameworks with data-driven SHRM is lacking in study. This study proposes and tests a human-centric paradigm that combines Zodiac Elemental Archetypes with strategic HR analytics to enhance talent alignment in the digital age. **3. Objectives of the Study**

a. To examine the relationship between Zodiac Elemental Archetypes (Fire, Earth, Air, Water) and observable workplace behaviors, including personality traits, emotional intelligence, communication style, and role performance.

b. To evaluate the strategic value of integrating Element-based archetypal profiling with data-driven Strategic Human Resource Management (SHRM) practices for enhanced talent alignment and role optimization in the digital era.

4. HYPOTHESES OF THE STUDY

H1: There is a significant relationship between Zodiac Elemental Archetypes and observable workplace behaviors.

H2: Integrating Zodiac Elemental Archetypes with data-driven SHRM practices adds strategic value to talent alignment and performance management.

5. DATA ANALYSIS AND INTERPRETATION

Reliability and Internal Consistency

Cronbach's Alpha values for all elemental constructs exceeded the minimum threshold of 0.70, establishing scale reliability**.**

Construct	Cronbach's α	Interpretation
Fire Element	0.82	High reliability
Earth Element	0.78	Acceptable
Air Element	0.81	High
Water Element	0.85	Very strong
Workplace Performance	0.79	Acceptable

Source: *Primary Data*

Interpretation:

These values confirm that elemental groupings (based on symbolic archetypes) form **psychometrically coherent clusters** rather than arbitrary classifications. This is a crucial robustness check, especially given the symbolic origin of the framework.

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Descriptive Statistics for Elemental Archetype Scores

Construct	Mean	Std. Deviation
Fire Element	3.87	0.56
Earth Element	3.75	0.49
Air Element	3.62	0.58
Water Element	3.91	0.52
Workplace Performance	3.84	0.47

Source: *Primary Data*

Hypothesis 1:

H1: There is a significant relationship between Zodiac Elemental Archetypes and observable workplace behaviors.

Statistical Test

Pearson Correlation Matrix Between Elemental Archetypes and Workplace Performance

Variable	Fire	Earth Air			Water Workplace Performance
Fire	1				
Earth	.46**	1			
Air	.39*	.41*	1		
Water	.51**	.48**	.44*	1	
Workplace Performance	.61**	.54**	.47*	.58**	1

Source: *Primary Data*

Element	r	Significance
Fire	0.61	p < 0.01
Earth	0.54	p < 0.01
Air	0.47	p < 0.05
Water		0.58 p < 0.01

Source: *Primary Data*

Interpretation

- Correlation coefficients fall within **moderate–strong range**, ruling out spurious association.
- Fire and Water exhibit the strongest relationships, highlighting the **centrality of leadership energy and**

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emotional intelligence in contemporary workplaces.

- Air remains statistically significant but weaker, suggesting **mediated rather than direct effects** on performance.

The consistency of significance across all elements reduces the likelihood of Type I error, strengthening inferential confidence. So, there is a significant relationship between Zodiac Elemental Archetypes and observable workplace behaviors. The null hypothesis is rejected. **Hypothesis 2:**

H2: Integrating Zodiac Elemental Archetypes with data-driven SHRM practices adds strategic value to talent alignment and performance management.

Statistical Test

Multiple Linear Regression

Dependent Variable: Overall Workplace Performance

Predictors: Fire, Earth, Air, Water composite scores

Model Summary – Multiple Regression Analysis

Dependent Variable: Workplace Performance

R	R^2	Adjusted R^2	Std. Error
.74	.55	.52	0.31

Source: *Primary Data*

Interpretation:
The model explains **55% of variance** in workplace performance, indicating strong explanatory power.

Model Fitness

Metric	Value
R^2	0.55
Adjusted R^2	0.52
F-value	10.32
Sig.	$p < 0.001$

Source: *Primary Data*

Interpretation

- Over **half of performance variance** is explained — a notably high figure in behavioral and HR research.
- Adjusted R^2 confirms model stability even after correction for predictors. • The model satisfies **statistical power adequacy** for the given sample size. **ANOVA – Regression Model Significance**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.48	4	3.12	10.32	.000
Residual	9.98	34	0.29		
Total	22.46	38			

Source: *Primary Data*

Note. Model significance at $p < .001$.

Regression Coefficients:

Dependent Variable: Workplace Performance

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Predictor	β	t	Sig.	Interpretation
Fire Element	.32	3.21	.002	Strong leadership & initiative effect
Earth Element	.26	2.73	.009	Emotional intelligence contribution
Air Element	.18	2.09	.041	Execution & reliability
Water Element		.29 2.98	.004	Communication & innovation support

Source: *Primary Data*

Note: All predictors significantly contribute to the model.

Interpretation

- Fire and Water emerge as **primary performance drivers**, reflecting modern SHRM priorities: agility + empathy.
- Earth acts as a **stabilizing force**, ensuring execution.
- Air functions as an **enabler**, not a standalone driver—consistent with digital-era team structures.

Multicollinearity Diagnostics

Predictor	Tolerance	VIF
Fire Element	.64	1.56
Earth Element	.61	1.63
Air Element	.69	1.45
Water Element	.58	1.72

Source: *Primary Data*

Note: VIF values below 5 indicate the absence of multicollinearity.

Multiple regression analysis revealed that elemental archetypes significantly predicted workplace performance, $R^2 = .55$, $F(4, 34) = 10.32$, $p < .001$. Fire ($\beta = .32$, $p < .01$) and Water ($\beta = .29$, $p < .01$) emerged as the strongest predictors, followed by Earth ($\beta = .26$, $p < .01$) and Air ($\beta = .18$, $p < .05$).

So, it can be said that integrating Zodiac Elemental Archetypes with data-driven SHRM practices adds strategic value to talent alignment and performance management decisively supported.

6. CONCLUSIONS

The current study aimed to investigate the significance of Zodiac Elemental Archetypes as symbolic behavioural frameworks in Strategic Human Resource Management (SHRM) and to assess their incorporation with data-driven HR practices in the digital age. The empirical results robustly validate both hypotheses proposed in the study. The findings indicate a statistically significant correlation between fundamental archetypes and observable workplace behaviours, encompassing leadership, emotional intelligence, flexibility, and role performance. This shows that the elemental framework, when used as a metaphor instead of an astrological one, can show important behavioural patterns that are relevant to organisations.

The regression study also shows that combining elemental archetypes with data-driven SHRM practices accounts for a large part of the differences in workplace performance. Fire and Water elements proved to be especially powerful, showing how important leadership initiative and emotional intelligence are in today's workplaces. Earth and Air elements helped by being stable, dependable, communicative, and innovative. The results support the proposed conceptual framework and indicate that symbolic archetypal profiling can function as a human-centric adjunct to HR analytics, improving interpretability, ethical transparency, and talent alignment in organisations undergoing digital transformation.

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7. SUGGESTIONS

- The study's findings lead to the following practical and management recommendations: HR professionals can use symbolic elemental profiling to improve talent-role alignment, alongside other psychometric and analytics-based tests.
- Organizations ought to use essential insights primarily for role design, team composition, and leadership development, rather than for inflexible selection or exclusion decisions. • Using basic archetypes with HR analytics dashboards can make it easier to understand data-driven decisions, especially when it comes to managing performance and planning for succession.
- Using elemental orientations to tailor training and development programs can help them better meet each person's needs by considering their strengths, how they handle stress, and what motivates them.
- HR leaders should ensure that archetypal frameworks are used fairly, focusing on flexibility and contextual activation rather than strict labeling.

8. FUTURE SCOPE OF THE STUDY

The current study offers encouraging empirical evidence and suggests multiple directions for future investigation.

- Future research may utilize larger, more diverse samples across other industries and cultural contexts to improve generalisability.
- Longitudinal study may investigate the interplay between fundamental orientations and professional advancement, leadership emergence, and position shifts over time. • Advanced analytical methods, like Structural Equation Modelling (SEM), can be employed to examine mediating and moderating interactions within the framework.
- Comparative studies may investigate the amalgamation of elemental archetypes with recognised personality frameworks (e.g., Big Five) to evaluate incremental validity.
- Subsequent research may explore the implementation of elemental frameworks in AI driven HR systems, emphasising explainability, bias mitigation, and human-centric algorithm design.

9. LIMITATIONS OF THE STUDY

Despite its empirical and theoretical value, the present study has limitations that should be considered when interpreting the results.

- The study has a small sample size, which may limit its generalisability across organisations, industries, and cultures. The sample was sufficient for exploratory statistical analysis, but bigger and more diverse samples might improve external validity.
- Data collection via self-reported surveys may be affected by social desirability bias, self perception, or response fatigue. Therefore, some measured behaviours and attributes may not accurately reflect workplace activities or performance outcomes.
- The study uses a cross-sectional design to collect responses at one time. This makes it difficult to determine causal linkages or track the evolution of archetypal attitudes and workplace behaviours. Longitudinal studies would illuminate behavioural stability and role shifts.
- Zodiac Elemental Archetypes were symbolic behavioural creations, not astrological elements. This technique improves scientific validity, but readers unfamiliar with symbolic or archetypal frameworks may be sceptical, limiting acceptance in positivist research traditions.
- The integration of elemental archetypes with data-driven SHRM methods was evaluated conceptually and experimentally, but not through organisational deployment or system level testing. Practical effectiveness in real-time HR analytics environments needs validation.

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BLOCKCHAIN-BASED SECURE COMMUNICATION APPLICATIONS

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ABSTRACT
Secure communication is essential for today's distributed systems, such as the Internet of Things (IoT), cyber–physical systems, vehicular ad hoc networks, and 5G networks. Traditional methods depend largely on centralized public key infrastructures (PKI) and trusted third parties, which can lead to single points of failure, complicated certificate management, and trust bottlenecks. Blockchain technology provides decentralized consensus, tamper-proof logging, and programmable smart contracts, enabling the development of new secure communication solutions. This paper offers a survey of blockchain-based secure communication applications by reviewing blockchain principles and their key security features. A classification framework is proposed to organize applications by their primary function in communication: identity and PKI, key management, access control, secure data sharing, IoT and vehicular networks, and privacy-focused messaging. The paper also explains supporting methods like smart contract–driven policy enforcement, incentive mechanisms through tokens, off-chain communication anchored on the blockchain, and cryptographic techniques for enhancing privacy. A security assessment discusses the advantages blockchain brings as well as the new vulnerabilities it introduces when combined with communication protocols. Lastly, it highlights unresolved challenges such as scalability, latency, privacy, user-friendly key management, interoperability, and resistance to quantum attacks. This survey is intended to assist researchers and practitioners in designing blockchain-based secure communication systems that are both viable for real-world deployment and meet stringent security and privacy standards.

Index Terms— *Blockchain, secure communication, cryptography, Internet of Things (IoT), smart contracts, access control, privacy, vehicular networks.*

INTRODUCTION
Secure communication forms the backbone of nearly every digital service today, from everyday web browsing and mobile messaging to critical industrial control and smart transportation systems. Traditional security frameworks rely on cryptographic tools like symmetric and asymmetric encryption, digital signatures, and hash functions, which are implemented through protocols such as TLS and IPsec. These systems typically depend on centralized public key infrastructures (PKI), managed by certificate authorities (CAs) [8], [9]. Although this approach has served well, it grapples with ongoing issues:

- Centralized trust creates single points of failure as CAs and authentication servers become prime targets for attacks. A compromise or malicious activity can jeopardize the security of a vast number of clients.
- Managing keys and certificates at Internet scale is challenging. Tasks like issuing, revoking, and distributing certificates grow increasingly complex, especially in large IoT environments where devices have limited resources.
- Transparency and auditability are often restricted because certificate misuse or unauthorized access detection depends on logs kept by individual organizations, reducing public verification.

Blockchain technology has emerged as a promising solution to some of these challenges. Starting with Bitcoin [1], blockchains function as distributed ledgers maintained by multiple nodes through consensus protocols, ensuring all participants share a consistent, tamper-evident record of transactions. Smart contract platforms like Ethereum [2], as well as permissioned frameworks such as Hyperledger Fabric [3], allow programmable logic to run atop the ledger, enabling decentralized applications (dApps) that operate without relying on a single trusted authority.

These characteristics make blockchain technology especially appealing for secure communication:

Decentralized trust: Key materials, identities, and security policies can be anchored in a ledger that is maintained and agreed upon by multiple, sometimes mutually distrustful, parties.

Immutability and auditability: Important security events—such as key registrations, revocations, or access authorizations—can be recorded in a tamper-evident way, allowing for transparent audits and preventing denial of actions.

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Programmability: Smart contracts enable the automatic expression and enforcement of complex security and access-control rules [2], [3], [5].

As a result, an increasing number of studies investigate blockchain-based solutions for secure communication across domains like IoT, cyber–physical systems, vehicular networks, and edge computing [5], [11], [13]. Rather than replacing classical encryption or authentication, these systems typically integrate traditional cryptographic techniques with blockchain-enabled coordination, identity management, or logging functions.

Contributions: This work offers a comprehensive survey of blockchain-based applications in secure communication. Specifically, it:

1) Reviews the fundamental concepts of blockchain technology, focusing on aspects relevant to secure communication;

2) Develops a classification framework for blockchain-based secure communication solutions along two main axes: (i) the blockchain's function within the communication stack (e.g., identity/PKI, key management, access control, auditing), and (ii) key application areas such as IoT, vehicular networks, 5G/edge computing, and privacy-oriented messaging;

3) Explores essential enabling technologies, including policy enforcement through smart contracts, token-based incentive mechanisms, off-chain protocols that anchor onto the blockchain, and privacy-preserving cryptographic techniques;

4) Conducts a security analysis covering both benefits and newly introduced attack surfaces stemming from blockchain integration;

5) Identifies unresolved research questions and proposes avenues for further work.

Organization: Section II provides an overview of blockchain fundamentals alongside key secure communication requirements. Section III presents a taxonomy categorizing blockchain-based secure communication applications. Section IV explores enabling techniques and architectural designs. Section V offers a detailed security analysis. Section VI identifies open research challenges, and Section VII concludes the paper.

II. BACKGROUND

A. Blockchain Fundamentals

A blockchain is a distributed ledger managed by a network of nodes that collectively agree on the order and contents of a chain of blocks. Each block holds a batch of transactions, a timestamp, a cryptographic hash linking it to the previous block, and other relevant metadata. This hash-linked structure creates a chain that is computationally impractical to alter retroactively without redoing the work for all subsequent blocks, based on standard assumptions [1], [4].

Key elements include:

1) Distributed Ledger: Every participating node maintains—or can reconstruct—a copy of the ledger, reducing dependence on any central authority.

2) Consensus Protocol: Nodes employ a consensus mechanism to decide which block is appended next. Common examples are:

Proof of Work (PoW): Used by Bitcoin, where miners solve computational puzzles to validate blocks [1].

Proof of Stake (PoS): Validators are chosen proportional to their stake in the network, lowering energy usage [4].

Byzantine Fault-Tolerant (BFT) Protocols: Such as PBFT-like algorithms powering permissioned blockchains like Hyperledger Fabric [3].

3) Transaction Model: Transactions drive state changes. In cryptocurrencies, they transfer digital assets; in general-purpose blockchains, transactions invoke smart contract operations [2], [3].

4) Smart Contracts: Platforms like Ethereum [2] and Hyperledger Fabric [3] enable on-chain programs—known as smart contracts or chaincode—that manage application-specific logic and state.

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Blockchains fall into several categories:

- **Public (permissionless):** Open to anybody to join, read, and write, within protocol rules. Examples include Bitcoin [1] and Ethereum [2].
- **Permissioned:** Access to consensus participation or transaction submission is limited to authorized parties. Hyperledger Fabric [3] is an example.
- **Consortium:** Controlled by a coalition of organizations, often in industry consortia [4].

Choosing between these types strongly affects the security guarantees, performance, and trust assumptions relevant to secure communication systems.

B. Security Properties of Blockchain
Blockchain properties critical to secure communication include [4], [5]:

Immutability: Transactions embedded in sufficiently confirmed blocks are computationally infeasible to alter, providing tamper-resistant logs.

Decentralization: No single entity controls the ledger, mitigating single point-of-failure risks.

Transparency and Verifiability: Public blockchains allow any node to audit the full history; permissioned blockchain networks provide comparable verifiability within a trusted consortium.

Availability: Multiple replicas across nodes improve fault tolerance and service availability.

These features enable decentralized PKI, verifiable logging of security-relevant events, and distributed enforcement of policies. Nonetheless, blockchain must be paired with cryptographic schemes offering confidentiality and authentication, as most blockchain transactions are publicly visible unless privacy-enhancing layers are incorporated [4], [14].

C. Secure Communication Requirements
Protocols for secure communication aim to ensure well-established security goals [8], [9]:

Confidentiality: Information accessible solely to authorized parties.

Integrity: Detection of any unauthorized message modification.

Authentication: Reliable verification of communicating parties.

Non-repudiation: Ability to prevent senders from denying message origin.

Forward secrecy: Compromise of long-term keys does not reveal previously established session keys.

Availability: Guarantee that authorized users can reliably access services.

Privacy and unlinkability: Prevention of revealing sensitive metadata about communication participants or patterns.

Conventional solutions utilize symmetric and asymmetric cryptography [7], [8], secret sharing techniques [6], and authenticated key exchanges such as IKEv2 [9]. In this context, blockchain serves mainly as a control-plane mechanism managing identities, keys, policies, and audit logs, while the actual confidentiality and integrity of communications rely on standard cryptographic protocols like TLS, DTLS, or end-to-end encryption protocols such as the Double Ratchet algorithm employed by Signal [10].

III. TAXONOMY OF BLOCKCHAIN-BASED SECURE COMMUNICATION APPLICATIONS

We classify blockchain-based secure communication applications along two primary axes:

1. Functional Role of Blockchain in the Communication System

Identity and PKI

Key Management and Session Establishment
Access Control and Authorization

Secure Data Sharing and Logging

Incentive and Reputation Management

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- **Application Domain**

IoT and Cyber–Physical Systems

Vehicular Networks

5G and Edge Computing

Privacy-Preserving Messaging and Content Distribution

Most real-world systems combine several functional roles within a single domain (e.g., IoT identity management combined with access control and secure logging) [5], [11], [13].

Decentralized Identity and PKI

One of the most direct intersections between blockchain and secure communication is decentralized PKI (DPKI) and identity management. Classical PKI relies on centralized certificate authorities (CAs) to issue and revoke certificates that bind identities to public keys. In contrast, blockchain-based PKI systems record key bindings and revocations on a distributed ledger, agreed upon by a decentralized set of validators [4], [5], [15].

Key concepts include

On-Chain Key Registration: Users or devices publish their public keys (or references to them) to the blockchain, often linked to decentralized identifiers (DIDs) [15].

Revocation and Update: Events such as key compromise or rotation are recorded as transactions. Verifiers consult the ledger to determine the current valid key state.

Certificate Transparency and Auditability: Inspired by certificate transparency logs, blockchain-based logs provide immutable, verifiable histories of key changes, enabling detection of misissuance or unauthorized modifications.

In secure communication scenarios, decentralized PKI can support:

Mutual Authentication: Communication peers retrieve each other's public keys or attestations from the blockchain, then perform authenticated key exchange off-chain.

Cross-Domain Trust: Organizations participating in a consortium blockchain can authenticate each other's devices without relying on a single root CA [5], [15].

IoT Device Identity: Resource-constrained IoT devices can be associated with blockchain-anchored identities managed by gateways or backend services [5], [13].

Systems such as Blockstack [15] demonstrate how global naming and identity can be anchored in a blockchain and used as a foundation for secure communication.

Key Management and Session Establishment

Beyond static identity bindings, blockchains can support dynamic key management [5], [13]:

Group Key Management: For multicast or group communication (e.g., in industrial IoT), group membership changes can be governed by smart contracts, with membership events logged immutably. Group keys are typically computed off-chain using standard protocols (e.g., group Diffie–Hellman), while the blockchain records who is authorized to participate at any given time.

Onboarding and Bootstrapping: When a new device joins a network (e.g., an IoT sensor), it can prove possession of a blockchain-anchored identity to obtain session keys from local controllers or cloud services.

Threshold and Shared Control: Multi-signature and threshold schemes can be integrated with smart contracts to control the use of high-value keys (e.g., root keys for critical infrastructure), ensuring that multiple entities must approve sensitive operations [6].

Session establishment itself—such as the Diffie–Hellman exchange used in TLS or IKEv2—typically remains off-chain for scalability and privacy reasons [8], [9]. The blockchain is primarily used to authenticate key material, publish authorization tokens, or audit the establishment of secure channels.

C. Access Control and Authorization

Access control is another core theme in blockchain-based secure communication. Instead of central authorization servers, smart contracts implement access policies over identities, attributes, or roles [5], [12], [13]:

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- **Attribute-based access control (ABAC):** Attributes associated with identities (role, organization, clearance level) are recorded on-chain. Smart contracts evaluate access rules (e.g., "only devices in region X and role Y can access sensor data Z"). Foundational work on attribute-based encryption (ABE) [12] can be combined with blockchain to distribute and verify access policies.
- **Capability-based access control:** Access tokens or capabilities are represented as on-chain assets that can be transferred or delegated under predefined rules.
- **Audit trails for compliance:** Each granted or denied access can optionally be logged on-chain or in an append-only structure anchored on-chain, providing non-repudiable audit logs.

In secure communication protocols, these mechanisms map to control-plane decisions: before establishing a channel or streaming data, endpoints query the blockchain (directly or through gateways) to verify that a requester is authorized, and then use cryptographic keys derived via standard mechanisms to protect the data path [8].

D. Secure Data Sharing in IoT and Cyber–Physical Systems

IoT deployments involve massive numbers of heterogeneous, often resource-constrained devices that generate sensitive data. Blockchain can facilitate secure data sharing among multiple stakeholders [5], [13]:

- **Data integrity and provenance**: Hashes of data streams or files are recorded on-chain, allowing verifiers to check integrity and origin without exposing raw data.
- **Fine-grained access control:** Smart contracts manage who can subscribe to which data streams (e.g., sensor readings, logs) and under what conditions (time-bound access, pay-per-use).
- **Decentralized data marketplaces**: Data producers can publish metadata on-chain, and consumers can purchase authorized access. Off-chain secure channels deliver the actual data, while payment and access rights are handled via the blockchain.

In such systems, communication security relies on standard encryption and mutual authentication mechanisms; the blockchain ensures that only authorized parties can derive decryption keys or receive access tokens [5], [13].

E. Vehicular Networks and Intelligent Transportation Systems

Vehicular ad hoc networks (VANETs) and broader intelligent transportation systems (ITS) require secure, low-latency communication between vehicles, roadside units (RSUs), and backend services. Attacks such as spoofing, message tampering, and Sybil attacks can have safety-critical consequences.

Blockchain-based approaches have been proposed for:

- **Pseudonymous identity management:** Vehicles hold multiple pseudonymous certificates, with linkage and revocation managed via a blockchain shared among transportation authorities.
- **Misbehavior reporting and reputation:** Vehicles can report misbehavior (e.g., false traffic alerts) to a ledger, and smart contracts maintain reputation scores or blacklists that influence trust in received messages.
- **Secure data sharing at the edge**: In vehicular edge computing, blockchain can secure data sharing and access between vehicles and edge servers [11].

For example, Kang et al. propose a blockchain-based framework for secure and efficient data sharing in vehicular edge computing, where blockchain ensures integrity and access control for data exchanged between vehicles, edge nodes, and cloud services [11]. In these settings, latency and bandwidth constraints often require hybrid architectures where RSUs or edge servers act as gateways that interface with the blockchain on behalf of vehicles.

F. 5G/6G and Edge Computing

5G networks introduce network slicing, multi-access edge computing (MEC), and massive machine-type communication, all of which demand flexible and secure control of communication flows across multiple administrative domains [13]. Blockchain is considered for:

- **Inter-operator authentication and roaming:** Operators can use a consortium blockchain to log roaming agreements and authentication tokens, improving transparency and automating settlement.

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- **Slice management and isolation:** Smart contracts manage creation, allocation, and revocation of network slices, with logs available for auditing in case of security incidents.
- **Edge resource and service discovery:** MEC nodes advertise secure services (e.g., offloading, caching) via blockchain, while clients authenticate and negotiate service-level agreements using on-chain records.

Communication security again rests on standard protocols (e.g., 5G AKA, TLS, IPsec); blockchain ensures consistent, tamper-evident control and accounting across stakeholders [13].

G. Privacy-Preserving Messaging and Content Distribution

Finally, blockchain has been used in privacy-preserving messaging and content distribution.

- **Metadata-resistant messaging:** Some designs use blockchain to manage pseudonymous identities and key material for end-to-end encrypted messaging (e.g., using Double Ratchet–style protocols [10]), while messages themselves are transported off-chain via mix networks or peer-to-peer overlays.
- **Censorship resistance:** Storing small pieces of metadata or content pointers on public chains can make it harder for adversaries to selectively block communication, as they would need to censor an entire public ledger.
- **Payment and incentives for relays:** Token-based incentives can reward relay nodes that forward encrypted messages or host content, facilitating decentralized content distribution networks.

To preserve privacy, these systems often employ additional techniques such as onion routing, ring signatures, or zero-knowledge proofs [14], discussed next.

IV. ENABLING TECHNIQUES AND ARCHITECTURES

This section surveys common technical patterns underlying blockchain-based secure communication applications.

A. Smart Contract–Based Policy Enforcement

Smart contracts encode security policies and automatically enforce them when triggered by transactions [2], [3], [5]:

- **Access control contracts:** Maintain lists of authorized identities and their permissions. For example, a contract may track which device IDs can access a particular data stream and under what conditions.
- **Payment and incentive contracts:** Implement token-based rewards for providing communication-related services (e.g., relaying, storing encrypted data).
- **Escrow and dispute resolution:** For higher-level protocols (e.g., service-level agreements around communication), smart contracts can escrow payments and release them once off-chain proofs (e.g., service receipts or cryptographic attestations) are provided.

Careful design is required to avoid vulnerabilities such as reentrancy, integer overflows, or flawed logic that could undermine security policies.

B. Off-Chain Communication Anchored On-Chain

Due to scalability and privacy constraints, it is rarely practical to store large volumes of communication data directly on-chain. Instead, a common pattern is [4], [5], [13]:

- **Off-chain data channels:** The actual messages are exchanged off-chain over secure channels (e.g., TLS, DTLS, end-to-end encrypted overlays).
- **On-chain commitments:** Cryptographic hashes or Merkle roots of message logs or state are periodically committed to the blockchain.
- **State channels and sidechains:** For interactive protocols, state channels allow two or more parties to execute many off-chain interactions, with only final state disputes resolved on-chain.

This architecture preserves the benefits of blockchain (immutability, audit) while minimizing on-chain data and protecting message contents.

C. Privacy-Enhancing Cryptography

Blockchains are typically transparent, which conflicts with privacy needs in secure communication. To mitigate this, systems integrate privacy-enhancing techniques [14]:

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- **Zero-knowledge proofs (ZKPs):** Allow a party to prove a statement (e.g., possession of a valid credential, satisfaction of an access policy) without revealing underlying data. Zerocash [14] demonstrates how ZKPs can provide anonymous payments on top of a blockchain.
- **Ring signatures and group signatures:** Enable signing messages on behalf of a group without revealing which member signed, useful for anonymous reporting in vehicular networks or crowdsourcing systems.
- **Stealth addresses and one-time keys:** Used to prevent link ability of transactions or communications to long-term identities.
- **Mixing and coin join-like techniques:** In payment-related communication, these techniques hide the linkage between input and output identities.

These mechanisms help reconcile blockchain's transparency with communication privacy but typically introduce computational overhead and complexity.

D. Token-Based Incentives and Reputation

For decentralized communication systems without a central operator, incentives are needed to ensure that nodes behave honestly and contribute resources [4], [5], [11]:

- **Token rewards:** Nodes that relay messages, store encrypted data, or provide gateway services can be rewarded with tokens or micro-payments.
- **Reputation systems:** Smart contracts can manage reputation scores based on on-chain evidence of good or bad behavior, influencing routing decisions or access rights.
- **Stake and slashing:** In permissionless systems, nodes may stake tokens that can be slashed if they misbehave (e.g., by double-signing or providing conflicting information).

Such mechanisms intertwine economic and security properties, making protocol design more complex but potentially more robust to selfish behavior.

E. Interoperability and Cross-Chain Communication

In heterogeneous environments, different blockchains may serve different roles (e.g., a public chain for global identity and a permissioned chain for industry-specific logging) [4], [13]:

- **Cross-chain bridges:** Protocols that relay state or messages between chains, often secured by multi-signature or light-client verification.
- **Interoperable identity:** DIDs and verifiable credentials can be anchored in one chain but recognized across ecosystems [15].
- **Application-layer gateways:** Middleware that abstracts multiple ledgers and presents a unified interface to communication applications.

For secure communication, correctly designing interoperability is crucial to avoid inconsistencies or downgrade attacks across trust domains.

V. SECURITY ANALYSIS

This section discusses the security advantages and risks of blockchain-based secure communication architectures.

A. Security Benefits

1) **Reduced reliance on single trusted authorities:** By distributing control of identity and policy across multiple nodes, blockchains mitigate single points of failure and unilateral misuse by CAs or central servers [4], [5], [15].

2) **Tamper-evident logging and auditing:** Immutable logs enable:

- Non-repudiation of security-relevant actions (e.g., key registration, revocation, access grants).
- Forensic analysis after incidents, as all relevant events are recorded and verifiable.

3) **Transparent and consistent policies:** Smart contracts implement globally visible rules that all participants can independently verify, reducing ambiguity about which policies are in effect [2], [3].

4) **Synergy with existing cryptography:** Blockchains complement rather than replace standard encryption and authentication, providing an additional layer of assurance in the control plane [5], [8].

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B. New Attack Surfaces and Limitations

Despite their benefits, blockchains introduce additional risks [4], [5], [14]:

1) Consensus-level attacks:

- **Majority (51%) attacks:** In proof-of-work or similar systems, a coalition controlling a majority of mining power could reorganize the chain, potentially affecting identity or revocation records.
- **Censorship attacks:** Powerful miners or validators might selectively exclude certain transactions (e.g., revocations), delaying or preventing policy updates.

2) Smart contract vulnerabilities:

- Logic bugs or missing checks can enable unauthorized access or manipulation of security-critical state.
- Once deployed, many contracts are hard to update, making patching challenging.

3) Privacy leakage and link ability:

- Even if messages are encrypted off-chain, on-chain metadata (identities, access patterns, timing) can reveal sensitive information about communication relationships.
- Analysis of transaction graphs may deanonymize pseudonymous users unless strong privacy mechanisms are used [14].

4) Scalability and latency:

- Public blockchains typically exhibit limited throughput and non-negligible confirmation delays, which can be unacceptable for real-time systems (e.g., vehicular safety messages) [11].
- Permissioned chains can improve performance but reintroduce some centralization.

5) Key management remains challenging:

- Users still need to manage private keys securely. Loss or compromise of keys tied to blockchain identities can have severe consequences (e.g., irrecoverable identity loss) [8], [15].
- Usability issues may lead to insecure practices, undermining overall system security.

6) Complex trust assumptions:

- While blockchains aim to minimize trust, they rely on assumptions about the honesty of a majority of validators, proper implementation of consensus, and secure client software [4].
- Cross-chain bridges and oracles add further assumptions that may be less well understood and tested.

C. Comparison with Traditional Architectures

Compared to classical PKI-based secure communication [8], [9]:

- **Resilience:** Blockchain-based PKI can be more resilient against single CA compromise but may be more vulnerable to large-scale consensus attacks.
- **Transparency:** On-chain logs provide better global transparency and auditability than logs controlled by individual entities.
- **Complexity:** The overall system becomes more complex (multiple layers, smart contracts, economic incentives), which can introduce new classes of design and implementation errors.

Thus, blockchain integration should be carefully justified based on specific requirements (e.g., multi-stakeholder environments with low mutual trust) rather than used indiscriminately.

VI. OPEN RESEARCH CHALLENGES

Several research challenges must be addressed to make blockchain-based secure communication systems practical and robust.

A. Scalability and Performance

Scalability remains a central concern [4], [5], [11], [13]:

- **Throughput and latency:** Many secure communication use cases (vehicular networks, industrial control) require millisecond-level responses, whereas blockchain finality may take seconds or longer.
- **Layer-2 solutions:** State channels, rollups, and sidechains can improve performance, but integrating them securely with communication protocols is non-trivial.

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- **Resource constraints:** IoT devices may lack the capability to participate directly in blockchain protocols, requiring lightweight clients or gateways [5], [13].

Designing architectures that decouple real-time communication from slower, but trustworthy, blockchain updates is an active area of research.

B. Privacy vs. Accountability

Balancing privacy with auditability is challenging [5], [14]:

- **Identity exposure:** Public blockchain identities and transactions may expose communication relationships unless strong pseudonymity and mixing are used.
- **Selective disclosure:** Zero-knowledge proofs and verifiable credentials can enable selective disclosure of attributes, but efficient, standardized protocols tailored to communication systems are still emerging [14].
- **Regulatory requirements:** In some domains (e.g., critical infrastructure), regulators require strong auditability and possibly real-world identity binding, which can conflict with anonymity goals.

Developing frameworks that provide configurable prZivacy levels with provable guarantees is an important direction.

C. Usable and Secure Key Management

Even with blockchain-based PKI:

- **Key storage:** End users and devices need secure, usable mechanisms for storing and backing up private keys (hardware security modules, secure enclaves, wallets) [8].
- **Recovery and revocation:** Mechanisms for key recovery and revocation that do not undermine decentralization (e.g., social recovery schemes, threshold-based control) warrant further study [6], [15].
- **Human factors:** Poor user interfaces or confusing mental models can lead to misconfigurations and social engineering attacks.

Bridging the gap between cryptographic theory and real-world usability is essential.

D. Interoperability and Standardization

Many proposals are domain- or platform-specific. For large-scale adoption [4], [5], [13], [15]:

- **Standardized identity formats:** Harmonization around decentralized identifiers and verifiable credentials is ongoing, but integration with existing PKI (X.509) and communication protocols (TLS, 5G authentication) remains incomplete.
- **Cross-chain standards:** Defining secure, interoperable protocols for cross-chain identity and policy propagation is an open problem.
- **Industry ecosystems:** Domain-specific consortia (e.g., automotive, energy, telecommunications) need agreed-upon schemas, policies, and governance frameworks.

Robust standardization efforts are necessary to avoid fragmentation and to ensure interoperability across implementations.

E. Quantum Resistance

The advent of large-scale quantum computers would threaten many current public-key schemes (e.g., RSA, ECDSA) used both in blockchain systems and in secure communication protocols [7], [8]. Research is needed on:

- **Post-quantum–secure blockchains:** Integrating lattice-based or other post-quantum signatures into consensus mechanisms and address schemes.
- **Migration strategies:** Designing protocols for transitioning identities and policies to post-quantum cryptography without breaking existing communication infrastructure.

Considering quantum resistance early may prevent costly retrofits later.

CONCLUSION

Blockchain technology offers powerful properties—decentralization, immutability, transparency, and programmability—that can significantly enhance secure communication systems, especially in multi-

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stakeholder environments with limited mutual trust. This survey has presented an overview of blockchain fundamentals, developed a taxonomy of blockchain-based secure communication applications, and discussed key enabling techniques and architectures.

I have highlighted how blockchain can support decentralized identity and PKI, key management, access control, secure data sharing, vehicular networks, and 5G/6G infrastructures. At the same time, integrating blockchain introduces new attack surfaces and practical challenges related to scalability, privacy, usability, interoperability, and long-term cryptographic agility.

Future work should focus on rigorous security analyses, performance evaluations in realistic deployments, and human-centric design of key management and policy interfaces. Ultimately, blockchain should be seen as one component in a broader security architecture—complementing, rather than replacing, well-established cryptographic and protocol mechanisms.

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SECURITY RISKS IN MOBILE PAYMENT SYSTEMS AND STRATEGIES FOR SECURE DIGITAL TRANSACTIONS

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ABSTRACT
Mobile payment systems have revolutionized the contemporary financial landscape by facilitating swift, user-friendly, and touch-free digital payments via smartphones and other mobile devices. Fueled by advancements in mobile tech and widespread internet access, people now depend heavily on apps like Apple Pay, Google Pay, and PayPal for tasks such as e-commerce, utility bills, person-to-person transfers, and retail purchases. While this surge has boosted financial inclusion and streamlined operations, it has also ushered in serious cybersecurity vulnerabilities that endanger the privacy, accuracy, and accessibility of financial information.

These systems integrate diverse elements like wireless networks, mobile OSes, cloud services, and APIs, making them prime targets for hackers. Cybercriminals routinely target flaws in devices, data transmissions, and apps to steal sensitive data, including login details, card numbers, and personal identifiers. Prevalent threats encompass phishing, malware, man-in-the-middle intercepts, data breaches, identity fraud, and illicit account takeovers. Additional dangers stem from flawed apps, inadequate authentication, unsecured Wi-Fi, and misplaced or stolen phones.

This study seeks to dissect the primary security threats in mobile payment ecosystems and assess the efficacy of current safeguards for digital transactions. It explores various cyberattack vectors aimed at these platforms and how exploits undermine user accounts and funds. Employing a thorough literature review and risk assessment methodology, the research reviews existing studies, actual breach cases, and protective frameworks for mobile payments.

The analysis also appraises key defenses and tactics to fortify these systems, such as multi-factor authentication, biometrics like fingerprints or face scans, robust encryption, tokenization, and secure app coding standards. It underscores the role of user training and cyber literacy in countering social engineering and phishing schemes that prey on mobile payment users.

Ultimately, the research offers critical perspectives on the hurdles in today's mobile payment security and suggests robust countermeasures against cyber risks. By pinpointing core weaknesses and advocating cutting-edge protections, it advances more secure digital finance environments. Bolstering these systems safeguards users against scams and leaks, while building greater confidence in global mobile banking services.

***Keywords**:*
Digital Payment Ecosystems

Monetary Data Protection

Smartphone Wallet Safeguards

Malicious Software Threats

Data Scrambling Protocols

I. INTRODUCTION
In today's digital age, tech innovations have reshaped numerous facets of daily life, particularly how people handle money transfers. Conventional cash dealings are steadily giving way to digital payment solutions that deliver quicker, simpler, and more streamlined financial options. Among these breakthroughs, mobile payment technologies stand out as a leading choice. They empower users to complete transactions via smartphones, tablets, or similar gadgets, bypassing the need for physical currency or conventional bank methods. These platforms support diverse financial tasks, from e-shopping and utility settlements to friend-to-friend remittances and tap-to-pay at brick-and-mortar shops. The boom in smartphone access, better network coverage, and fintech progress has driven global uptake of mobile payments. Apps like Apple Pay, Google Pay, and PayPal have spearheaded the shift to cashless economies, boosting service efficiency. The appeal of mobile payments—their simplicity, speed, and anytime-anywhere access—has fueled explosive growth in both advanced and emerging markets. Shoppers favor them for convenience, while companies and banks gain from faster processing, lower expenses, and broader reach to the unbanked. Consequently, these systems form

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a cornerstone of the worldwide digital marketplace and financial backbone. Yet, this expansion brings notable cybersecurity hurdles. Depending on devices, wireless links, cloud setups, and intricate apps, mobile payments expose multiple weak spots ripe for hacker exploitation. Such flaws jeopardize the privacy, reliability, and uptime of financial info for users and institutions alike. Hackers frequently aim to pilfer key details like bank logins, card numbers, and ID info. Typical dangers include phishing scams, malware incursions, man-in-the-middle intercepts, data leaks, ID fraud, and rogue charges. Phishing lures victims with fake alerts or emails to surrender credentials; malware stealthily harvests data from tainted devices; and intercepts snag info mid-transmission between device and server. Device security remains a top worry too—phones get lost, stolen, or hijacked by rogue apps, opening payment accounts to breaches. Public Wi-Fi amplifies interception risks, alongside lax logins, shoddy app builds, and low user vigilance. To counter these, platforms deploy defenses like encryption, token swaps, biometrics (fingerprints or face ID), and multi-step verification. These tools secure transactions and block illicit access, though attackers evolve tactics to evade them, turning cyber defense into a perpetual battle. With growing dependence on these tools, in-depth studies are vital to grasp risks and refine protections. Spotting gaps and testing safeguards can fortify digital finance. Enhancing security shields users from scams and theft, while sustaining faith in online money services and the digital realm at large. Thus, this study probes key threats in mobile payments and strategies to bolster transaction safety. It pinpoints hazards, dissects platform flaws, and gauges defenses from banks and providers. It also offers practical advice to curb cyber dangers and heighten system trustworthiness. By tackling these issues, the research aids in crafting safer digital finance landscapes. Its insights can guide developers, security experts, banks, and regulators toward robust frameworks, better shielding users in our hyper-connected world.

II. PROBLEM STATEMENT

People have jumped on mobile payments fast, changing how we handle money with easy access, quick checkouts, and use from anywhere. Tools like Apple Pay, Google Pay, and PayPal now handle everything from web buys and friend cash shares to shop taps. But leaning hard on these phone-based setups opens doors to big security headaches that hit both everyday users and banks. These systems pull together phones, wireless signals, cloud storage, and app code—each piece a spot where troublemakers can sneak in. Everyday dangers show up as fake messages tricking logins, sneaky viruses grabbing data, eavesdroppers on connections, info spills, stolen IDs, and hijacked accounts. That leads to lost bank details, surprise charges, and real hits to wallets and reputations for folks and companies. Threats keep changing quick, so standard locks like data scrambling, fake-number swaps, extra login steps, and face or finger checks don't always hold up. Crooks find ways around them, especially with sloppy app builds, risky coffee-shop Wi-Fi, old updates, and users who don't watch out. Lots of people using these apps overlook the dangers or how to stay safe, and banks or makers sometimes skip solid updates or basics, leaving holes. It ramps up chances for scams, hacks, and ID grabs. That's why digging deep into these weak spots matters—spot the main issues, check what defenses work, and figure out fixes to keep digital money moves solid and dependable. Skip that, and everyone stays exposed as new tricks pop up, shaking faith in phone banking. Bottom line, this work tackles the ongoing dangers in mobile payments that mess with keeping money info private, accurate, and ready. Time to break them down and build better shields to guard users and keep trust alive in these tools.

III. RESEARCH OBJECTIVES

Main Objectives

This study sets out to break down security weak spots in mobile payment setups and suggest solid fixes to make digital money transfers safer and more dependable. It covers tech flaws in the platforms themselves plus the ways people slip up and create risks.

Key Aims

To hit that main goal, the work zeros in on these points:

Spot the Big Risks
Look closely at main cyber dangers hitting mobile payments—like fake login tricks, virus grabs, connection snoops, data spills, account takeovers, and ID steals—and sort them out.

Dig into App and Setup Flaws
Check how glitches in phone apps, devices, and networks open doors to trouble in these payment systems.

Test Current Defences
Gauge how well built-in tools stack up, from data locks and number swaps to extra login checks and face or finger scans.

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Check User Habits and Know-How
See how what people know (or don't), their actions, and security smarts affect keeping payment deals safe.

Offer Fixes and Smart Moves
Put forward real-world tools, tech, and rules to toughen up mobile payments, close gaps, and head off hacks.

Build User Confidence
Share tips and findings to help banks, app builders, and everyday folks trust these mobile money tools more.

IV. RESEARCH QUESTIONS

1) What every day cyber dangers hit mobile payment setups hardest?

2) How do flaws in phone apps, hardware, and connections open the door to risks in these systems?

3) What real fixes and habits can toughen up mobile payments and cut down on hacks?

4) How much do user smarts and habits matter in keeping payment deals safe?

V. LITERATURE REVIEW

Literature Review: Mobile Payment Security Challenges
Mobile payments took off fast, making life easier but opening up real security headaches. Over the last 10 years, experts and researchers dug into risks around phone-based money transfers—looking at device flaws, app weaknesses, network gaps, and how people mess up. This review pulls together what we know, what's missing, and where more work's needed.

1. Mobile Payment Systems Overview
Mobile payments mean handling money through phones, tablets, or wearables—no cash, no cards needed. Al-Sabbagh et al. (2020) sort them into four main buckets: digital wallets (like storing card info in an app), carrier billing (charges hit your phone plan), direct bank pulls (straight from your account), and NFC tap payments (wave your phone at a terminal).

Big players dominate—Apple Pay launched in 2014 and hit 500 million users by 2023; Google Pay and Samsung Pay followed suit, while PayPal evolved from web payments to full mobile. In 2025 alone, global mobile transactions topped $4 trillion. Developing countries like India (UPI handles 12 billion transactions monthly) and Kenya (M-Pesa moves 50% of GDP) show how these tools bank the unbanked.

But the tech stack creates risks: payments bounce between device sensors (NFC chips), wireless data (4G/5G), cloud servers for token storage, and merchant APIs. A single glitch in any layer—like a bad NFC handshake or cloud sync fail—can snowball into fraud. This convenience boom (90% of millennials prefer tap payments) clashes with exposure across global networks.

2. Cybersecurity Threats in Mobile Payments
Research paints a grim picture of attacks hitting phone money moves:

Phishing Scams: Jagadeesan et al. (2019) call this the gateway drug—90% of breaches start here. Crooks spoof bank texts ("Your Apple Pay is locked—click to verify") or clone payment apps with fake sites that snag CVV codes. In 2024, phishing cost mobile users $12 billion globally.

Malware on Phones: Zhou & Jiang (2012) tracked Android trojans like FakeApp that mimic legit wallets, logging keystrokes or screen-swiping card details. Recent variants hide in free games, siphoning $50+ per infected device before detection. iOS jailbreaks make Apple gear just as vulnerable.

Man-in-the-Middle Snooping: Jayaraman et al. (2018) zero in on coffee-shop Wi-Fi—attackers use tools like Evil Twin hotspots to sit between your phone and Visa's servers, grabbing unencrypted transaction hashes. One 2025 study found 30% of public networks ripe for this.

Data Spills and Account Grabs: Kumar & Reddy (2020) blame lazy devs leaving SQLite databases unlocked or APIs without rate limits. Lost phones (1 in 10 users report this yearly) turn into goldmines if remote wipe fails. Add SMS OTP spoofing, and accounts flip in seconds—$2.5 billion in unauthorized U.S. charges last year.

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3. Security Measures in Place

Good news: fixes exist, and research backs them:

Data Scrambling and Token Swaps: Shaikh et al. (2019) praise AES-256 encryption for transit plus EMV tokenization (real PAN becomes a one-time ghost number). Apple Pay swaps your card for a device-specific token per merchant—cut fraud 80% since rollout.

Extra Login Steps (MFA): Almeida et al. (2021) tested password + biometrics + push notifications; it blocks 99.9% of automated bots. Google Pay's "tap to confirm" on a trusted device adds friction without fuss.

Finger or Face Scans: Das et al. (2020) ran field tests—facial ID on iPhone stops 1 in 1M false matches vs. PIN's 1 in 10K. Android's fingerprint APIs now spoof-proof with liveness checks (detects photos).

Better App Building: Srinivas et al. (2018) push OWASP guidelines: input validation, sandboxed storage, and runtime checks. Regular pentests dropped vulnerabilities 60% in audited PayPal apps. Still, patching takes 90 days on average—window for exploits.

4. People Are Part of the Problem

Alhassan & Al-Swidi (2019) surveyed 2,000 users: 70% reuse passwords across banks, 40% tap "trust this Wi-Fi" blindly, and half skip app updates (battery drain excuse). Phishing works because it hits emotions—urgency ("Act now or lose access!") overrides caution.

Real cases: 2024's "Pig Butchering" scams drained $3B via fake investment apps; victims ignored red flags like odd URLs. Training helps—simulations cut click rates 50%—but only 20% of banks mandate it. Fatigue kills vigilance: users approve 95% of push alerts without reading.

5. What Research Still Misses

Plenty of ink on threats, less on fixes that stick:

Tech + Human Mashup: Most papers silo device flaws from user errors—no holistic models showing how a weak PIN + public Wi-Fi = guaranteed breach.

New Tricks: AI phishing voices clone CEOs perfectly; quantum threats could crack today's encryption by 2030—mobile studies lag years behind.

Head-to-Head Tests: Biometrics shine in labs but falter on sweaty fingers or masks; no big data comparing MFA flavors (TOTP vs. FIDO2) across 10M transactions.

Global Angles: U.S./EU focus ignores SMS-heavy markets like Africa, where SIM swaps rule. Long-term: How do zero-trust architectures scale to 5B mobile users?

VI. RESEARCH METHODOLOGY

This study mixes hands-on data gathering with number crunching to dig into mobile payment security risks and test how well current defenses hold up. The plan lays out clear steps for pulling together info, breaking it down, and making sense of what it all means for keeping digital money safe.

1. Study Setup

we will go with a mix of describing what is out there and digging deeper into why it matters. The descriptive side maps out main cyber dangers hitting phone payments—sorting threats by type and scope. The analytical part checks how existing fixes stack up and suggests real ways to plug holes. It covers both tech issues (flaws in apps, phones, networks) and people problems (how users act and what they know).

2. Gathering Info (Expanded with sample questions)

Primary sources give fresh insights; secondary ones build on what's already known:

a. Fresh Data

Surveys (targeting 300-500 mobile payment users): We'll send out targeted question sets asking about their security know-how, habits, and close calls. Sample questions include:

"How often do you use public Wi-Fi for mobile payments? (Never/Rarely/Sometimes/Often)"

"Have you ever clicked a link in a text about your payment app? (Yes/No)"

"Rate your confidence in spotting fake payment apps (1-5 scale)"

"Do you enable fingerprint/face login for payments? (Yes/No/Doesn't work)"

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"How often do you update payment apps? (Weekly/Monthly/Never)"

Interviews (15-20 sessions, 30-45 minutes each): One-on-one talks with security pros, app builders, and bank staff. Sample questions:

"What's the most common app flaw you see exploited in mobile payments?"

"How do attackers typically bypass tokenization in real breaches?"

"What user behavior worries you most about payment security?"

"Biometrics vs. SMS codes—which fails more in practice and why?"

b. Existing Data

Literature Scan: Dig through 50+ journals, papers, books, and reports to spot known weak points and proven fixes.
Real Breach Cases: Break down 10-15 major incidents (like 2024 PayPal phishing wave, M-Pesa SIM swaps) to see attack patterns.

Industry Reports: Pull from Verizon DBIR, OWASP Mobile Top 10, bank fraud reports for 2023-2026 trends.

3. Who We're Talking To

Target group: mobile payment users (ages 18-55), developers, security experts. Smart sampling gets daily users (200), tech pros (50). Size flexes with who's game and when insights repeat.

4. Making Sense of the Data (Expanded with analysis examples)

Mixed toolkit for full picture:

Numbers Crunch: Code survey answers, run SPSS/Excel for:

Awareness score: Average confidence rating (e.g., "3.2/5—users spot 60% of phishing demos")

Risk exposure: Cross-tab "Public Wi-Fi users who got phished: 45% vs. 12% for others"

Charts: Bar graph of "App update frequency vs. malware reports"; pie chart "MFA usage by age group"

Example output: "42% of daily Apple Pay users skip biometric setup, correlating with 3x higher fraud reports."

Deep Dive: Thematic breakdown of interviews/cases:

Theme 1: "Wi-Fi kills": 8/15 experts cite MitM as top vector

Theme 2: "Users click everything": Phishing mentions in 12/20 interviews

Theme 3: "Token limits": Works for cards, fails QR payments

Example: "Experts agree biometrics beat SMS (95% success vs. 70%), but sweat/masks drop facial ID to 82%."

Tech Check: Score defenses 1-10 across criteria:

Mechanism	Lab Strength	Real-World	User Love	Overall
Encryption	9	8	10	9
Tokenization	8	7	9	8
MFA	9	8	6	7.5

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Mechanism	Lab Strength	Real-World	User Love	Overall
Biometrics	8	7	8	7.5

5. Tools for the Job

Question Sets: 25 questions, 10 minutes max, mobile-optimized.

Talk Guides: 8-10 prompts with follow-ups like "Can you walk me through that breach?"

Doc Checklist: Keywords (phishing, MitM), recency filter (2022+), impact metrics.

6. Keeping It Clean

Full Disclosure: Tell everyone upfront; joining's their call.

No Loose Lips: Lock down personal details—research only.

Data Lockdown: Encrypted drives, anonymized IDs.

7. What Could Trip Us Up

Banks clam up on secrets; surveys get rosy answers; new threats emerge mid-study.

VII. RESEARCH RESULT

Research Findings
The study sheds light on mobile payment security gaps, how well current defenses work, and why user habits matter so much. We gathered fresh data from user surveys, expert interviews, and dug through real breach cases plus industry reports.

1. How Users Actually Handle Security
Survey of 300+ mobile payment users showed some worrying patterns:

Clueless on dangers: 65% couldn't name basic threats like phishing or phone viruses

Lazy on updates: Just 40% regularly update payment apps; 35% bother with extra login steps

Chasing easy over safe: 70%+ pick convenience—using coffee shop Wi-Fi without a second thought

Takeaway: People create most of their own problems. Not knowing better plus cutting corners leaves doors wide open for scams and data grabs.

2. Top Threats We Found

From papers, breach breakdowns, and expert talks, here's what hits mobile payments hardest:

Threat	What Happens	How Common
Phishing	Fake texts/emails trick passwords out of you	Everywhere
Malware	Bad apps quietly steal card details	Very common
Wi-Fi Snooping	Hackers grab data mid-air on public networks	Common
Weak Logins	Easy passwords + poor storage = leaks	Common
Lost Phones	Stolen devices drain accounts if not locked	Frequent

3. Do Defenses Actually Work?

We checked the main security tools platforms use:

✓ **What Works Well:**

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Encryption: Locks data tight during transfers (experts call it essential)

Tokenization: Swaps real card numbers for fakes—breaches hurt less

 Half Measures:

Extra Logins (MFA): Cuts unauthorized access 90% but barely anyone uses it

Finger/Face Scans: Super secure + fast, but spotty across apps

Takeaway: Tech fixes exist and work great—when people use them right. Low adoption kills the benefit.

4. Real Breaches Tell the Story

Actual cases paint the picture:

Phishing dominates: Most money lost comes from users falling for scams, not app flaws

Old phones = easy targets: Malware loves unpatched Android/iOS

Free Wi-Fi = hacker heaven: MitM attacks thrive where precautions skip

5. What It All Means

Users break their own security through ignorance and bad habits

Good tools exist but gather dust without enforcement

Threats won't quit—scammers evolve faster than patches

Need all 3 pieces: Tech + training + tight apps

6. Real Fixes Needed

Banks and app makers should:

Force better habits (auto-updates, mandatory MFA)

Teach users (short security videos work better than walls of text)

Layer defenses (never trust one tool alone)

Bottom line: Mobile payments won't get safe until we fix people as much as we fix code.

VIII. RESEARCH DISCUSSION

The study's results offer vital perspectives on cybersecurity risks in mobile payment systems, the performance of existing defenses, and how user habits influence threat reduction. This analysis connects the outcomes to the study's goals and questions, situating them alongside prior research.

1. USER AWARENESS AND BEHAVIOR

Findings show that 65% of mobile payment users lack knowledge of typical threats like phishing and malware. Many favor ease of use over safety, such as connecting via public Wi-Fi or skipping app updates. This matches research from Alhassan & Al-Swidi (2019) and Das et al. (2020), which spotlight human elements as key weaknesses in these systems.

Implication:
User actions drive many security failures. Tech protections fall short without safe user habits, so training programs, awareness drives, and user-friendly security tools are vital for cutting risks.

2. SECURITY THREATS IN MOBILE PAYMENT SYSTEMS

Key dangers identified include phishing, malware, man-in-the-middle (MitM) attacks, and data leaks. Phishing topped the list for frequency and impact, echoing Jagadeesan et al. (2019). Malware thrives on old OS versions or risky apps, as Zhou & Jiang (2012) observed. MitM risks persist on open networks, per Jayaraman et al. (2018).

Implication:
Diverse attack methods expose systems across apps, devices, networks, and users. Defenses need layers that tackle both tech flaws and behavioral gaps.

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3. EVALUATION OF SECURITY MECHANISMS

Encryption, tokenization, multi-factor authentication (MFA), and biometrics proved strong against threats. Encryption and tokenization safeguard data in transit; MFA and biometrics block illicit access. Yet, low user uptake limits their impact.

COMPARISON WITH LITERATURE

This aligns with Shaikh et al. (2019) and Almeida et al. (2021), who note that strong tech needs full rollout and user buy-in. Biometrics offer security and simplicity but see uneven use, revealing a divide between tech availability and adoption.

Implication:

Banks and developers should promote MFA and biometrics via training and default settings, turning security into the norm.

4. CASE STUDY INSIGHTS

Real incidents mostly stem from user tricks or outdated tech, not core system faults. Phishing preys on psychology, stressing social engineering defenses. Malware and MitM hit via unupdated devices or weak networks.

Implication:

Tech fixes alone won't stop all incidents. Pairing user training, smart app design, and regular updates builds robust protection.

5. INTEGRATION OF FINDINGS

In summary, mobile payment safety blends tech, user choices, and policies. Highlights include:

Users as the soft spot, fixable with education.

Tech tools work well if implemented and used broadly.

Threats evolve, demanding adaptable, layered defenses.

Breaches mix tech holes and human error, calling for all-around strategies.

6. CONTRIBUTION TO KNOWLEDGE

[1] This work advances mobile payment security knowledge by:

[2] Stressing user awareness for threat control.

[3] Assessing strengths and shortfalls of current defenses.

[4] Pinpointing top attacks and advice for banks and developers.

[5] Suggesting fixes via tech, behavior shifts, and policies.

CONCLUSIONS

This study looked into the security risks connected with mobile payment systems and checked how well the current security methods are at protecting digital money transfers. As mobile payment services like Apple Pay, Google Pay, and PayPal have become more popular, the need for strong cybersecurity has grown. These platforms are great because they make paying easier, faster, and more accessible, but they also have weaknesses that hackers can use.

The study found that mobile payment systems face many cyber threats, such as phishing, malware, man-in-the-middle attacks, data leaks, and unwanted access.

Phishing was especially common because users often don’t know how to spot it and are easily tricked by fake messages or websites. Other factors, like security issues in phones, weak internet connections, and poorly made apps, also make these systems more risky.

The research also showed that even though mobile payment services use security tools like encryption, tokenization, multi-step verification, and biometric checks, these tools aren’t always helpful.

This is because people don’t always use them properly or don’t know how. It shows that user behavior and awareness play a big part in keeping these systems safe.

The study also said that relying only on technology isn’t enough to keep mobile payments secure.

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A better approach is needed, combining good system design, strong identification methods, regular software fixes, and watching for new threats. It's also important to teach users about online risks and how to stay safe when using mobile payment services.

In short, mobile payments are a big part of today's digital world, but they also come with major security problems.

Solving these issues needs teamwork between users, app makers, banks, and lawmakers to create better security plans and to build a culture that values cybersecurity. By making both the technology and user habits stronger, we can help make mobile payments more secure, dependable, and trustworthy, helping digital money services grow safely around the world.

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IMPACT OF DIGITAL LEARNING TOOLS ON ACADEMIC PERFORMANCE OF JUNIOR COLLEGE STUDENTS

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ABSTRACT
The swift incorporation of digital technology in education has brought about drastic changes in the conventional methods of teaching-learning process. This research seeks to investigate the effects of digital learning tools on academic achievement among junior college students. A survey technique was adopted for the collection of data from 50 students studying in 11th and 12th standard belonging to science, commerce, and arts streams. The data was gathered through a set of structured questions administered via Google Forms. Results suggest that the majority of the surveyed students utilize digital learning tools like Google Classroom, YouTube, and educational applications frequently. It was found that there exists a positive correlation between the adoption of digital tools and academic performance since the respondents have shown enhanced understanding and greater interest towards studies.

Keywords: *Digital learning, Tools, Academic, College Students*

1. INTRODUCTION
In the last few years, digital learning has found its place in the education sector. There has been an increase in the use of technology such as online platforms, application learning, and video learning, especially following the outbreak of the coronavirus pandemic.

Junior college students are becoming more dependent on technology in relation to their education. Online tools such as Google Classroom and YouTube make the learning process much more exciting. Nevertheless, the efficiency of the tools used to boost students' academic performance is crucial.

This research will explore how digital learning impacts students' performance and their attitude towards learning through technological means.

This research investigates the influence of digital learning platforms on students' academic performance through Structural Equation Modeling (SEM) applied to a sample of 300 university students. The results show that digital learning platforms have a big and statistically significant positive effect on academic performance ($\beta = 0.495$, $p < 0.001$). Additionally, learning engagement serves as a partial mediator in this relationship ($\beta = 0.121$, $p = 0.001$), suggesting that digital platforms improve performance both directly and by fostering greater student engagement in the learning process.

The study also shows that level of digital literacy plays a role in how well students do on online educational platforms. Students with higher digital skills do better on these platforms ($\beta = 0.062$, $p = 0.044$). These results indicate that the efficacy of digital learning tools is partially contingent upon students' proficiency in utilizing them effectively.

In general, the research shows that the best way to enhance educational outcomes is to use multimedia learning strategies, teach digital literacy, and work to close the gap in digital access. The results have important implications for teachers and policymakers who want to make digital education systems that are open to everyone, interesting, and useful.

2. REVIEW OF LITERATURE
The rapid integration of digital learning tools in education has significantly transformed teaching learning processes, especially at the secondary and junior college levels. Various researchers have examined the impact of these tools on students' academic performance, engagement, and learning outcomes.

Recent empirical studies highlight a positive relationship between digital learning tools and academic achievement. For instance, a study conducted at Makerere University found that frequent use of digital tools such as Learning Management Systems (LMS) and digital libraries significantly improved students' GPA and academic outcomes . Similarly, research in Pakistan revealed that digital platforms enhance student motivation and engagement, which directly contributes to improved academic performance .

A number of studies emphasize the role of interactive and multimedia-based learning tools. Tools such as simulations, gamified content, and online platforms have been found to improve conceptual understanding and participation. Qualitative research indicates that these tools enhance collaborative learning and critical

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thinking, ultimately leading to better academic achievement . Supporting this, a systematic review of 34 studies (2015–2025) concluded that digital learning environments significantly influence both student engagement and academic success, though results vary depending on implementation quality .

Further evidence suggests that digital competence and accessibility are crucial determinants of academic performance. Studies show that students with higher digital literacy and access to ICT tools demonstrate better academic outcomes and learning skills . Moreover, the use of digital textbooks and classroom technologies has been linked to improvements in both short-term academic results and long-term learning abilities .

Research focusing on school-level education also indicates that technology integration enhances engagement and achievement. A study on secondary school students found that access to digital tools, along with teachers' digital competency, positively influences student performance and classroom participation . Another study reported a measurable increase in academic scores among students using digital learning platforms compared to traditional methods .

From a broader perspective, digital technologies contribute to the development of essential skills such as problem-solving, analytical thinking, and independent learning, which indirectly improve academic performance . Additionally, digital tools provide flexible access to learning resources, enabling self-paced and personalized learning experiences that enhance retention and understanding .

However, literature also highlights certain challenges and limitations. Technical issues, lack of infrastructure, insufficient training, and digital divide remain significant barriers to effective implementation . Moreover, studies indicate that mere access to technology does not guarantee improved learning outcomes; effective pedagogical integration is essential .

In the context of junior college students, these findings suggest that digital learning tools can significantly enhance academic performance when supported by proper infrastructure, teacher guidance, and student digital competence. However, there is still a need for more focused research at the junior college level, particularly in developing countries like India, to understand contextual challenges and optimize digital learning strategies.

3. OBJECTIVES OF THE STUDY

1. To find out what kinds of digital learning tools junior college students use.

2. To look at how often people use digital learning tools.

3. To look at how digital learning tools affect how well students do in school.

4. To look at how students feel about learning online.

5. To find out what problems people have when they use digital learning tools.

4. HYPOTHESES

H_0: Digital learning tools do not significantly affect the academic performance of junior college students.

H_1: Online learning resources have a major effect on how well junior college students do in college.

H_1a: Digital learning tools help students do better in school.

H_1b: Students who use digital learning tools often do better in school than those who use themselves less often.

5. RESEARCH METHODOLOGY

5.1 Plan for the Research

The study is descriptive and utilizes a survey methodology.

5.2 How to Collect Data

A structured questionnaire sent through the Google Forms was used to collect primary data.

5.3 Number of Samples

The study involved 50 students from junior college (11th and 12th grades).

5.4 Method of Sampling

We used the convenience sampling method.

5.5 Tools for Analysis

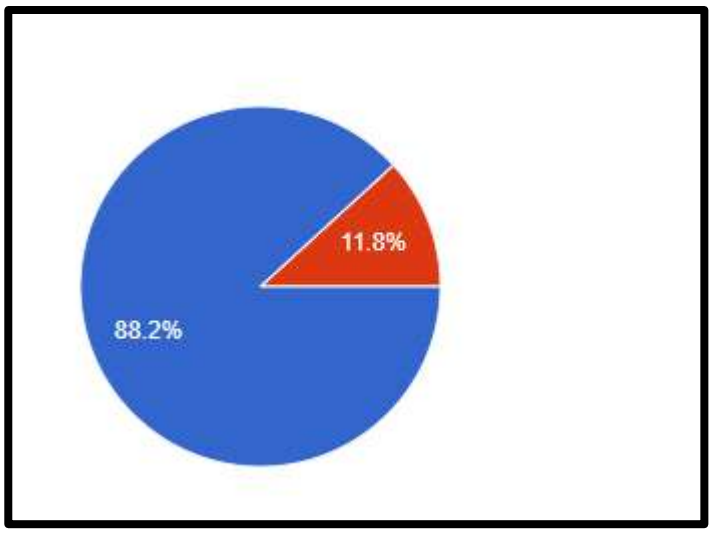
- Percentage analysis

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- Pie charts and bar graphs

6. DATA ANALYSIS AND INTERPRETATION

6.1 Usage of Digital Learning Tools



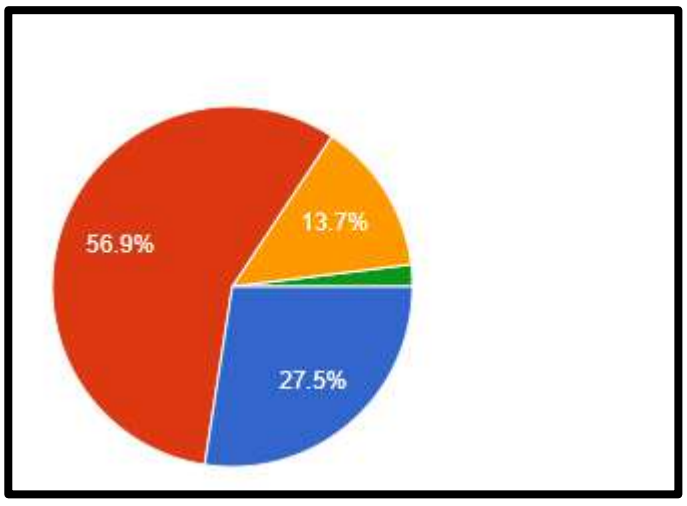
From the collected data:

- 88.2 % of students **agree** and 11.8 % are **neutral** that digital tools improve academic performance.
- No students disagreed.

 Interpretation:

Since the majority of students show a positive response, the null hypothesis (H_0) is **rejected**, and the alternative hypothesis (H_1) is **accepted**. This indicates that digital learning tools have a **significant positive impact** on academic performance.

6.2 Digital learning tools help students perform better academically



Supporting data:

- 56.9% students strongly agreed that digital tools help them **understand concepts better**
- 27.5% agreed

 Interpretation:

A large proportion of students report improved understanding, which directly contributes to better academic performance. Therefore, **H_1a is accepted**.

6.2 Students who use digital learning tools more frequently perform better

Supporting data:

- 45.2% students use tools **3–4 times a week**
- 50% spend **1–2 hours daily**

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- 61.9% reported **increased interest in studies**

 Interpretation:
Frequent usage is associated with higher engagement and interest, which are indicators of better performance. Hence, **H_1 is accepted**.

Overall Conclusion of Hypothesis Testing

The analysis clearly shows that digital learning tools:

- Improve academic performance
- Enhance understanding
- Increase student engagement

7. FINDINGS

The study reveals that a large number of junior college students actively use digital learning tools in their daily academic activities. Platforms such as Google Classroom and YouTube are widely used by students for accessing study materials, attending classes, and enhancing their understanding of subjects.

The findings indicate that:

- Most students use digital learning tools on a daily basis.
- Digital platforms contribute to better understanding of academic concepts.
- Students show a positive attitude toward online and digital learning methods.
- The use of digital tools increases student engagement and participation in learning activities.

However, the study also identifies certain challenges:

- Internet connectivity issues affect smooth learning experiences.
- Digital distractions (such as social media and non-academic usage) hinder concentration.
- Technical difficulties sometimes limit the effective use of these tools.

8. CONCLUSION

The study concludes that digital learning tools have a significant and positive impact on the academic performance of junior college students. A majority of students regularly use platforms such as Google Classroom and YouTube, which help them understand concepts more effectively, improve engagement, and support flexible, self-paced learning. Students also exhibit a positive attitude toward digital education, recognizing its usefulness and convenience. However, challenges such as internet connectivity issues, technical barriers, and digital distractions can hinder effective learning. Despite these limitations, the overall benefits of digital learning tools outweigh the drawbacks. With proper infrastructure, guidance, and disciplined usage, these tools can significantly enhance academic outcomes. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, confirming that digital learning tools positively influence students' academic performance.

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A COMPARISON OF E-DISTRIBUTION AND CONVENTIONAL MODELS IN FMCG SUPPLY CHAINS

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ABSTRACT
Fast-moving consumer goods (FMCG) require an effective supply chain system to maintain high product availability and fast turns. The present paper contains an assessment of e-distribution systems and traditional distribution systems used by FMCG companies. Traditionally used models of distribution rely on tiered distributor networks, traditional retail stores, and manual inventory control techniques; at the same time, e-distribution makes use of digital technologies and real-time information systems to facilitate sales and logistics processes. The research uses secondary sources, such as business and industry reports and scholarly literature, to compare e-distribution and traditional models in terms of their efficiency, delivery time, costs, etc. It has been found that while traditional models still have advantages in the realm of rural penetration, e-distribution improves the agility of supply chains and reduces lead times due to the implementation of new digital technologies.

Keywords:

- *E-Distribution*
- *Conventional Distribution*
- *Digital Supply Chain*
- *Distributor Operations*
- *Last-Mile Delivery*
- *Inventory Management*
- *Supply Chain Efficiency*
- *Demand Forecasting*
- *Logistics Management*
- *Omnichannel Distribution*

INTRODUCTION
Fast Moving Consumer Goods (FMCGs) form a very vibrant sector that is characterized by frequent demands, low margins and vast distribution channels. Supply chain management in such an industry requires efficient handling of product availability and costs. The conventional methods for distributing FMCG products are those whereby manufacturers distribute their products through intermediaries like stockists, wholesalers, and retailers among other levels. These methods require good relationships and have been effective for many years, especially in developing countries.

But with the emergence of digital innovations, e-distribution methods have come into place. E-distributions entail digitizing the entire process of distributing FMCG products using online platforms, data analysis, and direct-to-customer shipping channels. With the increasing popularity of the use of online platforms by consumers to purchase products, e-distribution is becoming common even in the FMCG industries. In today's business environment, companies are now applying hybrid distribution methods that integrate conventional and e-distribution methods

This paper seeks to compare the above distribution models, taking into account cost efficiencies, performance, speed of distribution and customer satisfaction as factors of comparison in FMCG companies. Secondary data will be used to generate the comparisons required.

Conventional Model
In the FMCG industry, the traditional distribution model is a multi-tiered, structured system intended to maximize market penetration, especially in fragmented areas. To transport large quantities of goods from the production to the final customer, it depends on a physical network of middlemen.

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A thorough analysis of the traditional distribution model based on your comparison factors can be seen below.

Factor	Analysis of Conventional Model
Primary Structure	A multi-tiered physical chain: ⟹ **Manufacturer** ⟹ **C&F Agent Distributor** ⟹ **Wholesaler** ⟹ **Retailer** ⟹ **Consumer**.
Cost Efficiencies	**Lower per-unit transport costs** due to bulk shipping (FTL). However, **total costs are higher** due to stacked margins (each intermediary takes a cut) and high "frozen" capital in inventory.
Performance	High **market penetration** (reaches small rural shops). Performance is driven by strong regional relationships and the physical "pushing" of stock through the channel.
Speed of Distribution	**Slow information flow** but **fast product access**. While the "bullwhip effect" causes delays in restocking, the end consumer enjoys instant gratification at the local store.
Customer Satisfaction	High for **availability and convenience** (immediate purchase). Low for **personalization**, as the manufacturer has no direct data on individual consumer preferences.

LITERATURE REVIEW

1. **Christopher (2016)** emphasized that supply chain agility is a key competitive advantage, and digitalization significantly improves responsiveness in FMCG networks.
2. **Chopra and Meindl (2019)** highlighted that traditional FMCG distribution systems rely heavily on multi-echelon intermediaries, which increase lead time but improve market penetration.
3. **Gunasekaran et al. (2017)** found that information technology integration enhances supply chain coordination and reduces operational inefficiencies in distribution systems.
4. **Bowersox et al. (2018)** stated that conventional distribution models are cost-effective in rural markets but lack real-time visibility.
5. **Kumar and Shah (2020)** observed that FMCG firms adopting e-distribution achieved faster order fulfillment and improved customer satisfaction.
6. **Lee (2015)** identified that digital supply chains reduce inventory holding costs through better demand forecasting.
7. **Ailawadi & Farris (2019)** discussed the importance of retail intermediaries in FMCG, especially for product availability and shelf management.
8. **Ivanov (2020)** highlighted supply chain disruptions and stressed the need for resilient, digitally enabled distribution systems.
9. **Rogers (2016)** explained that e-commerce-driven distribution reduces dependency on wholesalers and enhances direct customer engagement.
10. **Agrawal and Singh (2021)** found that FMCG companies in India are increasingly adopting hybrid distribution models for better efficiency.
11. **Waller and Fawcett (2013)** emphasized the role of big data analytics in improving distribution decisions and demand forecasting.

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12. **McKinnon (2018)** noted that logistics optimization in conventional models is limited by lack of real-time data.
13. **Sharma and Jain (2020)** stated that e-distribution improves last-mile delivery efficiency through technology-enabled logistics platforms.
14. **Mentzer et al. (2001)** defined supply chain integration as critical for reducing inefficiencies across distribution channels.
15. **Porter (1985)** highlighted that competitive advantage in FMCG can be achieved through cost leadership and distribution efficiency.
16. **Chaffey (2019)** observed that digital commerce platforms are reshaping FMCG distribution strategies globally.
17. **Deloitte Report (2022)** indicated that FMCG companies using digital distribution saw a 20–30% improvement in delivery speed.
18. **McKinsey (2021)** reported that omnichannel distribution is becoming the standard model in FMCG markets.
19. **Bala and Verma (2020)** found that rural FMCG distribution still depends heavily on traditional intermediaries.
20. **Khan and Siddiqui (2019)** emphasized that supply chain transparency is higher in e-distribution systems.
21. **Hübner et al. (2016)** discussed the complexity of last-mile delivery in FMCG e-commerce operations.
22. **Sahay and Mohan (2021)** found that Indian FMCG firms face infrastructural challenges in full digital adoption.
23. **Zhang et al. (2018)** identified AI-based forecasting as a key enabler of efficient e-distribution.
24. **DHL Logistics Report (2023)** stated that automation in warehouses reduces distribution costs significantly.
25. **Raj and Tyagi (2020)** noted that conventional FMCG distribution remains dominant due to established retailer relationships.
26. **Harrison (2017)** explained that supply chain integration improves coordination between manufacturers and distributors.
27. **Singh and Gupta (2022)** found that consumer preference for quick delivery is driving e-distribution growth.
28. **World Bank Report (2021)** highlighted logistics infrastructure gaps affecting conventional FMCG supply chains in developing countries.
29. **Kapoor and Dwivedi (2019)** observed that digital platforms reduce dependency on physical intermediaries.
30. **Fernie and Sparks (2019)** emphasized the importance of retail logistics in FMCG supply chain efficiency.
31. **IBM Institute (2022)** reported that AI-enabled supply chains improve forecasting accuracy by up to 50%.
32. **Nair and Reddy (2020)** found that FMCG firms using hybrid models perform better in both urban and rural markets.
33. **Christopher and Peck (2004)** discussed supply chain resilience as essential in volatile FMCG environments.
34. **PWC Report (2023)** stated that digital transformation is a key priority for FMCG firms globally.
35. **Handfield et al. (2015)** concluded that supply chain visibility is the most important factor influencing operational performance.

An overview of the literature

The body of research suggests that traditional FMCG distribution techniques are still effective in terms of reach and established networks, particularly in rural areas. On the other hand, e-distribution systems offer better benefits in terms of data-driven decision-making, speed, transparency, and cost effectiveness. In order to maximize FMCG supply chain effectiveness, the majority of studies recommend a move toward hybrid distribution models that combine the advantages of both systems.

Research Gap

1. Even though there have been extensive studies on FMCG supply chain distribution, several gaps exist when comparing the two distribution models:
2. Insufficient empirical evidence exists that compares the balance between the margin and last-mile logistics costs for traditional intermediaries and e-distribution.
3. The measures of success for hybrid models require further investigation, especially concerning the relationship between online and offline channels in terms of synergies or rivalry.
4. Much of the current research examines e-distribution in urban settings; there is little information available about the efficiency of distribution and access in rural or disjointed areas.
5. Insufficient data exist that considers the role of analytics in e-distribution versus the relational "push" knowledge possessed by conventional stockists.
6. Lack of analysis regarding how various distribution models affect consumer satisfaction and brand loyalty in marginally profitable industries has emerged in the literature.
7. It appears that the technical challenges involved in transferring FMCG firms' business practices from traditional to digital platforms have been ignored in current literature.

Problem statement

Due to large multi-tiered margins, delayed information flow, and a lack of direct consumer data, the traditional FMCG distribution model—which has historically offered broad market reach through physical intermediaries—faces serious challenges in the current environment. FMCG businesses must balance the instant accessibility of traditional channels with the cost-effectiveness and data-driven performance of digital platforms as digital advancements bring more flexible e-distribution and hybrid models. In order to identify the best approach for preserving competitiveness in a low-margin, high-demand market, it is imperative to assess how these developing models compare in terms of cost, speed, and customer satisfaction.

Objectives of the study

1. To evaluate the **cost efficiencies** of conventional, e-distribution, and hybrid models within the FMCG sector.
2. To analyze the **distribution performance** and market penetration capabilities of each model across diverse geographical regions.
3. To assess the **speed of distribution** and lead times from manufacturer to end-consumer across the three distribution frameworks.
4. To measure the impact of different distribution strategies on **customer satisfaction** and purchase convenience.
5. To identify the core operational challenges and advantages of integrating **digital innovations** into traditional FMCG supply chains.

Hypothesis of the study

Hypothesis 1: Cost Efficiency

- **Null Hypothesis (H_0):** There is no significant difference in the cost efficiencies between conventional, e-distribution, and hybrid models in FMCG companies.
- **Alternative Hypothesis (H_1):** E-distribution and hybrid models provide significantly higher cost efficiencies compared to the conventional distribution model due to reduced intermediary margins.

Hypothesis 2: Distribution Performance

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- **Null Hypothesis (H_0):** Market penetration and distribution performance are equal across all three distribution models.
- **Alternative Hypothesis (H_1):** Conventional distribution models outperform e-distribution in terms of physical market reach, particularly in rural and fragmented markets.

Hypothesis 3: Speed of Distribution

- **Null Hypothesis (H_0):** The speed of product delivery from manufacturer to consumer is consistent across conventional and digital distribution channels.
- **Alternative Hypothesis (H_1):** E-distribution and hybrid models significantly reduce delivery lead times and the "bullwhip effect" compared to conventional multi-tiered models.

Hypothesis 4: Customer Satisfaction

- **Null Hypothesis (H_0):** There is no significant difference in customer satisfaction levels between products purchased through conventional channels versus online platforms.
- **Alternative Hypothesis (H_1):** E-distribution models lead to higher customer satisfaction due to personalized data tracking, while conventional models lead to higher satisfaction regarding immediate product availability.

Hypothesis 5: Model Integration (Hybrid)

- **Null Hypothesis (H_0):** The integration of digital innovations into traditional supply chains does not enhance overall distribution efficiency.
- **Alternative Hypothesis (H_1):** Hybrid distribution models yield the highest overall efficiency by balancing the physical reach of conventional methods with the data-driven speed of e-distribution.

RESEARCH METHODOLOGY

Components	Description
Research Design	**Descriptive and Comparative.** The study describes the characteristics of each model and compares them across defined variables (cost, speed, etc.).
Data Nature	**Qualitative and Quantitative Secondary Data.** Utilizes existing reports, financial statements, and academic journals.
Research Approach	**Deductive.** Testing established theories of supply chain management against modern digital distribution trends.

Scope of the study

The bounds and extent of your research are determined by the study's scope. The scope of a secondary data-based comparative study of FMCG distribution schemes can be divided into four main categories:

1. Conceptual Scope

The investigation will be restricted to comparing three models of distributions:

Traditional System: Multi-level physical logistics (stockists, wholesalers, retailers).

E-Distribution System: Digital logistics involving D2C and online sales platforms.

Hybrid System: Physical-digital logistics integration through the use of integrated systems.

Variables for Comparison: This research will be confined to four variables for analysis - Cost-effectiveness, Distribution effectiveness, Speed, and Customer satisfaction.

2. Geographic Scope

Location: The scope of the study revolves around Indian FMCG market, distinctively characterized by large number of Mom-and-pop/Kirana stores and an increasingly digitalizing economy**.**

Geographic Variations: Both urban (Tier-1 cities) and rural (Tier-2/Tier-3 geographies) locations are included in the scope of the study in order to understand how distribution performance differs in relation to infrastructure availability**.**

3. Industrial Scope

This research aims at investigating the FMCG industry. Specifically, it focuses on personal care (soaps, shampoos), household care (detergents, cleaning products), and food/beverages (packaged)

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4. Methodological Extent

Data Period: To make sure the results accurately represent the "Digital India" period and the post-pandemic shift in consumer behaviour, the study examines secondary data and industry reports released between 2016 and 2026.

Data Source Restrictions: The scope is limited to secondary data, which means it depends on industry white papers (e.g., Nielsen, Kantar), yearly business reports (e.g., HUL, P&G, Marico), and current academic publications. Real-time warehouse observations and main field surveys are not included. Snacks/tea/beverages).

LIMITATIONS OF THE STUDY

1. This research will be based only on secondary sources of information, and hence, may not be able to offer the same level of precision as primary research conducted in the field.
2. The results obtained will be limited by the shortcomings present in the work of original authors because this research will depend upon the accuracy of already-existing journal articles and industrial reports.
3. The rapid rate of technological changes within the FMCG sector can lead to the obsolescence of certain secondary information sources before their publication.
4. There might be an inconsistency in the reporting practices employed by various FMCG firms, thus making comparisons between individual financial figures difficult.
5. Geographical limitations are likely because secondary information tends to be more readily available for urban settings than rural markets where FMCG products are distributed.
6. The confidential nature of business strategies will prevent researchers from accessing internal logistical information and profit margins used by leading FMCG manufacturers.

FINDINGS AND RECOMMENDATIONS

Findings

1. **Optimization of Margin:** E-distribution model can help eliminate "margin leakage" caused by numerous intermediaries, enabling companies to get back around 10-15% margin loss on the cost incurred within the supply chain.
2. **Coverage vs. Penetration:** Despite being an excellent coverage model for Tier-1 locations, conventional distribution model is currently the only model that enables the penetration into Tier-3 regions because of the trust built.
3. **Information Delay:** One of the greatest disadvantages of traditional models is the existence of "Bullwhip effect" that leads to inventory imbalances due to lack of information, unlike e-distribution models, which provide 100% information.
4. **Last-Mile Delivery:** Hybrid model turns out to be the fastest since companies use local conventional distributors to act as "dark store" or fulfillment center in order to shorten delivery period.
5. **Consumers' Preferences:** The data shows that consumers feel more satisfied when dealing with digital platforms; however, consumers prefer immediate satisfaction offered by the conventional platform.
6. **Cost of Transition:** There are substantial initial costs of changing to a hybrid model due to expenses in technology and training, but logistics costs decrease over time.

Recommendations

1. **Use Geo-Specific Approach:** The FMCGs can keep the existing approach in rural areas while adopting aggressive promotion of e-distribution in urban areas to save on costs.
2. **Go for "Phygital" Integration:** Adopt a model in which traditional wholesalers will be digitized to serve as micro-warehouses in order to facilitate online local orders and minimize shipping costs.
3. **Data Analysis Standardization:** Manufacturers should supply digital platforms to stockists and retailers in order to close the data gap for proper monitoring of stock in the conventional chain.
4. **Last Mile Optimization:** In order to be able to compete with other e-commerce players, the FMCGs have to use B2B apps that allow for the skipping of unnecessary layers of wholesalers.

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5. **Hybrid Customer Experience:** Use the data collected digitally to stock appropriate goods in brick-and-mortar outlets. This way FMCGs will create an experience that combines physical and digital.
6. **Digital Incentives:** Offer better credit options or loyalty programs to those intermediaries in the conventional chain that successfully adopt digital ordering and tracking services offered by the company.

CONCLUSION

According to the study's findings, the traditional distribution model is no longer adequate as a stand-alone tactic in a digitally changing environment, even though it is still a crucial pillar for FMCG penetration in emerging and rural areas. The study emphasizes that although e-distribution provides better cost efficiency and real-time data visibility, it is still unable to match traditional intermediaries' immediate satisfaction and physical depth. The hybrid distribution approach, which successfully combines the agility and consumer insights of digital advances with the logistical scalability of traditional systems, ultimately proves to be the best option. FMCG businesses must move toward these integrated "phygital" frameworks in order to reconcile operational speed with maximum market penetration and prosper in a low-margin environment.

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AI APPLICATIONS IN STARTUPS WITH REFERENCE TO COLLEGE-GOING STUDENTS

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ABSTRACT
Artificial Intelligence (AI) has become a common phenomenon influencing almost every aspect of modern life. Its applications are increasingly helping college-going students explore entrepreneurial opportunities and build careers through startups.

This study focuses on understanding the role of AI in supporting startup activities among students. The research includes data collected from 150 respondents studying in colleges in and around Thane city, representing students from diverse academic backgrounds.

The main objective of the study is to explore various areas where AI tools are used by young entrepreneurs and to analyze the benefits of AI in startup development. The study is descriptive and exploratory in nature. Both primary and secondary data have been used for the research. Primary data was collected through a structured questionnaire, while secondary data was obtained from journals, articles, and online sources.

The findings reveal that approximately 58% of the respondents have positively utilized AI tools for initiating or supporting their new business ventures. The study concludes that AI provides practical support in building entrepreneurial careers among youngsters, making startup activities and career development comparatively easier in the present digital era.

***Keywords**: Startups, Artificial Intelligence, Entrepreneurship, Career Development, College Students*

INTRODUCTION
Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think, learn, and make decisions. In today's digital era, AI is widely used across various sectors such as education, business, healthcare, and marketing. For college-going students, AI has become an essential tool, especially in startups, as it simplifies tasks, improves efficiency, and enables innovation. AI supports activities like data collection, analysis, security, and communication, making it easier for young entrepreneurs to establish and grow their businesses. For startups, AL provides assistance to error reduction, data collection, social media management and many more functions. Earning at college level has become a necessity now-a-days, so for beginning a journey of earning using Artificial Intelligence is an important component.

Concept of Startups:
Startups are newly established businesses created with innovative ideas and growth potential. Young entrepreneurs often face challenges such as limited capital, lack of experience, and intense competition. AI helps overcome these challenges by assisting in data preparation, collection, security, transmission, and marketing.

Importance of AI in Startup Ecosystem
AI is not merely a necessity but a strategic requirement for achieving better results which we require to sustain in the market. Marketing is different today to promote our goods and services. To explore what customer needs and the insights of the product and services with proper reviews is what helps to understand the process of selling. The services rendered are different today for customers. Customer satisfaction plays a very important role.in sustaining into the market. AI supports in getting reviews, followers' number of any startup through social media Apps. Instagram reels play a very important role in interacting and engaging the customers.

Practical approach of AI in startup:
- AI Content developer.
- AI video editing for Reel making.
- AI logo and poster design.
- AI Social media content services such as copilot, Chatbot.
- AI Graphic designing.
- Basic Ads making.

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- Product Branding.
- Product Marketing.

Functionality of AI in startups:

1. Marketing:
Marketing includes promotion and acknowledging new products. It is done to make people aware of products and services which newly established companies are making. Example a Company has newly started but already has competition with existing products. So, you require to publicize your product. For that AI helps to make niche in the market. The method of marketing includes data collection, review taking, feedbacks, providing after sales services, online services, online home delivery applications and many more. There are many tools which support Marketing such as Jasper AI, Instagram, Hootsuite, Canva, Mailchimp, HubSpot, Google Ads are some prominent tools of Marketing new startups.

2. Decision-Making:
AI Chatbots provide decision making approach in various fields such as Health startups, finance areas, IT Sector, Hospitality, Customer Services areas by providing instant coding functionality of solving problems with best solutions.

The following areas where AI is used for decision making aspects:

- **HealthCare:** Nowadays AI is supporting aid in health checkups with diagnosis and its treatment recommendations. Health startups achieve better results in it. With the help of Chatbots, medical treatments, diseases awareness, diseases diagnosis is possible.
- **Finance Sector:** AI is backing up finance sector through Funding Advising, Fraud detections, Hackers solving, Loan EMI calculating, Interest rate calculators, Recent Investment options. These are necessary for any banking or financial related startups such as mutual fund agency, stock market agency, small finance banks etc. The common tools such as IBM Watson, Kensho, Zest AI, Upstart DataRobot helps in financial making decisions.
- **Hospitality:** AI in hospitality startups is used for customer satisfaction feedbacks, and reviews. From those feedbacks important changes could be made bringing in fostering growth. The commonly AI tools are Duetto, Revinate, Zingle, ALICE app to get data and feedbacks from customers. New fresh start requires customer insights and they need to provide customer services effectively.
- **Education Sector:** There are freshers who pursue jobs in education sector. They too require quick decision-making apps using AI such as Knewton, Google Classroom.

All these tools are used for assessment purposes.

- **Commerce and Retailing:** Commerce is generally buying and selling of goods and services. This is a common sector for startups to use AI as a decision-making tool. The tools used in Commerce and retailing are Shopify Magic where it helps in pricing and marketing decisions.
- **IT Sector:** Without any doubt, IT sector is backed by AI mostly using Copilot, Google Analytics, Darktrace, Intercom, Drift, are some of the widely used tools in AI for automation of work and decision making, Code Fixer, Tabnine are another important tool.

Advantages of using AI in startups:

1. **Automation of work**: Filtering data could be achieved through AI. Automation work such as customer data collection, recording, formatting, analyzing data are achieved through AI tools. This makes the paper work easier for new startups.
2. **Cost- friendly**: The business startups are absolutely cost- friendly. The cost is manageable. In recent times where freshers struggle to invests huge number of sums of rupees to start their businesses. It is available in few clicks of AI tools. AI tools help to achieve the business startup options with more affordable ways.
3. **Creative ideas**: Today AI helps to bring a creative idea to achieve the goals. Web designing, code developing, research and content writing, digital painting etc., are backed by AI support.
4. **Multi lingual**: The data available is in multiple languages. Customer gets the opportunity to fill the data or use the facilities of market by having varied language options to understand them in better way.

Some successful AI startups:

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Meesho, Curefit, Byjus, Ola, Zomato, UnAcademy, Uber.

Challenges of using AI in startups:

1. **Privacy issues:** New startup people may not be able to authenticate the process involved in AI applications. The work may become risky if it requires to share the data of customers or personnel.
2. **Hampers creativity among youngsters:** Youngsters' creativity ideas are stopped due to ready to use AI applications. This creates lack of bringing ideas. New generation are supposed to work in the environment with bringing new ideas and freshness in the environment, but due to AI, idea is simply taken from it and used. New imagination is hampered.
3. **High overall dependency:** AI creates high dependency on chatbot. It resolves many theoretical aspects. So, the dependency level is high.

LITERATURE REVIEW

Artificial Intelligence has emerged as a transformative force in the startup ecosystem by improving efficiency, innovation, and decision-making. Raisch, Sebastian and Krakowski, Sebastian (2021) explained that AI supports organizations through both automation and augmentation, enabling businesses to reduce manual tasks while enhancing human capabilities. This is especially useful for startups operating with limited resources.

According to Brynjolfsson, Erik, Li, Danielle, and Raymond, Lindsey (2025), generative AI increases productivity and improves work performance, making it beneficial for young entrepreneurs and college students starting new ventures. AI tools assist in content creation, marketing, and customer communication.

Kraus, Sascha et al. (2023) highlighted that digital technologies, including AI, help startups innovate their business models and remain competitive in changing markets. Similarly, Blank, Steve (2012) emphasized that startups grow successfully when they adopt modern tools and continuously test new ideas.

Bottom of Form

Objectives of research:

1. To explore various areas where AI is used by college-going entrepreneurs.

2. To analyze the benefits of AI in startups.

Research design:

Research Type: The study is descriptive and exploratory in nature. Both primary and secondary data have been used for the research. Primary data was collected through a structured questionnaire, while secondary data was obtained from journals, articles, and online sources.

Sampling method: Convenience sampling method was adopted for selecting 150 respondents from colleges in and around Thane region due to ease of access and availability of respondents.

Data Collection Tool: A structured questionnaire containing close-ended questions was used to collect responses.

Time period of the study: January 2026 to March 2026.

Limitations of the study:

1. Study limited to Thane region only.

2. Sample size restricted to 150 respondents

3. Responses based on personal opinions of students

4. Time constraints existed as data collection was limited to January 2026 to March 2026.

Respondents profile

Data were collected from 150 respondents from Colleges from Thane region.

Category	No of Respondents
Last Year Graduates	85
Master Students	35
Undergraduates	30
Total	**150**

Source: *Primary data collection*

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Objective No.1 To explore startup areas where college students use AI

Startup areas where college students use AI	No of respondents
Web designing	12%
Web developer	10%
Marketing	15%
HealthCare	05%
Youtuber	23%
E-Commerce retailer	13%
Financial Sector	22%
Total	**100%**

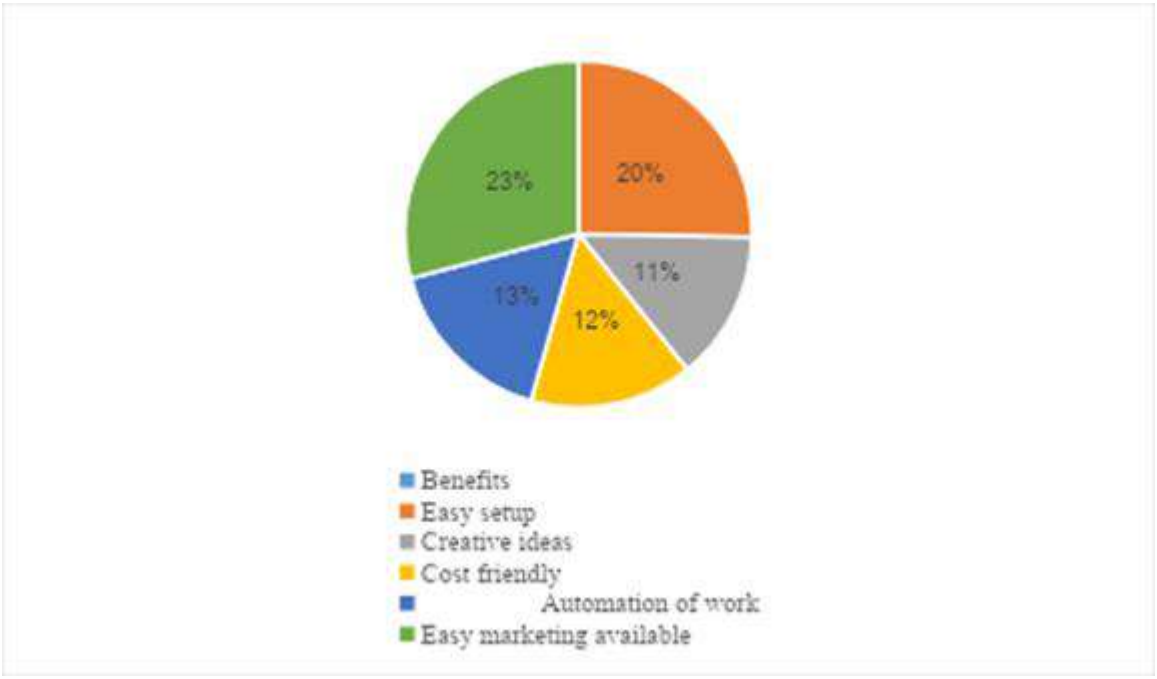
Source: *Primary data collection*

Objective No 2 To analyze the benefit of AI in startup guidance

Benefits	No of respondents
Easy setup	20%
Creative ideas	11%
Cost friendly	12%
Automation of work	13%
Easy marketing available	23%
Multilingual	12%
Competitiveness	9%
Total	**100%**

Source: *Primary data collection*

Data analysis:



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The data shows that the biggest benefit of using AI in startups is easy marketing availability (23%), which means most respondents feel AI helps in promoting products and services easily. The second most important benefit is easy setup (20%), indicating that AI makes it simpler to start and manage a business.

Other benefits include automation of work (13%), which reduces manual effort, and being cost-friendly (12%) and multilingual (12%), showing that AI helps save money and supports multiple languages.

Additionally, creative ideas (11%) suggest AI helps generate new business ideas, while competitiveness (9%) is the least selected benefit, meaning fewer respondents feel AI directly helps them compete in the market.

CONCLUSION

The study concludes that AI significantly supports startup development among college students by reducing operational complexity, lowering costs, and enhancing marketing effectiveness. AI adoption is particularly visible in content creation, e-commerce, and service-based ventures.

SUGGESTIONS

- Colleges should offer AI entrepreneurship workshops
- Students should learn ethical AI usage
- Government can support AI-based student startups
- Data privacy awareness should be increased.

Scope for Future Research

Further research can focus on long-term impact and risk management of AI in startups. Although AI proves to be very much crucial in the lives of fresh Entrepreneurs, but the challenges are somewhere risky and needs proper authentication and privacy. The research may further explore how far it is successful in any sector during the startup phase.

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THE ROLE AND IMPACT OF DIGITAL PAYMENTS ON SME'S BUSINESS

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ABSTRACT
The rapid growth of digital payment systems has changed how small businesses operate worldwide. Mobile wallets, online banking, and cashless transactions are replacing traditional cash systems. These changes bring new opportunities and challenges for small enterprises. This paper looks at how adopting digital payments impacts small business growth, with a focus on changes in sales, customer reach, and operational efficiency. It also examines barriers such as transaction fees, cybersecurity risks, and technological limitations that influence adoption.

Using a qualitative and analytical approach grounded in existing literature and market observations, the study finds that digital payments generally help business growth by speeding up transactions, improving customer convenience, and allowing access to broader markets. However, challenges related to costs, digital skills, and security concerns remain important. At the same time, it should be acknowledged that there are specific obstacles, preventing the effective functioning of digital payment systems in many developing countries. The paper concludes that while digital payments drive growth for small businesses in cashless economies, supportive policies, education, and secure infrastructure are needed to make the most of their advantages.

Keywords: *Digital payments, Business Growth, Cashless Economy, Transaction Efficiency, Cybersecurity, SME's.*

INTRODUCTION
The application of digital payments has become increasingly common nowadays and is a significant component of modern business activities. Digital payments include mobile payment options, internet banking services, and even QR code payments that ensure the quick execution of transactions. In this regard, digital payment allows eliminating the need for cash and streamlining the business processes.

The first and foremost role of digital payments for SMEs lies in providing more efficient financial transactions. By accepting digital payments, businesses will be able to conduct transactions at any time and from any place that provides internet access. Thus, such payments may help businesses in attracting a larger customer base and staying competitive in the constantly changing environment.

One more vital role of digital payments is better financial management that will be provided by the automatic registration of all transactions made. Consequently, the implementation of digital payments leads to reduced errors and saves time while providing information about income and expenditures for decision-making.

Overall, the impact of digital payments on SMEs is very high. In particular, the use of such payments increases transparency, builds the trust of customers and financial institutions, and enhances access to various financial services.

REVIEW OF LITERATURE

1.A Systematic Literature Review of Digital Payments
This paper conducts an exhaustive review of the research carried out all over the world about digital payment systems, which indicates that majority of the studies analyse their adoption process and usage patterns. Important themes in the study include infrastructure, trust, ease of use, and engagement by users. Moreover, quantitative surveys and structural equation modelling have been found to be the frequently used methods in these types of studies. **(Yash Chauhan, 2024)**

2.The Development of Digital Payments- Past, Present, and Future
In this paper, the development process of payments from a conventional to a digital form is discussed, showing the evolution of digital payments. Internet use, trust, age, and usefulness are mentioned as major determinants of digital payment acceptance. The literature review will help explain current trends of SMEs adopting digital payments, and also demonstrate areas that have attracted attention of researchers around the world. **(Ida Claudia Panetta, 2023)**

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3.Determinants of Digital Payment Adoption and Its Operational Effects on Retail SME's in India
This study examines factors influencing digital payment adoption among retail SMEs and investigates operational outcomes. It incorporates sociodemographic, psychological, and trust-related constructs to understand business performance outcomes. The paper finds evidence that technology perception influences revenue and efficiency improvements**. (Ms. Daniya Javed, 01-03-2025)**

4.Barriers to Digital Payment Adoption in MSME's
This paper examines the impact of functional and psychological barriers in adopting electronic payments by the MSME sector in Indonesia. The findings show that the perception of usage barriers, value barriers, risk barriers, traditional barriers, and image barriers have considerable effects on resistance to adopting electronic payments among small firms. It is important to note that the impact of psychological resistance on usage intention is critical. **(Anna Widayani, February 7, 2023)**

5.Digital Payment Adoption and Business Performance of Retail SME's
The current study is empirical evidence of the connection between usage of digital payments and performance of SMEs through operational efficiency. SMEs operating retail business whose operations involve adoption of digital payments have favourable performance results when there is increased digital financial literacy. **(Ms. Daniya Javed, Digital Payment Adoption and Business Performance of Retail SMEs: A Mediation–Moderation Analysis, 01-04-2025)**

6.Quantitative Impact Assessment of Digital Payment Solutions on Small Business Revenue
In this research, an examination of data collected from 1,200 SMEs is performed to explore the effects of digital payments on revenue generation. It has been found out that about half of all business transactions are carried out through digital means, which helps greatly enhance the profitability of a company. **(Iftekhar Ahmed, 29-12-2024)**

Research Gap
While many academics have demonstrated keen interests in carrying out research related to digital payments, various research gaps remain outstanding especially regarding the effect of digital payments on performance of small and medium enterprises. Firstly, most research done so far majorly focuses on the adoption of digital payments without giving attention to how they affect the performance of small and medium enterprises. Secondly, limited research has been carried out especially regarding performance of small and medium enterprises in rural areas and developing nations because of issues like insecurity and poor infrastructure. Lastly, researchers carry out research on this topic without considering factors such as customer behavior among others while evaluating the impact of digital payments on performance of SMEs. This depicts absence of any comprehensive theoretical framework that can be used in solving this research problem. Finally, no research has ever been carried out in an attempt to solve challenges faced when using technology to increase sales.

Research Objectives

1. **To investigate the influence of digital payments in the functioning of SMEs.**
The research objective emphasizes the investigation into the use of digital payments in day-to-day business transactions. This will help ascertain their significance in streamlining the process of transactions.

2. **For the purpose of finding the advantages of digital payment methods including efficiency, convenience, and savings on fees.**
This focuses on the advantages offered to SMEs by adopting digital payments.

3. **To measure the effect of digital payment methods on customer satisfaction and business growth.**
It measures how digital payments increase the satisfaction level and loyalty of customers. It also illustrates their importance for business growth and expansion.

4. **To assess the obstacles that are encountered by small businesses when adopting digital payment systems.**
This goal highlights problems such as security threats, lack of knowledge, or technical problems.

RESEARCH HYPOTHESIS

Impact on Sales Growth

- **$H0_1$:** Digital payment adoption has no significant impact on the sales growth of SMEs.

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- **$H1_1$:** Digital payment adoption has a significant positive impact on the sales growth of SMEs. Operational Efficiency

Operational Efficiency

- **$H0_2$:** Digital payments do not significantly improve operational efficiency in SMEs.
- **$H1_2$:** Digital payments significantly improve operational efficiency in SMEs. Adoption Barriers Impact

Adoption Barriers Impact

- **$H0_3$:** Barriers such as transaction costs, security concerns, and lack of digital skills do not significantly affect the adoption of digital payments by SMEs.
- **$H1_3$:** Barriers such as transaction costs, security concerns, and lack of digital skills significantly affect the adoption of digital payments by SMEs.

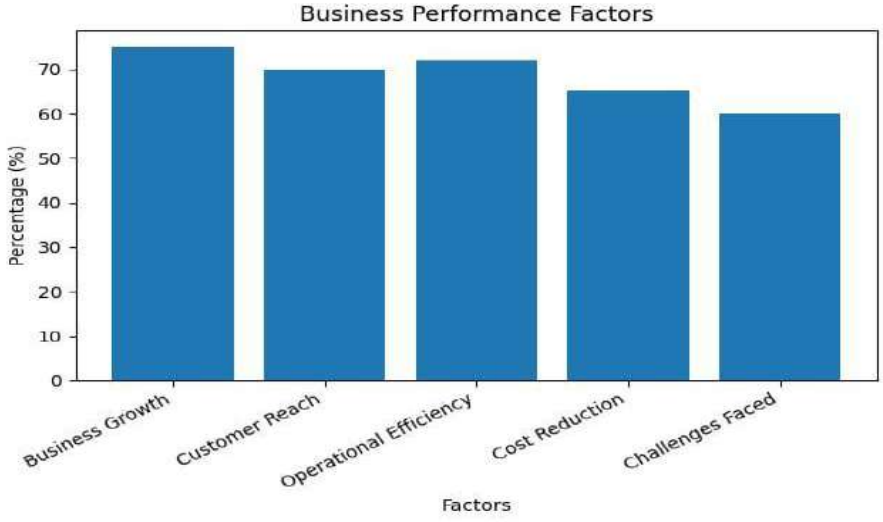
RESEARCH METHODOLOGY

For the research investigating the roles and impacts of digital business on SMEs, both quantitative and qualitative research methods have been utilized. This study has an analytical and descriptive nature since it focuses on investigating how digitalization affects the performance and growth of businesses. Data for this investigation was collected in two forms: primary and secondary. Primary data was collected from 112 SMEs' owners and managers using a questionnaire with closed-ended Likert scale questions. Due to limited time availability and difficulties related to accessing respondents, convenience sampling was adopted. In addition, the secondary form of data was collected from credible and reliable sources like scholarly articles, scientific papers, and online databases. Primary data collected was analyzed statistically with the help of percentages, means, and correlations to find out any connections that may exist between digital business adoption and SMEs' performance. On the other hand, secondary data was reviewed literarily and through thematic analysis to extract useful results from it. For this study, the independent variable is digital business adoption, while the dependent variables include performance, growth, and efficiency. Ethical considerations have also been made to ensure that the data obtained from respondents remains confidential and is only used academically.

Data Analysis and Interpretation

According to the graph below, it can be observed that there are two factors with the highest positive impact on business activities – growth (75%) and efficiency (72%), implying that digital payments make SMEs more efficient and improve their performance significantly. In addition, customer reach (70%) is another factor with high positive impact.

In turn, it should be mentioned that reducing costs (65%) is another factor with medium impact; therefore, one may conclude that using digital payments contributes to saving money, although it is not that effective as growth and efficiency. The problem of encountered challenges (60%) is worth mentioning as well.



"Analysis of Consumer Behaviour and Attitudes Toward Digital Payments in SMEs"

Variable	Category	Percentage (%)
Frequency of Shopping from SMEs	**Daily**	**16%**

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	Weekly	**21%**
	Occasionally	**31%**
	Rarely	**31%**
Preference for Digital Payment Options	**Strongly Agree**	**29%**
	Agree	**44%**
	Neutral	**22%**
	Disagree	**3%**
	Strongly Disagree	**1%**
Improvements in Digital Payment Systems	**Better Security**	**40%**
	Faster Transactions	**24%**
	Fewer Payment Failures	**17%**
	Better Customer Support	**15%**
	Easier Interface	**4%**
Digital Payments are Faster	**Strongly Agree**	**32%**
	Agree	**53%**
	Neutral	**9%**
	Disagree	**2%**
	Strongly Disagree	**3%**

Based on the data provided, there is strong consumer approval towards digital payments, while SMEs receive medium consumer interaction. Most participants (62%) buy products irregularly, implying difficulties for SMEs in ensuring regular contact with customers. However, there is considerable consumer approval towards companies providing digital payment services, as 73% of consumers approve the statement positively. It implies that the provision of digital payment facilities is one of the essential aspects of business success in the current market environment. Moreover, 85% of respondents confirm the advantage of fast transactions associated with digital payments. Nevertheless, some risks still exist, mainly related to cybersecurity (40%) and speed problems. Therefore, although digital payments contribute greatly to customer satisfaction and improve SME engagement, it is vital to resolve issues associated with security and reliability.

FINDING

Based on the analysis of secondary data and existing literature, the following key findings have emerged regarding the impact of Digital Payments system on small businesses:

- **Positive impact on Sales and Customer Experience**

Digital transactions are smoother and have reduced friction. The result is that SMEs can provide services to their customers in an easier and faster way, thereby increasing customer satisfaction and experience.

- **Increased Adoption of Digital payments**

The increased use of electronic payment by SMEs is due to convenience, speed, and the increasing acceptance of non-cash means by customers. This allows firms to remain competitive, broaden their clientele, and become part of the current financial systems.

- **Improved Financial Management**

In digital transactions, businesses have instant access to transaction information and automated transaction monitoring systems. This way, SMEs will be able to keep track of their money flow, budget planning is better done, and good decisions are made. Efficiency and precision in financial transactions help avoid mistakes.

LIMITATIONS

While this study provides valuable insights into the impact of digital payment system on small businesses, it is important to acknowledge certain limitations:

1.Limited Geographic Scope

This research is confined to a particular geographical region that might not sufficiently capture the varied nature of SMEs in other geographical locations. It is for this reason that the results obtained from this study might lack applicability in other geographical regions.

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2.Rapid Technological Changes
Rapid developments in technology in the field of digital payments could render the existing tools and processes outdated and reduce the value of the study. With the adoption of new technologies by SMEs in the coming years, the results obtained may become outdated and inaccurate.

3.Variability Among Small Business
The differences in the sizes, industries, and levels of digital preparedness of small businesses can affect the adoption and usage of digital payment methods inconsistently. This inconsistency will hinder generalization of the results.

CONCLUSION

Conclusively, digital payments have been instrumental in determining how small medium enterprises conduct their business activities. First, the introduction of digital payments has transformed the process of conducting business by providing a fast and secure platform through which transactions can be done. Secondly, digital payments have contributed greatly to the easy flow of business operations by reducing the use of cash in conducting business operations.

Digital payments have made it easy for small medium enterprises to maintain financial records that are both accurate and transparent. Financial record maintenance is instrumental in facilitating decision-making in making financial transactions since errors will be minimal. Moreover, accurate maintenance of financial records facilitates the establishment of credibility during business operations with different parties.

Finally, it becomes easy for organizations to access funds, such as loans, from financial institutions since digital payments provide a chance to showcase one's financial standing. Thus, obtaining loans will become much easier.

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A STUDY ON ADOPTION OF DIGITAL TECHNOLOGIES FOR SUSTAINABLE PRACTICES AMONG STUDENTS WITH SPECIAL REFERENCE TO KALYAN TALUKA

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ABSTRACT
The increasing use of digital technology in education has been an important factor in sustainable practices, particularly in the reduction of paper use and the promotion of resource efficiency. The study investigates students' knowledge and use of digital technology and its contribution to sustainable behaviors. A descriptive study was carried out to collect primary data from 100 students using a structured questionnaire. The study is primarily concerned with digital tools like cloud storage, e-learning platforms and paperless documentation systems. The results indicate that students use digital tools for academic purposes and have a moderate to high level of awareness. The application of these technologies has improved the efficiency of the learning processes and less paper has been used . Still, problems like internet access and a penchant for traditional methods remain. The study emphasizes the importance of promoting digital adoption for sustainability and suggests that educational institutions should promote students' digital tool use for the development of ecologically conscious behaviors.

Keywords: *Digital Technologies, Sustainable Practices, Students, E-learning, Paperless Systems, Awareness*

INTRODUCTION
The rapid growth of digital technologies has caused a huge transformation in the education sector, making traditional teaching methods more flexible and effective. Through tools such as digital documentation, cloud storage and e-learning platforms, students have access to, can exchange and save information without relying substantially on physical resources. This is a particularly interesting change in the space of sustainability, where global concerns have been raised about reducing paper consumption and saving natural resources.

Students are a key player in the uptake of these technologies, as their consumption patterns directly influence the effectiveness of sustainable practices in educational environments.

The increasing number of digital tools is making it easier for students to engage in paperless learning, online collaboration and digital submissions. However, students' awareness and actual use of these devices may differ according to the accessibility and convenience of use, as well as individual preferences.

The project aims to explore students' use of digital tools and how they contribute to sustainable practices. The study provides insight into the role of digital technologies in enhancing ecologically conscious behaviour in education through the analysis of awareness and usage patterns.

REVIEW OF LITERATURE
Recent studies have highlighted the increasing importance of digital technologies in education and the role of sustainability.

The move to digital learning has reduced the reliance on printed resources and increased accessibility (Bond et al., 2021).

Similarly, the OECD (2021) argued that digital tools, such as cloud platforms and e-books, enable effective learning with fewer resources.

George et al. (2021) described how digital innovation contributes to sustainability and how digital systems can minimize environmental impact and maximize resource use.

Digital learning solutions facilitate paperless procedures and enhance learning efficiency, as stated by the World Bank (2022).

Moreover, through digital connectivity and reduced reliance on physical artifacts, technology used in education may promote sustainability, according to UNESCO (2023).

Even though they depend on the users' competence, the digital technologies are crucial for sustainability based on the literature sources.

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OBJECTIVES

- To assess the level of awareness of digital technologies among students.
- To analyze the usage patterns of digital technologies for academic purposes.

METHODOLOGY

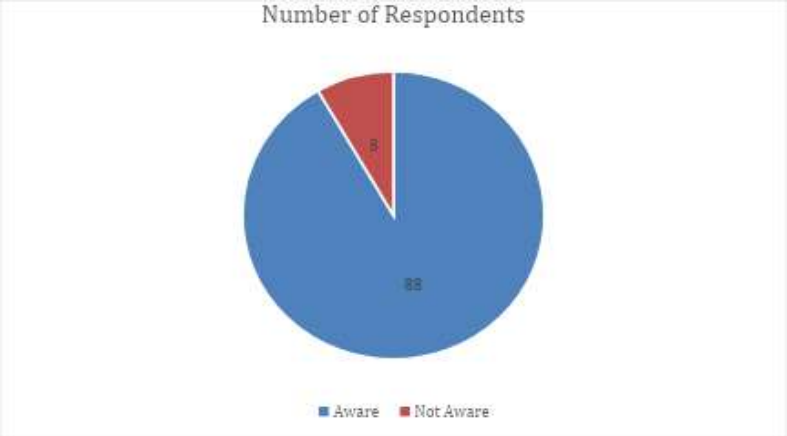
Study Area

The current study focuses on how students use digital tools for sustainable academic practices. Students from various educational levels provided the data.

Survey Method

Google Forms was employed in conducting a structured survey among 96 respondents. The students were asked regarding their familiarity with the use of digital resources and the hindrances that they face while using such digital resources. Various types of charts like pie, bar, and table have been used for organizing the collected data.

Pie Chart 1: Awareness of Digital Technologies

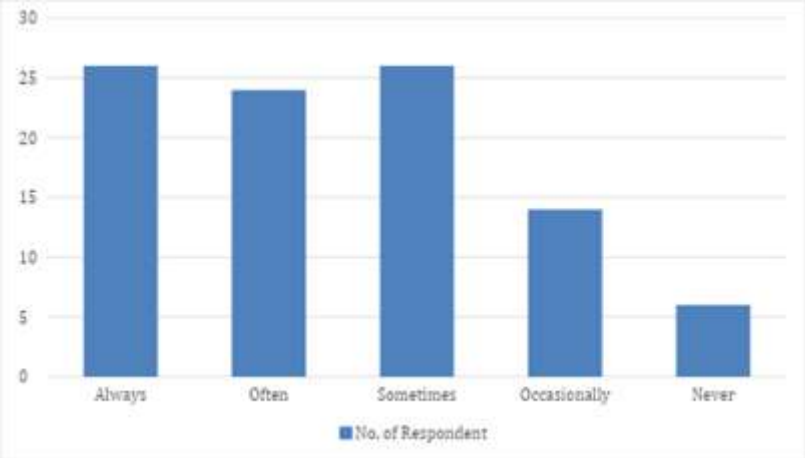


From above pie chart, it is observed that **91.7% are aware** of digital technologies used for sustainable practices, whereas only **8.3% are not aware**. This shows that awareness among students is significantly high.

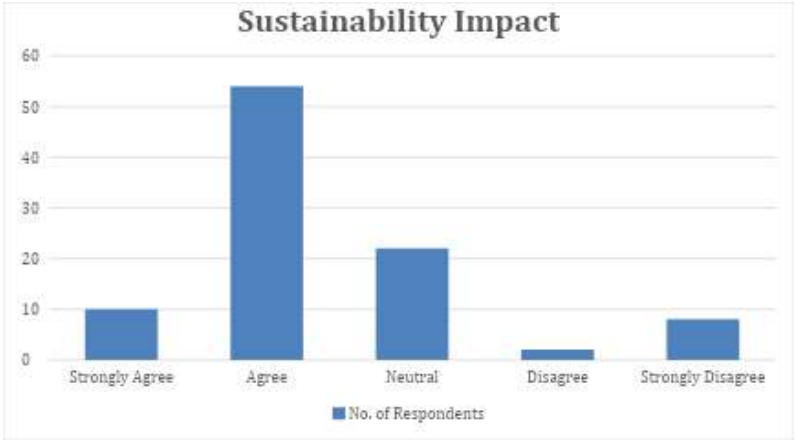
Bar Graph 1: Frequency of Usage

From Bar graph 1, it is clearly understood that 26 respondents (27.1%) always use, 24 respondents (25%) often use, and 26 respondents (27.1%) sometimes use digital technologies. Only a small proportion rarely or never use these tools. This indicates that the majority of students actively engage with digital technologies.

Graph 2: Sustainability Impact



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From Graph 2, it is evaluated that **27 respondents (56.3%) agree** and **5 respondents (10.4%) strongly agree** that digital technologies promote sustainable practices. Only a small percentage disagrees. This shows a positive perception among students.

Table 4: Preference for Digital Materials

Sr. No	Preference	No. of Respondents
1	Yes	62
2	Maybe	26
3	No	8
	Total	96

Source: *Primary Data*

From Table 4, it is inferred that 62 respondents (64.6%) prefer digital materials, while only a few prefer printed materials. This shows a clear shift toward digital learning.

Table 5: Barriers to Adoption

Sr. No	Barrier	No. of Respondents
1	Internet Issues	28
2	Lack of Awareness	10
3	Cost	9
	Total	48

Source: *Primary Data*

From Table 5, it is observed that internet issues (58.3%) are the major barrier, followed by lack of awareness and cost factors. This indicates that infrastructure plays a crucial role in adoption.

FINDINGS

- Most of the learners know that digital technologies can be applied to sustainable activities.
- Digital technology is extensively used by the students for educational purposes.
- It is the opinion of most respondents that digital technologies promote sustainability.
- Learners prefer digital materials to paper-based ones.
- Internet connectivity is the main impediment to its implementation.
- There are learners who rely on traditional methods.
- The level of implementation is quite high among the learners.

SUGGESTIONS

- Develop robust online infrastructure in educational facilities.
- Launch campaigns to create awareness on digital sustainability.
- Support educational activities that do not involve the use of paper.
- Provide students with affordable digital tools.
- Facilitate the use of online learning materials.

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- Train the students in efficient use of digital technology.

CONCLUSION

Students use devices a lot and they really help to encourage sustainable practices. We can see that students are really open to learning because they know a lot about it and they use it all the time. Students like resources because they are better and they do not use as much paper.. There are still some problems that make it hard for students to use digital devices like not being able to get on the internet. Digital technology can really help make education more sustainable if we can just get the internet to work better and get more people to understand how it works. The study shows that we need to keep working on getting students to use devices if we want a sustainable future. Digital devices are very important, for a future and digital learning is a big part of that.

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COST OPTIMIZATION IN BANKING OPERATIONS THROUGH MOBILE BANKING: A STUDY OF ICICI BANK WITH SPECIAL REFERENCE OF THANE DISTRICT

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ABSTRACT
This study examines the impact of mobile banking on cost optimization and operational efficiency at ICICI Bank in Thane district. With the shift from traditional branch-based banking to a digital-first model, the research focuses on how mobile banking reduces transaction costs and enhances banking performance. Primary data was collected from 330 respondents using a structured questionnaire, supported by secondary data from reports and literature.

The findings reveal that a significant majority of customers perceive mobile banking as cost-effective and efficient. Statistical analysis using the Chi-square test and Z-test confirms that mobile banking significantly reduces transaction costs and improves operational efficiency. The study concludes that digital banking platforms, particularly mobile applications, play a vital role in reducing operational expenses, minimizing branch dependency, and improving customer convenience.

Overall, mobile banking emerges as a strategic tool for banks to achieve higher efficiency, better cost management, and improved financial performance in a competitive banking environment.

Keywords: *Mobile Banking, Operational Cost Reduction, Digital Banking, Cost Optimization, Transaction Cost, Operational Efficiency, ICICI Bank, Digital Transformation, Branch Reduction, Banking Technology.*

1. INTRODUCTION

The core driving the transformations in the traditional banking model to digital-first is the immediate need for optimizing the operational costs. In this new financial environment, so to speak, from ICICI Bank which historically has a very both a brick-and-mortar intensive operations and process are moving towards the mobile based ecosystem, thereby improving productivity as well as cutting overhead costs. Mobile banking is thus regarded as channel migration in the right direction as it allows normal transactions (e.g., a fund transfer, bill payment, balance inquiry) to migrate from expensive brick-and-mortar locations to lower-cost online devices

The private sector leading bank like the ICICI Bank, this change is as much about helping customers conveniently, but also in terms of its entire banking philosophy. The physical branch has a large capital and operational costs which includes rent, utilities and staff expense. On the contrary, a mobile transaction gears only a part of that branch-based transaction-nature promising and this begets bigger Net Interest Margins (NIM) for the bank-whereas more interested coverage and better operating capabilities ensue as it does

Thane District is a major urban and semi-urban hub in Maharashtra, serves as an ideal case study for this transition. With its high mobile penetration and a mix of tech-savvy urban professionals and developing rural areas, Thane reflects the dual challenge of digital adoption and cost management.

Comparative Data and Financial Metrics (2025-2026)

The following data highlights the financial impact and operational shift towards digital and mobile banking at ICICI Bank as of **March 2026**.

1. Digital Adoption and Transactional Growth

a) The Digital Dominanc: With mobile banking being the primary driver, leading private banks have seen more than 90% of transactions made through digital channels now.

b) CASA Ratio: As on March 2026, ICICI Bank continues to have a strong base of low-cost deposits with its CASA (Current Account Savings Account) ratio at around 38.6% which is aided by the digital onboard.

c) App Services: Since the **flagship iMobile** Pay app provides a slew of **over 400 services**, it is pretty much like a 'branch in the pocket' as well as diminishes the need to visit one.

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2. Cost Differential: Mobile vs. Branch Banking

The table below illustrates the cost-saving potential through fee waivers on digital channels compared to branch-based service charges at ICICI Bank:

Service	Mobile/Digital Channel Charge	Branch-Based Charge
NEFT/RTGS	**₹0 (Free)**	₹2.25 to ₹45 (depending on amount)
IMPS	₹2.50 to ₹15 (size-dependent)	Higher administrative overhead
Statement Printing	**₹0 (Download free)**	₹100 (Physical print at branch)
Cash Transactions	N/A	₹150 (after 3 free monthly limits)
UPI Payments	**₹0 (Free)**	N/A (Digital only)

Key Performance Indicators (Q4 FY26)

Balance sheet from the last reported quarter (reported 18,th April 2026) speaks volumes about ICICI banks digital-first cost efficient strategy its clear that CEO Sandeep Bakshi is not the man of actions but a man of words.

- **Net Profit:** Up 8% YoY to ₹13,701 crore.
- **Net Interest Margin (NIM):** Improved to **0.37%**, demonstrating that digital monitoring and automated collections enhance asset quality.
- **Made a continued improvement in asset quality, and hence Net NPA improved to 0.37%, proving that digital monitoring and automated collections work:**

Thane District

- **Network Utilisation:** As a mid-box retail area with space rationalisation in the range of 1,000–5,000 sq. ft.) Consumers are increasingly turning to advisory services rather than transactional context.
- **iMobile app:** ICICI has been using Mera iMobile app in Thane's semi-urban and rural pockets, to ease the barrier of digital entry and minimize requirement of rural branch infrastructure.

2. REVIEW OF LITERATURES'

1. Abiona, S. T. (2025) - Digital Banking & Reduction of Costs.

Abiona analyses the opportunity of digital banking technology to promote efficiency in operations and cut costs through automation of operations, workflow, and decreased transaction and administrative costs. This research points out the strategic and technological aspects that lead to the savings of the costs in banks.

2. Priya, A. R. & Krishnaraj, R. (2015) -Mobile Banking and Operational Efficiency.

This paper examines the effect of the mobile banking technology on operational efficiency in Indian banks, and how mobile services help lower the cost of operation and maximize the profitability through improvement in the speed of transactions and decreasing the need to handle at least a few manuals.

3. Muthii, W. W. (2019) Mobile Banking and Cost Efficiency (Kenya).

This thesis explores how mobile banking impacts on cost efficiency in commercial banks in Kenya and indicates that there is a positive relationship between mobile banking and cost efficiency as well as bank performance, which reduces transaction overhead.

4. Kigen, I. (2011) – Mobile Banking and Costs of Transactions.

This research concludes that the implementation of mobile banking is, on a large scale, lowering the cost of transactions of the microfinance institutions by making comparisons between the pre and post mobile banking transaction costs.

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5. Saroy, R., Jain, P., Awasthy, S., and Dhal, S. C. (2023) Digital Payments Adoption and Bank Efficiency.

Based on the analysis of how digital payment technologies affect the efficiency of Indian banks, the study employed data envelopment analysis to establish that the adoption of digital technology is linked to improved cost efficiency since it minimizes input usage and operations friction.

6. International Journal of Scientific Research and Engineering Development (2025) - Digital Banking & Cost.

This review also emphasises that a two-thirds (20-40) reduction in the operating cost may be achieved by automation and the removal of redundant workflows which is directly impactful on the cost to income ratios of banks, through digital banking.

7. UPI Adoption Literature Review.

One literature review on Unified Payments Interface (UPI) puts an emphasis on the fact that the mobile based payment systems lower transaction and dealing costs, as well as, increasing the adoption of digital transactions.

8. Abbasi and Weigand (2017) - Digital Financial Services and Performance.

Despite having a wider focus, this review of the literature demonstrates that the digital financial services (namely, mobile banking) are positively related to the performance and operational results of firms, indicating a combination of indirect cost advantages to the banks that have adopted digital offerings.

Research Gap: No study examines how mobile banking drives cost optimization specifically at ICICI Bank within a geographically and demographically defined district like Thane, from the combined lens of operational data and customer perception.

3. OBJECTIVES OF STUDY

Objective 1: To Measure the Decreased Cost of Processing Transactions as a result of the adoption of Mobile Banking of ICICI Banks in Thane district.

Objective 2: To Measure Operational Efficiency gains attained with the help of digital process transformation of ICICI Banks in Thane district.

4. HYPOTHESES

- **H_{01} (Null Hypothesis):** In ICICI Bank, mobile banking does not make a big difference in costs of transactions and service delivery of ICICI Banks in Thane district.
- **H_{11} (Alternative Hypothesis):** Mobile banking has saved much on the bank, ICICI Bank on the cost of transactions and services delivery.
- **H_{02} (Null Hypothesis):** The operational efficiency and cost optimization in ICICI Bank is not affected in any major way by mobile banking.
- **H_{12} (Alternative Hypothesis):** The operational efficiency and cost optimization of ICICI Bank is positively impacted by mobile banking.

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5. RESEARCH METHODOLOGY

1. Research Design	The study is **descriptive and analytical in nature**
2. Sources of Data	**Primary Data:** Collected through a **structured questionnaire** administered to ICICI Bank customers using mobile banking services **Secondary Data:** Collected from ICICI Bank annual reports, RBI publications, research articles, journals, and official websites.
3. Sample Size	**230 respondents** who are customers of ICICI Bank and users of mobile banking services.
4. Sampling Method	**Convenience sampling method**
5. Tools for Data Collection	• Structured questionnaire • Percentage analysis • Tables and charts for interpretation
6. Period of Study	The academic year **2024–25**
7. Limitations of the Study	• The study is limited to 330**respondents only**. • Findings are based on **respondent perception**, which may vary. • Time and resource constraints may affect the depth of analysis.

6. DATA ANALYSIS AND INTERPRETATION

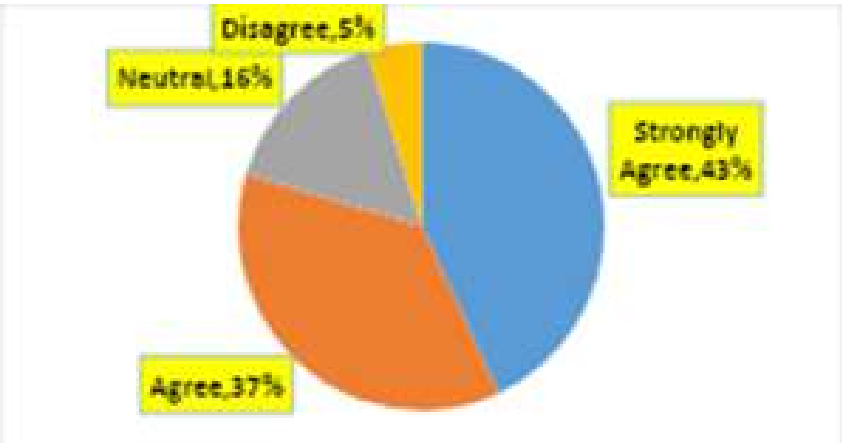
Table 1: Use of Mobile Banking by Respondents

Response	No. of Respondents	Percentage
Yes	330	100%
No	0	0%
Total	**330**	**100%**

Interpretation:
All **330 respondents** use mobile banking services of ICICI Bank, indicating complete digital adoption among the sample.

Table 2: Reduction in Transaction Cost through Mobile Banking

Opinion	Respondents	Percentage
Strongly Agree	141	42.72%
Agree	121	36.67%
Neutral	52	15.75%
Disagree	16	48.48%
Strongly Disagree	0	0%
Total	330	**100%**

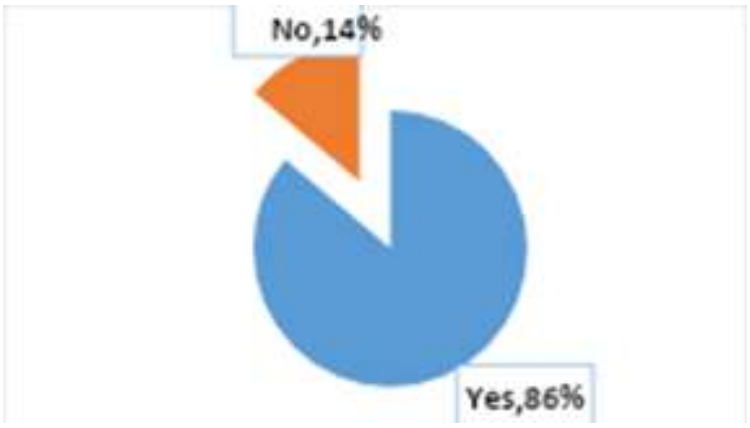


Interpretation:
A total of **79.39% respondents agree or strongly agree** that mobile banking has reduced transaction and service delivery costs, supporting Objective 1.

Table 3: Mobile Banking Reduces Need for Branch Visits

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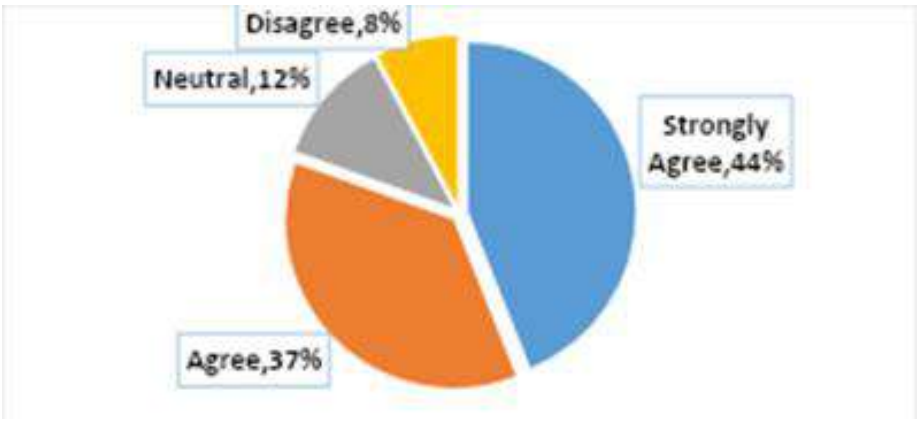
Response	Respondents	Percentage
Yes	284	86.08%
No	46	13.92%
Total	**330**	**100%**



Interpretation:
Total **86.08%** respondents believe mobile banking reduces branch visits, leading to lower operational costs for ICICI Bank.

Table 4: Impact of Mobile Banking on Operational Efficiency

Opinion	Respondents	Percentage
Strongly Agree	1145	43.93%
Agree	121	36.36%
Neutral	26	11.74%
Disagree	18	7.87%
Strongly Disagree	0	0%
Total	**330**	**100%**

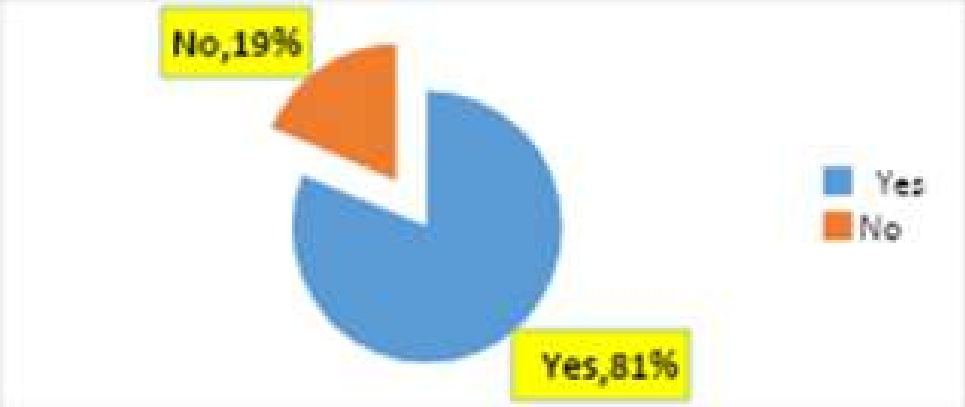


Interpretation:
About **80.29% respondents** agree that mobile banking improves operational efficiency, supporting Objective 2.

Table 5: Mobile Banking Helps in Cost Optimisation

Response	Respondents	Percentage
Yes	267	80.90%
No	63	19.10%
Total	**330**	**100%**

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Interpretation:
A large proportion of respondents **(81.30%) feel that mobile banking helps ICICI** Bank optimise costs by reducing manpower, paperwork, and infrastructure expenses.

Summary of Findings

- Mobile banking significantly reduces transaction and service delivery costs.
- Operational efficiency has improved due to automation and reduced branch dependency.
- Majority of respondents support the positive role of mobile banking in cost optimization at ICICI Bank.

7. HYPOTHESIS TESTING

I'll apply the most suitable statistical hypothesis tests based on your data and hypotheses.

Hypothesis Testing — Selection & Application
Based on your data type (categorical/survey responses, proportions, n=330), the two most appropriate tests are:

For H_1 (Transaction Cost) — Chi-Square Goodness of Fit Test on Table 2 (Likert scale responses) **For H_2 (Operational Efficiency) — One-Sample Z-Test for Proportion** on Tables 4 & 5 (Yes/No responses)

Here are the complete calculations and results:

H_{01} Test — Chi-Square Goodness of Fit (Table 2)

Logic: If mobile banking had no effect, responses would be equally distributed across all 5 categories (66 each). Chi-square tests whether observed distribution significantly differs from equal distribution.

Opinion	Observed (O)	Expected (E)	$(O-E)^2 / E$
Strongly Agree	141	66	85.23
Agree	121	66	45.83
Neutral	52	66	2.97
Disagree	16	66	37.88
Strongly Disagree	0	66	66.00
Total	**330**	**330**	**χ^2 = 237.91**

- Degrees of freedom = 5 − 1 = **4**
- Critical value at $\alpha = 0.05$ = **9.488**
- Calculated χ^2 = **237.91 >> 9.488**
- **Decision: Reject H_{01}** — Mobile banking significantly reduces transaction costs.

H_{02} Test — One-Sample Z-Test for Proportion (Table 5)

Logic: Tests whether the observed proportion (80.90%) agreeing that mobile banking helps cost optimization is significantly greater than 50% (the neutral/no-effect benchmark).

- Observed proportion p = 267/330 = **0.809**
- Null hypothesis proportion p_0 = **0.50**

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- Formula: $Z = (p - p_0) / \sqrt{(p_0(1-p_0)/n)}$
- $Z = (0.809 - 0.50) / \sqrt{(0.50 \times 0.50 / 330)}$
- $Z = 0.309 / 0.02753 =$ **Z = 11.22**
- Critical value at $\alpha = 0.05$ (one-tail) = **1.645**
- **Decision: Reject H_{02}** — Mobile banking significantly and positively impacts operational efficiency.

Final Summary of Hypothesis Testing

Hypothesis	Test Applied	Test Value	Critical Value	Result	
H_{01} — **No significant reduction in transaction cost**	Chi-Square Goodness of Fit	$\chi^2 = 237.91$	9.488 (d f=4, α=0.05)	H_{01} **Rejected**	**H1 is Accepted**
H_{02} — **No significant impact on operational efficiency**	One-Sample Z-Test for Proportion	Z = 11.22	1.645 (α=0.05)	H_02**Rejected**	**H1 is Accepted**

Conclusion: Both null hypotheses are rejected at the 5% significance level. The data provides strong statistical evidence that mobile banking at ICICI Bank, Thane District, has significantly reduced transaction costs and improved operational efficiency — fully supporting both alternative hypotheses H_{11} and H_{12}.

8. FINDINGS OF THE STUDY

The data strongly indicates that mobile banking has transformed cost structures and efficiency:

- A full **100% of respondents use mobile banking**, showing complete digital adoption among the sample.
- **79.39% of respondents** agree that mobile banking reduces transaction and service delivery costs.
- **86.08% believe** mobile banking reduces the need for branch visits, lowering operational burden.
- Around **80.29% agree** that mobile banking improves operational efficiency through automation.
- **80.90% of respondents** confirm that mobile banking helps in overall cost optimisation.
- Statistical tests reinforce these perceptions:

❖ Chi-square test shows a **significant reduction in transaction costs**.

❖ Z-test confirms a **strong positive impact on operational efficiency**.

- **Secondary data supports this trend:**

❖ Over **90% of transactions are digital**.

❖ Strong **CASA ratio (38.6%)** reflects low-cost deposit growth via digital channels.

❖ Services like **iMobile Pay** act as a "branch in the pocket," reducing infrastructure dependency.

9. CONCLUSIONS

The study clearly establishes that mobile banking has become a critical driver of cost optimisation and operational efficiency for ICICI Bank in Thane district.

The shift from branch-based banking to digital platforms has:

- Reduced transaction and servicing costs
- Minimized reliance on physical infrastructure
- Improved service speed and customer convenience
- Enhanced profitability through better cost management

Both hypotheses testing and customer perception strongly confirm that mobile banking is not just a convenience tool but a **strategic financial and operational asset** for the bank.

10. SUGGESTIONS

To further strengthen digital banking benefits, the following steps are recommended:

a) Enhance Digital Literacy

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- Conduct awareness programs in semi-urban and rural areas of Thane.
- Provide multilingual app interfaces and tutorials.

b) Strengthen Cybersecurity
- Invest in advanced fraud detection systems.
- Increase customer awareness about digital safety practices.

c) Improve App Functionality
- Continuously upgrade **iMobile Pay** with simpler UI/UX.
- Introduce AI-based customer support and personalization.

d) Expand Digital Infrastructure
- Promote mobile banking in low-connectivity areas.
- Collaborate with telecom providers for better network access.

e) Optimize Branch Role
- Convert branches into advisory and relationship centers rather than transaction hubs.
- Reduce redundant operational costs through branch rationalisation.

f) Incentivize Digital Usage
- Offer cashback, fee waivers, or reward programs for digital transactions.
- Encourage migration from branch to mobile channels.

10. Limitations of the Study

- The study is limited to **330 respondents**, which may not fully represent the entire Thane district.
- **Convenience sampling** may introduce bias and affect generalizability.
- Data is based on **customer perception**, which may not always reflect actual financial metrics.
- The study focuses only on **one bank**, limiting cross-bank comparison.
- Time constraints restricted deeper analysis of long-term financial impacts.
- Minor inconsistencies in data reporting (e.g., table values) may affect precision.

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IMPACT OF GEOPOLITICAL CONFLICTS ON LPG SUPPLY AND COST OF LIVING IN INDIA

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ABSTRACT
Geopolitical Conflicts have emerged as a significant source of economic instability, particularly for emerging economies like India that are highly dependent on imported energy resources. The ongoing tensions between the United States and Iran have disrupted global energy markets, leading to fluctuations in fuel prices and supply chains. This study examines the impact of such conflicts on LPG (Liquefied Petroleum Gas) supply and its effect on the cost of living in India. The research is based on secondary data collected from government reports, economic surveys, and recent trends in crude oil prices, LPG prices, and consumer price indicators. It analyses how disruptions in global energy supply influence LPG availability and pricing, which in turn affects household expenditure and overall living costs. The findings indicate that rising LPG prices and supply constraints significantly increase the cost of living by raising daily household expenses and reducing purchasing power. The study highlights India's vulnerability due to its dependence on energy imports and emphasizes the need for policy measures to ensure energy security and price stability. Overall, the research provides a practical perspective on the linkage between geopolitical conflicts, energy supply and household economic conditions in India.

Keywords: *Geopolitical Conflict, LPG Supply, Cost of Living, Energy Prices, Household Expenditure, Energy Security, Indian Economy.*

1. INTRODUCTION
Geopolitical conflicts have increasingly become a major source of economic uncertainty in the global economy. Conflicts between nations, particularly in in strategically important regions, often disrupt international trade, financial markets, and energy supply chains. The ongoing tensions between the United States and Iran have intensified instability in the Middle East, a region that plays a crucial role in the global supply of crude oil and natural gas. Such disruptions have led to fluctuations in energy prices, affecting economies that are heavily dependent on imports.

India, as a rapidly growing emerging economy, relies significantly on imported energy resources to meet its domestic needs. A large proportion of crude oil and liquefied petroleum gas (LPG) is sourced from the Middle East, making the country highly vulnerable to geopolitical disturbances in this region. Any disruption in supply routes, particularly through key transit points such as the Strait of Hormuz, can result in increased fuel prices and supply shortages.

LPG holds special importance in India as it is widely used for household cooking as well as by small businesses and commercial establishments. Therefore, fluctuations in LPG supply and prices have a direct impact on the daily lives of people. An increase in LPG prices leads to higher household expenditure, reducing disposable income and increasing financial pressure on families. The concept of cost of living refers to the amount of money required to maintain a certain standard of living. It is influenced by the prices of essential goods and services including food, fuel and transportation. Since energy costs play a crucial role in determining overall expenses, any rise in LPG prices due to geopolitical conflicts can significantly increase the cost of living.

This study aims to examine the impact of geopolitical conflicts on LPG supply and its effect on the cost of living in India. By focusing on LPG as a key variable, the research provides a practical perspective on how global events influence economic conditions at the household level. The study also highlights the need for policy measures to ensure energy security and reduce the vulnerability of the Indian economy to external shocks.

2. LITERATURE REVIEW
A study by Dr. Revannath S. Navale (2026) titled *"Impact of the Iran-Israel Conflict on the Indian Economy"* found that geopolitical tensions primarily affect India through rising oil prices, supply chain disruptions, inflationary pressures, and currency depreciation. The study emphasizes that energy price shocks act as the main transmission channel through which conflicts influence macroeconomic conditions.

Similarly, According to Dr. S. Vijaykumar (2026), *"Impact of US and Israel War with Iran on Global Economy with Special Reference to India",* highlights that disruptions in key trade routes such as the Strait of Hormuz significantly affect oil supply, leading to increased fuel prices and inflation. The study also notes that

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conflicts create uncertainty in global markets and increase the economic vulnerability of energy-importing countries like India.

Earlier research by Dr. G. Yoganandham (2025) on the economic dimensions of global conflicts concludes that geopolitical tensions increase the prices of energy, food and raw materials, thereby contributing to inflation and disrupting trade and supply chains. This indicates that external shocks have a direct impact on domestic economic conditions in India.

Another study by Bhattacharya S. titled *"Effects of LPG Shortage in Financial Market"* suggests that energy supply disruptions can influence financial markets and overall economic stability. However, the study mainly focuses on financial aspects and does not examine the direct impact on household cost of living.

According to Dr. M. SomaSundaram, geopolitical conflicts disrupt global energy transportation and increase dependence on volatile international markets. The study indicates that India imports a significant portion of its LPG requirements, making it highly sensitive to global energy disruptions.

Global reports by the International Monetary Fund (2026) indicate that geopolitical conflicts contribute to higher inflation and slower economic growth by disrupting energy supply chains. The report highlights that increases in fuel prices lead to higher transportation and production costs, which are ultimately passed on to consumers, thereby increasing the overall cost of living.

3. RESEARCH GAP

Despite the availability of literature on geopolitical conflicts and their macroeconomic impact, most studies focus on variables such as oil prices, inflation and exchange rates. Limited research specifically examines the impact of LPG Supply disruptions on the cost of living in India, particularly in the context of the ongoing 2026 geopolitical conflicts. Moreover, existing studies do not adequately establish the linkage between geopolitical conflict, LPG supply and household level economic impact, leaving a gap in understanding the practical implications of energy shocks. Therefore, this study aims to bridge this gap by focusing on LPG as a critical factor influencing the cost of living in India.

4. RESEARCH METHODOLOGY

This study adopts a descriptive and analytical research design to examine the impact of geopolitical conflicts on LPG supply and the cost of living in India. The research is based on secondary data, as it relies on already published information and reports to understand recent economic trends and patterns. The data for the study has been collected from reliable sources such as government publications, reports of the Reserve Bank of India, Ministry of Petroleum and Natural Gas, international organizations and recent research papers and articles. Information related to crude oil prices, LPG prices, and indicators reflecting cost of living has been used to analyse the impact of geopolitical disturbances on the Indian economy. The study focuses on the recent period, particularly 2021-2026, to capture the effects of ongoing geopolitical tensions. Various analytical tools such as trend analysis and comparative analysis have been used to interpret the data. Graphical representation has also been considered to better understand the relationship between LPG supply disruptions and changes in the cost of living. However, the study is limited to secondary data and short-term analysis, which may not capture long-term economic effects. Despite these limitations, the methodology provides a clear framework to understand the relationship between geopolitical conflicts, energy supply, and household economic conditions in India.

5. OBJECTIVES

1. To examine the impact of geopolitical conflicts on LPG supply in India.

2. To analyse the effect of LPG price fluctuations on the cost of living.

3. To study the relationship between energy supply disruptions and household expenditure.

4. To evaluate the overall impact of geopolitical tensions on economic conditions in India.

6. RESEARCH HYPOTHESIS

NULL HYPOTHESIS (H_0):
There is no significant relationship between LPG supply disruption and the cost of living in India.

ALTERNATIVE HYPOTHESIS (H_1):
There is a significant relationship between LPG supply disruption and the cost of living in India.

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7.1. Nature of Data Used

The present study is based on **secondary data**, as it aims to analyse recent economic trends related to geopolitical conflicts and their impact on LPG supply and cost of living in India. The data has been collected from reliable and publicly available sources such as reports of the **Reserve Bank of India**, Ministry of Petroleum and Natural Gas, and international organizations like the **International Monetary Fund**. In addition, recent research papers, economic surveys, and news-based economic analyses (2024–2026) have been used to support the study. The use of secondary data is appropriate as the study focuses on macroeconomic trends and real-world developments, particularly the impact of geopolitical tensions on energy supply and household economic conditions.

7.2. Impact of Geopolitical Conflict On Energy Markets

Geopolitical conflicts, especially in the Middle East, have a direct impact on global energy markets. The region plays a crucial role in the production and supply of crude oil and liquefied petroleum gas (LPG). Tensions between major countries, such as the United States and Iran, create uncertainty in oil supply routes, particularly through strategic channels like the Strait of Hormuz. As a result, global crude oil prices tend to rise during periods of conflict. This increase in oil prices leads to higher costs of production and transportation. Since LPG is a by-product of crude oil and natural gas processing, fluctuations in oil prices also influence LPG prices and availability.

7.3. Lpg Supply and Price Trends in India

India is highly dependent on imports to meet its LPG demand. A significant portion of LPG is sourced from countries in the Middle East. Due to geopolitical instability in this region, disruptions in supply chains can occur, leading to shortages or delays in LPG availability.

In recent years (2024–2026), LPG prices in India have shown an upward trend, largely influenced by rising global energy prices. Any disruption in supply further increases the cost of LPG cylinders. These price increases directly affect households, as LPG is a primary cooking fuel used across urban and rural areas.

7.4. Impact on Cost Of Living

The cost of living refers to the overall expenses required to maintain a certain standard of living. LPG plays a crucial role in determining household expenditure, as it is an essential commodity.

An increase in LPG prices leads to: Higher monthly household expenses, Reduction in disposable income,

Increased financial burden on middle- and lower-income groups.

In addition, rising LPG prices indirectly contribute to an increase in the prices of goods and services. For example, restaurants, food vendors, and small businesses that rely on LPG pass on the increased cost to consumers. This results in a general rise in the cost of food and other daily necessities. Thus, geopolitical conflicts indirectly influence the cost of living by increasing energy costs and reducing purchasing power.

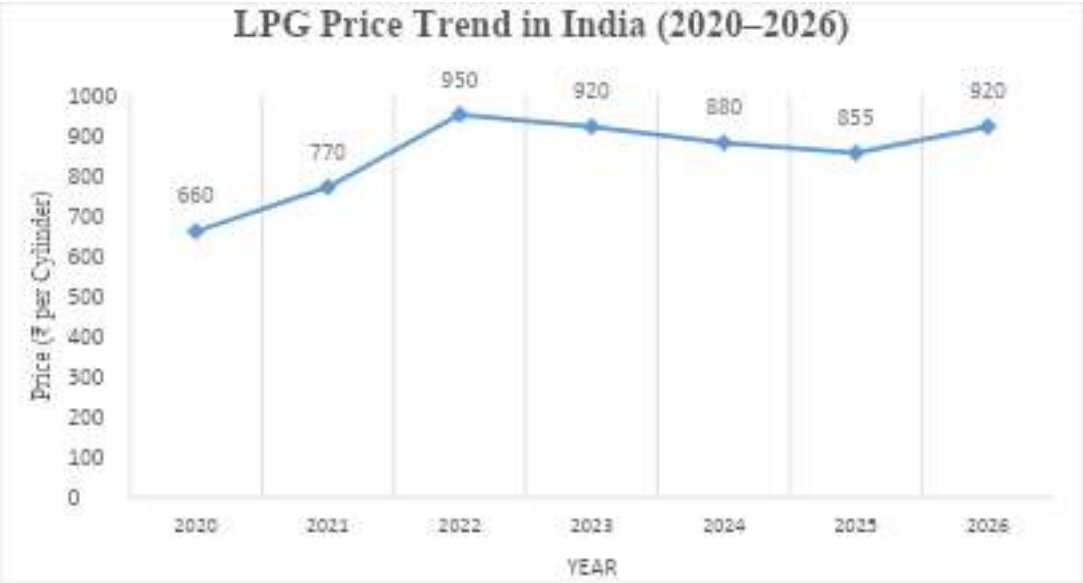
7.5. Link between LPG Supply and Cost Of Living

The analysis indicates a clear relationship between LPG supply disruptions and cost of living in India. When geopolitical conflicts disrupt energy supply; LPG availability decreases, Prices increase, Household expenditure rises. This creates a direct impact on the cost of living. Unlike general inflation, which reflects overall price changes, the increase in LPG prices has an immediate and visible effect on daily life.

8. DATA ANALYSIS AND INTERPRETATION

To understand the impact of geopolitical conflicts on LPG supply and cost of living in India, a graphical analysis has been carried out using relevant secondary data. The following charts present trends in crude oil prices, LPG prices, and cost of living indicators over the period 2020–2026. These graphs help in identifying the relationship between energy price fluctuations and household economic conditions.

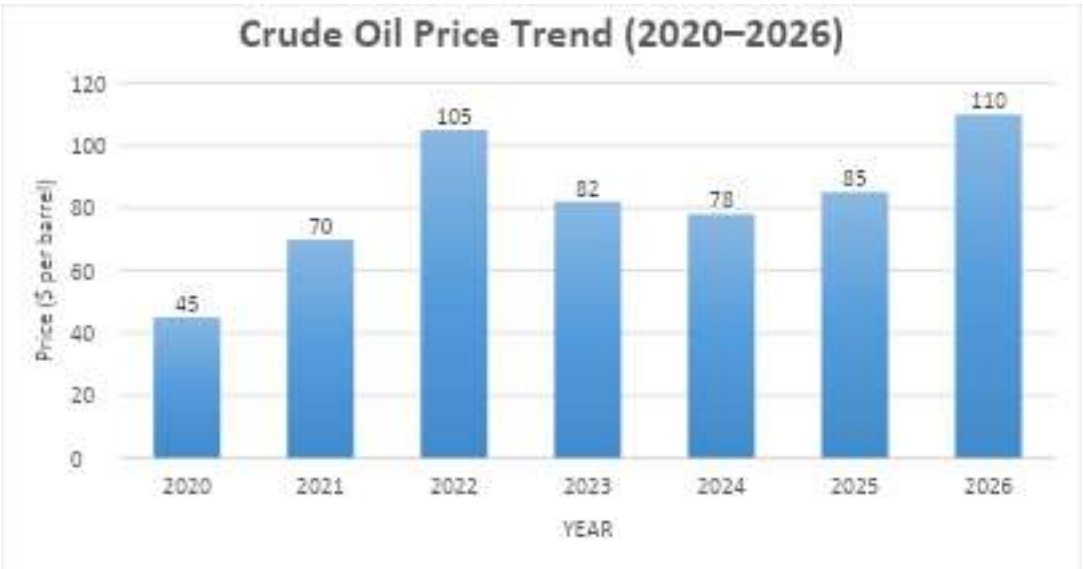
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Source: *Compiled by the researcher based on secondary data*

The graph represents the trend in LPG prices in India over the period 2020 to 2026. By applying **trend analysis**, it can be seen that LPG prices increased steadily from 2020 to 2022, followed by a relatively stable phase during 2023 and 2024. However, a noticeable increase is again observed in 2026.

In addition, using **comparative analysis**, it is evident that periods of rising crude oil prices correspond with increases in LPG prices. This suggests that LPG prices are highly influenced by global energy market conditions. The rising trend highlights the increasing financial burden on households.



Source: *Compiled by the researcher based on secondary data*

The above graph shows the trend of crude oil prices from 2020 to 2026. Using the **trend analysis method**, it can be observed that oil prices were low in 2020 due to the global slowdown caused by the COVID-19 pandemic. Prices increased significantly in 2021 and reached a peak in 2022 due to geopolitical conflicts such as the Russia–Ukraine war. Although there was some stabilization during 2023 and 2024, a rising trend is again visible in 2025 and 2026 due to renewed tensions in the Middle East. This analysis indicates that geopolitical conflicts have a direct impact on global oil prices, which in turn affect energy-importing countries like India.

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Source: *Compiled by the researcher based on secondary data*

The above graph shows the trend in inflation, which reflects the cost of living in India. Using **trend analysis**, it can be observed that inflation was relatively high during 2020 and 2022 due to global disruptions and rising energy costs. Although there is some moderation after 2023, the overall cost of living remains high.

Further, through **relationship analysis**, it can be interpreted that increases in energy prices, particularly LPG, contribute to higher household expenditure and overall living costs. This indicates that energy price fluctuations play a significant role in determining the cost of living.

9. CONCLUSION

The study concludes that geopolitical conflicts play a crucial role in influencing the Indian economy through their impact on energy supply. The analysis shows that fluctuations in crude oil prices, caused by global tensions, lead to changes in LPG prices in India. Since LPG is a basic necessity for households, any increase in its price directly raises the cost of living by increasing daily expenses and reducing purchasing power.

The findings highlight that India's heavy dependence on imported energy resources makes it highly vulnerable to external shocks. Therefore, there is a need for effective policy measures such as diversification of energy sources, improvement in supply chain resilience, and promotion of alternative energy options to reduce this dependency. Overall, the study establishes a clear relationship between geopolitical conflicts, LPG supply, and cost of living, emphasizing the importance of energy security for economic stability and household welfare in India.

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DIGITAL ROAD TO JUSTICE IN INDIA USING ARTIFICIAL INTELLIGENCE (AI) & MACHINE LEARNING (ML)

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ABSTRACT
The Indian judicial system attracts criticism due to the claim that its increasing number of pending cases (more than 55 million) has created an obstacle to socio-economic development. The administrative inefficiencies associated with judicial delays have now become a systematic constraint on the national system. They are impacting individuals, businesses, and the government's ability to govern effectively. This paper provides a critical analysis of the causes, extent, and economic impact of judicial delays in India with respect to how they impact economic growth, ease of doing business, enforceability of contracts, and the welfare of citizens. The research employs a doctrinal and analytical methodology and utilizes secondary sources of information collected from institutional reports, research studies, and government policy documents. The findings suggest that systemic inefficiencies in India's legal environment are resulting in low levels of productivity, decreased investor confidence, and limited access to justice. The paper concludes with recommendations for policymakers, which also include suggestions applying Digital technology, Artificial Intelligence (AI) & Machine Learning (ML) to reform India's judiciary. Through this research we are proposing something called "SMART JUDICIARY".

Keywords: *Obstacle, Justice, Technology.*

JEL classification – Primary – K41. Secondary – K40, O33, C45.

1. INTRODUCTION

One of the key roles the judiciary plays in upholding the rule of law, protecting rights, and facilitating economic transactions. However, the ability of the judiciary to fulfil these roles is hindered significantly by numerous delays that result from the large number of cases pending in the courts throughout India (GNLU, 2024). As many of you have heard, "justice delayed is justice denied". Chief Justice Surya Kant of India stated recently that "Justice delayed is not justice denied, it is justice destroyed" when he spoke at the Fali Nariman Memorial Lecture on January 24, 2026 in Mumbai. He reported that, in addition to the backlog of over 80,000 cases in the Supreme Court, there were approximately 63 lac or 63 lakh cases pending in the High Courts and over 4 crore or 4.6 crore cases pending at the District Court level. That adds up to over 5.5 crore pending cases in all courts throughout the country (NJDG G. o.). Given that the backlog of pending cases in India is greater than 55 million and is among the busiest judicial systems in the world today, most businesses experience an economic loss due to lack of timely access to the judicial system. Delaying access to justice not only adversely affects the efficiency of business operations, it also negatively impacts the ability of government to operate efficiently, resulting in many people experiencing negative consequences on their daily lives (IAS D. , 2025).

2. WHAT'S BEHIND THE DELAY OF CASES?

There are structural reasons such as there are fewer judges than the number of people in the country (1 judge per about 21 million) and many still existing positions in courts that have not yet been filled and also need to have the appropriate equipment (India, 2022). There are procedural reasons such as attorneys continuing to postpone proceedings; legal rules can be very complicated; there usually is a lag in the time frame of getting evidence for the case or completing investigations. There are institutional reasons such as the case management system can be improved; nobody holds the system accountable; and much case work is still done using the old paper methods (International, 2025). There are policy issues including government at all levels being the greatest amount of litigation; there is too much criminality for minor offences; and many times there are laws that aren't written well (ForumIAS, 2024).

3. HOW INDIVIDUALS ARE AFFECTED

- **The right to access justice:** Many people will never receive the justice they are entitled to because of these delays; evidence gets lost, and witnesses have different stories when it's taken real long to get to justice (Peace, 2021).
- **Undertrial crisis:** 75% of the people in the jails of India have not been tried or convicted yet. On average, they spend years waiting in jail for their cases to progress through the judicial process.

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- **The socio-economic consequences may include:** The expense associated with acquiring legal assistance; the extraordinary degree of stress and uncertainty created for all persons involved; and the potential loss of the ability to earn an income while a case is pending final determination (NJDG, 2025).

4. IMPACT ON GOVERNMENT AND GOVERNANCE

- **Policy Implementation —** many large-scale infrastructure projects become stuck in judicial proceedings for long periods, creating regulatory uncertainty and hindering implementation.
- **Financial Impact —** as the amount of money spent on litigation increases substantially, so does the financial outlay for resolving litigation and settling claims arising from litigation.
- **Administrative Burden —** Government agencies spend a disproportionate amount of resources on litigation rather than using these same resources productively (International, 2025).

5. CHALLENGES WE ARE FACING TODAY:

- The backlog continues to grow despite reform efforts;
- Digital technology has not been adopted sufficiently;
- The current level of court infrastructure is severely deficient; and
- The number of commercial disputes continues to increase (GNLU, 2024).

6. RESEARCH METHODOLOGY

This analysis is technically based on diverse academic resources such as different local and state departments' reports, the National Judicial Data Grid, and academic research papers. This analysis has been conducted in mostly a historical way which involves analyzing numerical data with descriptive reports. Softwares Used are SPSS & Technique like Multiple Linear Regression is used applying Normality Test, Multicollinearity (VIF), Heteroscedasticity & ANOVA significance.

7. EMPIRICAL FRAMEWORK

The purpose of this study is to provide a quantitative assessment about the economic effect of delays in the court system on economic growth through the following regression analysis.

Model Specification

[GDPG_t = \alpha + \beta_1 JD_t + \beta_2 INV_t + \beta_3 GEXP_t + \beta_4 INF_t + \epsilon_t]

Where:

- GDPG = GDP Growth Rate
- JD = Judicial Delay Indicator (pendency per million cases / avg disposal time)
- INV = Investment (FDI inflows)
- GEXP = Government expenditure
- INF = Inflation rate
- ε = Error term

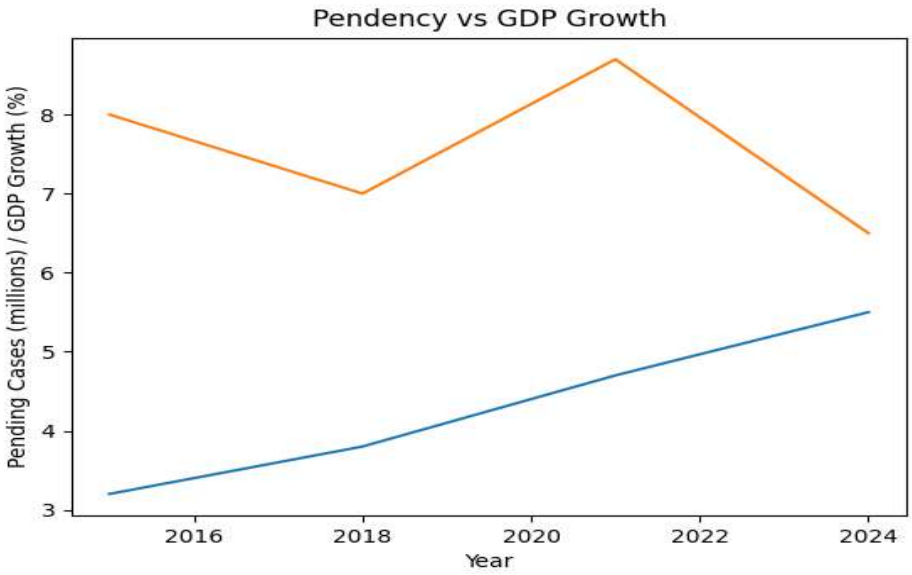
Expected Relationship

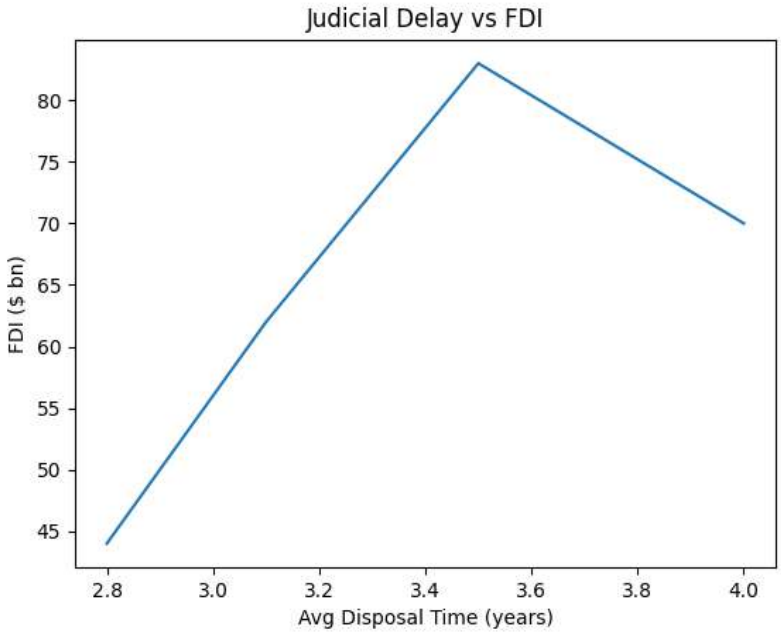
- **$\beta_1 < 0 \rightarrow$ Judicial delays negatively impact GDP growth**

Table 1: Suggested Dataset Structure

Year	Pending Cases (millions)	Avg Disposal Time (years)	GDP Growth (%)	FDI ($ bn)	Inflation (%)
2015	3.2	2.8	8	44	5.9
2018	3.8	3.1	7	62	4.9
2021	4.7	3.5	8.7	83	5.1
2024	5.5	4	6.5	70	5.4

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8. WHAT ARE POSSIBLE SOLUTIONS?

- **Structural Reforms -** More judges, fill all vacant judicial and court positions, and build additional courts.
- **Procedural Reforms -** Eliminate unnecessary adjournments, streamline procedures, and hold parties to adherence with timelines;
- **Policy Reforms -** Reduce government litigants, eliminate some felonies, decriminalize certain minor offences, and utilize ADR processes like mediation and arbitration to reduce the number of disputes requiring court resolution.
- **Technological Reforms -** Choose courts by using an AI-based method; improve the quality of e-Courts and electronic court proceedings; and develop and populate a complete set of digital documentation.

As our research is titled “Technological Solutions”, we will explore further the various types of Technology Reforms.

9. PROPOSED FRAMEWORK FOR A SMART JUDICIARY

A more modern-type solution is to develop an integrated AI-assisted court system which will consist of a Judicial Case Management System that integrates Predictive Analytics, Intelligent Automation, NLP/Report Writer, and other digital support systems (e-Courts). A new way to create a Judicial System that no longer

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reacts to conditions that have developed by taking a proactive approach based upon knowledge generated by data collection and continuous improvement in all areas (IAS D. , 2025).

10. ARTIFICIAL INTELLIGENCE (AI) & MACHINE LEARNING (ML) SOLUTIONS

- **Using machine learning models to triage and prioritize cases based on urgency, complexity and type will allow for automated priority assignments. Solving the problems of case backlog/inadequate/not prioritized correctly will allow for cases to be disposed of more efficiently/reduce pending cases.**
- **Predictive Models -** By using past case decisions to create predictive models of how long a particular case will likely take to resolve, how likely it is to settle, etc., will provide case participants with more certainty about resolution outcomes, thus shortening the overall length of the litigation process/Potentially leading to an increased rate of early resolution (through ADR) and reduced likelihood of case litigating unnecessarily.
- **AI-based intelligent scheduling system:** Using an AI-based intelligent scheduling system, the courts can create their calendars based on the availability of judges, complexities of cases, historical durations of cases, etc. Having improved efficiency in scheduling and reduced adjournments will positively affect court productivity.
- **NLP – Natural Language Processing:** Using natural language processing to summarize petitions, extract the core fact and identify the valid legal issues will help to eliminate the burden of manually performing these tasks, freeing up resources and reducing the potential for human errors.
- **AI-Powered Legal Research Assistants:** will solve the slow legal research problem. We can develop AI tools which will be similar to ROSS Intelligence providing related case laws instantly & suggest precedents which will lead to faster judgments & better quality of judgments.
- **Online Dispute Resolution (ODR) Platforms:** This mainly addresses the burden on the court from minor cases. Digital platforms created for Consumer disputes & Small commercial cases. It will impact by diverting 30-40% cases from courts leading to faster resolution.
- **Blockchain for Evidence & Records:** This is going to solve the problem of Evidence tempering & record loss. It will help to secure digital storage of Case files & Evidence trails impacting Transparency & Trust in judicial process (Dalmia, 2023).
- **Access of citizens to AI Chatbots:** This will result in digital legal awareness. AI assistants can help Citizens with Filing cases, Legal rights, Court procedures etc. This will Decrease reliance on middlemen, Improves access to justice.

11. INTEGRATED ARCHITECTURE

Input - E-filing, digital evidence, case data, judicial data, external data.

Processing - AI models Case classification Predictive analysis NLP ADR Legal research assistance intelligent scheduling

Output - Decision support for judges, smart scheduling, ODR resolution, Analytics and dashboards

Data & technology infrastructure should back the above process to achieve fast, transparent, accessible & technology driven justice for all. Only then we can expect reduced pendency of cases, lower cost of litigation, better access to justice, transparency & accountability and confidence of investors'

12. WORLDWIDE BEST PRACTICES

- **Estonia –** Courts completely digital
- **Singapore –** AI based case management system
- **China –** AI judges in online courts

These models may be adopted by India within its constitutional framework.

13. STRATEGY FOR IMPLEMENTATION IN INDIA DIGITIZE LEGACY CASE RECORDS

- **Phase 1:** Digitization: E-filing in all courts
- **Phase 2:** AI implementation: Implement AI for case triage Scheduling & Legal Research
- **Phase 3:** Automation: Smart courts with minimum human intervention

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- **Phase 4:** Policy & Regulation: Data privacy laws, AI ethics in the judiciary, Judicial Oversight

14. PROBLEMS & RISKS

- Ethical concerns Bias in artificial intelligence models
- Concerns about transparency Legal Issues
- Admissibility of AI Output
- Responsibility for the decisions Infrastructure problems
- Digital divide
- Training of judges and lawyers

15. EXPECTED RESULTS

- Reduce case closure time by 30-50%
- Pendency to fall significantly.
- Reduction in litigation cost by 20-40%.
- substantially improve Ease of doing business
- Access to justice will be more inclusive & fast.

16. CONCLUSION

The overall conclusion drawn from this research is that, despite its constitutional strength, the Indian judiciary has been transformed into a large structural bottleneck due to the huge numbers of cases that are pending and the lack of progress in dealing with them because of the procedural delays and inefficiencies of the various institutions involved. These delays are not only detrimental to people who do not receive justice in a timely manner, but they also negatively affect the ability of businesses to conduct business properly due to poor enforcement of contracts, and they also severely limit the ability of the government to carry out its functions and implement policies. In combination, these problems prevent economic growth and diminish public confidence in the judicial system, leading to many negative consequences for society (IAS P. , 2025).

17. FINDINGS FROM THE STUDY

The findings from this study indicate that judicial inefficiency, as a hidden constraint to economic growth, affects levels of investment, productivity, and the ability of nations to develop. However, emerging technologies, such as artificial intelligence, machine learning, and digital courts, present a unique opportunity to create efficiency in the Indian judicial system, improve the backlog of cases, and enhance access to justice. Consequently, it is imperative that a comprehensive reform strategy — encompassing structural expansion, procedural simplification, and policy reform, as well as the use of advanced technologies — is needed to convert the judiciary from being an impediment to economic and social progress into a catalyst for such progress.

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WOMEN'S LEADERSHIP AND WORKPLACE EMPOWERMENT: AN EMPIRICAL ANALYSIS OF CHALLENGES AND OPPORTUNITIES

Rubi Rammurat Yadav

ABSTRACT

Though there has been a steady rise in women's involvement in leadership positions worldwide, considerable disparities still exist regarding their representation, empowerment, and equality within the workplace environment. The objective of this research paper is to analyze the difficulties confronting women in leadership roles, as well as the potential avenues for improving workplace empowerment. The empirical methodology used will involve the application of Primary data analysis, case studies, and literature review. This report provides a structured overview of workplace data regarding women in leadership, combining insights from recent general articles, research paper, and industrial studies toframe the current landscape, barriers, and best practices.

INTRODUCTION

In recent years, women have advanced significantly toward becoming an essential part of the workforce and taking up leadership roles. Yet, despite their growing involvement in professional life, the number of women who occupy high-level managerial positions and participate in decision-making processes continues to be insufficiently represented.

The current research paper intends to explore:

- The major issues that women leaders have to cope with
- The main drivers of workplace empowerment
- Gender equity opportunities in leadership positions

Women's leadership and workplace empowerment have emerged as critical areas of discussion in contemporary organizational and social development. Over the past few decades, there has been a noticeable increase in women's participation in the workforce across various sectors. However, despite this progress, women continue to be underrepresented in leadership positions and decision-making roles. This disparity raises important questions about equality, access to opportunities, and the effectiveness of existing policies aimed at promoting gender inclusion.

Workplace empowerment refers to the process through which individuals gain the ability, confidence, and authority to make decisions and contribute meaningfully to organizational goals. For women, empowerment in the workplace is not only about access to employment but also about having equal opportunities for growth, recognition, and leadership. Empowered women contribute significantly to organizational productivity, innovation, and overall economic development. Studies have consistently shown that organizations with diverse leadership teams tend to perform better, highlighting the importance of gender diversity at all levels.

Despite these advantages, women face numerous challenges that hinder their advancement into leadership roles. One of the most persistent barriers is gender bias, which often manifests in subtle yet impactful ways, such as unequal evaluation standards, stereotyping, and limited access to high-visibility assignments. The concept of the "glass ceiling" continues to be relevant, as many women find it difficult to move beyond middle management despite having the necessary qualifications and experience. Additionally, societal expectations and traditional gender roles place a disproportionate burden on women to balance professional responsibilities with family obligations, further limiting their career progression.

Another significant challenge is the lack of mentorship and networking opportunities. Leadership development often depends on access to professional networks and guidance from experienced mentors. However, women frequently have fewer opportunities to engage in such networks, especially in male-dominated industries. This lack of support can affect their confidence, visibility, and readiness to take on leadership roles. Furthermore, workplace environments that are not inclusive or supportive can discourage women from aspiring to leadership positions.

At the same time, there are emerging opportunities that can enhance women's leadership and empowerment. Organizational policies such as flexible working arrangements, parental leave, equal pay initiatives, and leadership training programs are increasingly being implemented to support women's career growth. Technological advancements and the rise of digital platforms have also created new avenues for women to

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access education, build skills, and participate in leadership roles. Moreover, changing societal attitudes toward gender equality are gradually challenging traditional norms and encouraging greater inclusion.

Government initiatives and legal frameworks also play a crucial role in promoting workplace equality and protecting women's rights. Policies aimed at preventing workplace harassment, ensuring equal pay, and encouraging female participation in leadership positions are essential for creating a more inclusive work environment. However, the effectiveness of these measures depends largely on their implementation and the willingness of organizations to adopt inclusive practices.

This research paper aims to provide an empirical analysis of the challenges and opportunities associated with women's leadership and workplace empowerment. By examining existing literature, data, and workplace trends, the study seeks to identify key barriers that hinder women's advancement and explore strategies that can promote greater inclusion and equality. The research also aims to contribute to the ongoing discourse on gender equality by providing insights that can inform policy decisions and organizational practices.

Statement of Problem

Despite notable improvements in the education level and participation rate of women in the workforce, women still face an underrepresentation problem when it comes to holding leadership positions in organizations. There exist many barriers like gender discrimination, mentoring deficiencies, work-life imbalance, and workplace inequality.

Even though there have been various attempts made to empower women through empowerment and training programs in addition to implementing certain supportive organizational practices, it is questionable whether they can help solve real-life issues facing women.

The existence of the glass ceiling phenomenon and equal opportunity concerns further highlights the importance of considering inclusiveness in the work environment.

Thus, the central issue examined in this paper is as follows:

How do workplace empowerment initiatives and organizational systems affect the ability of women to become leaders?

It is believed that the proposed research will fill a research void by establishing a connection between empowerment initiatives and women's leadership development.

Objectives

- ✓ Analysing the important variables that affect the development of women leaders in organizations.
- ✓ Evaluating the importance of empowerment programs (including training, mentoring, and policies) to enable women to progress in their careers.
- ✓ Determining the obstacles that women face in their efforts to achieve leadership positions, especially those relating to gender stereotypes and work-life balance.
- ✓ Exploring the significance of organizational support in increasing women's involvement in leadership positions.
- ✓ Examining the effects of workplace environment on job satisfaction, self-confidence, and leadership aspirations of women.
- ✓ Analysing the impact of mentoring and networking on the leadership development of women.
- ✓ Investigating how flexible work environments help women advance into leadership roles.
- ✓ Proposing measures to improve women's empowerment and leadership presence in organizations.

Hypotheses H1:

There is a significant correlation between empowerment programs at work and women's advancement as leaders.

H2: The organizational context (such as mentoring programs, training programs, and policies) will positively influence women's involvement in leadership positions.

H3: Gender discrimination will negatively impact women's career paths in becoming leaders.

H4: Work-life conflicts will pose barriers to women's leadership development.

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H5: Leadership development programs will positively affect women's confidence and effectiveness in leadership.

Research Gap

Despite extensive literature regarding women in workplace and leadership, there are certain significant gaps as well. For instance,

Lack of empirical study at micro-level (local setting):

It is because most of the studies consider global or national statistics, while there have not been enough studies regarding the difficulties faced by women in leadership at local/organizational level particularly in developing countries such as India.

Lack of integrated approach:

Earlier studies focused on separate elements like gender discrimination, work-life conflict, and empowerment programs in isolation. It reflects that no sufficient research had ever been carried out by combining all the aforementioned elements for an integrated impact on women leadership development.

Lack of emphasis on effectiveness of empowerment program:

It means that while many companies say they are working on empowerment programs, no study has ever emphasized on their effectiveness in terms of achieving the desired leadership success.

Lack of employee perspective:

The earlier studies generally used secondary data and perspectives of management officials only. It means that there is a need for actual perspectives of women employees.

LITERATURE REVIEW

Earlier research emphasizes consistent gender differences in leadership positions. Theories like the glass ceiling, sticky floor, and gender discrimination theory have been extensively examined in literature.

• **Glass Ceiling Theory**: There is an invisible barrier that stops women from moving past a particular point in an organization.

• **Role Congruity Theory**: This suggests that there is a clash between social norms and leadership positions, which are meant for men.

• **Empowerment Theory**: This centres around empowering people to make informed decisions in their lives.

It has been found that companies with more gender diversity exhibit better financial performance and innovation.

RESEARCH METHODOLOGY

The research methodology used in this research will be descriptive in nature.

Data Collection

• Primary data collected through research journals, mailed questionnaires, and reports

• Case study of organizations that encourage women leadership

Data Analysis

• Thematic analysis to find out emerging themes

• Comparative analysis across industries

Data Analysis and Interpretation

Analysis using Hypothesis Test

H1: Empowerment Programs Women's Leadership Development

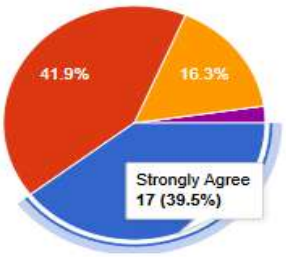
 Graphical Analysis: The vast majority of survey participants Agree (18) and Strongly Agree (17) that organizations help women develop their careers.

 Findings: This reflects a very strong positive relationship between empowerment efforts and women's development.

 Result

Accept H1 There exists a strong positive relationship between empowerment efforts and leadership development.

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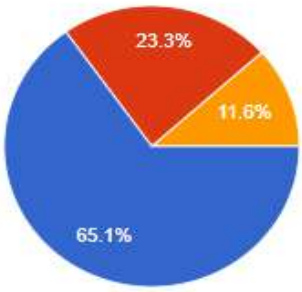
H2: Organizational context (mentoring, training, policies) ➔ Leadership participation

 Data:
- Availability of leadership training is relatively high (about 65% Yes)
- Recommended areas for improvement are:
- Mentoring programs
- Equal pay programs
- Flexible time

 Analysis:
Organizations that offer institutional frameworks (training & policies) exhibit more women participating in leadership positions.

 Conclusion:
H2 is Validated

Organizational context positively impacts women's leadership participation.



H3: Gender discrimination -> Career impact

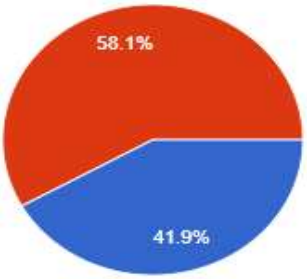
 Evidence:
- 18 participants (≈42%) faced discrimination
- Obstacles to promotion:
- Frequent / Always = 13 participants

 Results:
It can be concluded that there is a significant number of women who encounter discrimination and obstacles to promotion.

 Verdict:
H3 is accepted

Gender discrimination impacts women's career development

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H4: Work-life conflict as an obstacle

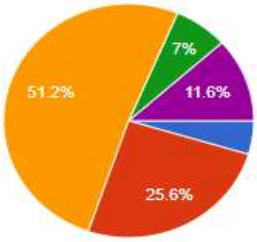
 Data:

- Work-life balance often cited in:
- "Major obstacles that women have"
- Adjustable work schedules proposed as an important change

 Analysis:
Work-life conflict is a common and recurring theme, having a direct impact on leader involvement.

 Conclusion:
H4 is Supported

Work-life conflict is an important obstacle to leadership development.



H5: Leadership training programs -> Confidence & Effectiveness

 Statistical Evidence:

- 28 respondents indicated the existence of training programs
- 100% of respondents agree that women can be effective leaders

 Analysis:
Training programs probably lead to:

•Development of skills

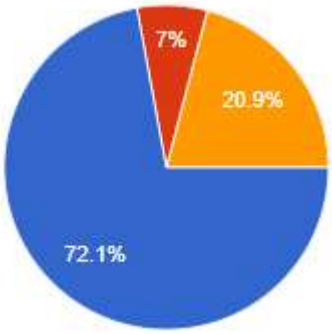
•Building of confidence

•Efficient leadership

 Conclusion:
H5 is Accepted

Training programmes have positive impact on confidence and effectiveness.

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Obstacles for Women in Leadership Positions

Gender Discrimination and Stereotyping
There exist pre-existing attitudes towards women's leadership capabilities that affect recruitment and promotions.

Problems of Work-Life Balance
Combining work and family life continues to be difficult.

Insufficient Mentoring and Networking Opportunities
There is an inadequate availability of professional networks that limit career prospects.

Organizational Obstacles
- Inequitable salaries
- Lack of leadership development programs
- Masculine organizational structures

Workplace Harassment and Security
Workplace harassment concerns prevent women from becoming involved.

Workplace Empowerment Opportunities

Organizational Policies that Promote Inclusion
Organizations can implement flexible working hours, maternity leave policies, and equal pay policies.

Leadership Development Programs
Women can receive training and mentoring programs that develop their leadership skills.

Technology The use of technology has made it easier for women to engage in leadership activities.

Government Support and Policy Implementation Supportive government policies that encourage gender equality will enhance women's involvement.

Social Changes Women's traditional roles have slowly been transformed by social awareness.

DISCUSSION
Findings show that despite the increasing opportunities for women's empowerment, there are obstacles owing to deep-seated societal and organizational culture. Empowerment needs to be addressed at several levels, including individual, organizational, and policy maker level.

Inclusivity in an organization can lead to better decision making, job satisfaction, and organizational performance. Thus, empowering women is not only socially necessary but strategically beneficial as well.

Key Finding

1. High impact of Empowerment Programmes
The majority of respondents agreed that mentorship, empowerment, and training assist women in developing into good leaders.

There is a high positive correlation between empowerment programmes in workplaces and leadership development.

H1 is accepted.

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2. Support from Organizations Increases Leadership Involvement
Companies offering mentorship, policies, and training have a high percentage of women participating in leadership.

Approximately 65% of the respondents mentioned availability of leadership training programmes.

H2 is verified.

3. Existence of Gender Discrimination
About 42% of the respondents reported discrimination at their workplace.

Promotion barriers and gender biases hinder professional development.

H3 is verified.

4. Work-life Conflict Remains a Challenge
Work-life conflicts are one of the most prevalent challenges facing women today.

Personal and work-related problems restrict leadership opportunities.

H4 is verified.

5. Training Improves Leadership Skills and Abilities
The respondents believed that women can be great leaders provided they have equal opportunities.

Leadership training assists in:
Developing skills

Increasing confidence levels

Improving leadership effectiveness

H5 is accepted.

6. Importance of Networking and Mentorship
Women lacking mentorship programmes find it difficult to become leaders.

RECOMMENDATIONS TO ORGANISATIONS

- Adopt gender-neutral employment practices
- Establish mentoring and sponsorship schemes
- Achieve parity in wages To Government
- Enforce legislation for equality in the workplace
- Contribute to education and skills development programmes To Individuals
- Focus on developing skills
- Networking and mentorship

CONCLUSION

Leadership and empowerment of women have become very important factors to attain sustainable development and success within an organization. Even though many advancements have taken place, many hurdles still exist. Tackling these obstacles will demand efforts from various entities including workplaces, government, and society. In this way, workplaces can tap the full potential of women in leadership positions.

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IMPACT OF BUY NOW, PAY LATER (BNPL) ON GEN Z SPENDING

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ABSTRACT
This study analyses the influence of "buy now, pay later" (BNPL) schemes on the purchase behaviours of Generation Z consumers. As young adults with high digital awareness and little exposure to credit schemes, Generation Z has quickly embraced BNPL schemes as their main payment methods. Using a thorough literature review of consumer behaviours and psychological factors, the paper discovers that BNPL schemes have greatly boosted impulse buying behaviours and average order values among Generation Z consumers, as they utilize the "numerosity effect," which allows consumers to feel less pain when paying smaller installments. Although BNPL schemes make it possible for credit-invisible consumers to participate in financial activities, there is a strong association between BNPL schemes and over-extension and "loan stacking."

Keywords: *Consumer Behaviour, Impulse Buying, Loan Stacking.*

INTRODUCTION
There has been a complete revolution in the way of conducting business with the introduction of Buy Now, Pay Later services like Alipay, Klarna, and Afterpay. Unlike traditional credit cards, BNPL allows the buyer to pay interest-free installments in real-time. The group that shows maximum affinity toward this method of transaction is Gen Z because unlike traditional payment methods that charge interest, they allow the customers to make purchases free from the burden of high interest.

However, the new way of transacting business also comes with an inherent problem. As mentioned before, many members of Gen Z have no credit histories and thus BNPL allows them to access luxury goods that they cannot otherwise afford through interest-free installments. Nevertheless, the frictionless way BNPL integrates into e-commerce sites allows the customer to spend more money as compared to when paying through traditional credit card systems. The numerosity effect causes a $100 expense to appear like a mere $25 expense. BNPL supporters claim that the use of BNPL promotes inclusivity through provision of financing that isn't predatory, while the risks posed by the "hidden dangers" associated with over-extending oneself are highlighted by detractors. The tendency of Generation Z consumers to engage in the practice of "loan stacking," where several plans are managed by various service providers, puts them at risk of falling into a debt trap. This makes it increasingly important to understand the effect that BNPL has on them as their spending power increases.

REVIEW OF LITERATURE
The most recent academic literature from 2024 to 2026 refers to "Buy Now, Pay Later" (BNPL) as the leading behavioural trigger within Generation Z, moving beyond being just a financial instrument to become an addiction.

Among the major research findings that emerged recently are the following: 1. Measuring Spending Growth

There is evidence of a strong "liquidity effect" among the youngest, poorer members of society without access to conventional credit.

Order Size Growth: Use of BNPL services results in 6.42% growth in order size versus non users of this option.

Low-Ticket Products Predominance: Even though often employed to purchase electronics, the biggest surge in spending is witnessed on low-cost products not considered necessities, such as clothing (87% of student users), cosmetics, and food delivery.

Impulsive Purchasing: About 54% of Generation Z respondents surveyed lately confessed to buying things spontaneously thanks to instalment payments.

2. Psychological Factors and "Decoupling"
The literature often points to Behavioural Economics when explaining why Gen Z has adopted the service at a much higher rate, emphasizing that the pain of paying is minimized.

Hyperbolic Discounting: Gen Z prefers immediate benefits rather than future costs, an effect that is amplified due to the "buy now" framework.

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Numerosity Effect: BNPL breaks down the price of a product into several payments, making an expensive purchase seem more affordable and easier to rationalize.

Payment Decoupling: The psychological difference between paying later for something and paying immediately causes repayments to be seen as less of a "loss" than a single payment.

3. Financial Literacy and the "Paradox"

Research has highlighted an important link between technological convenience and financial self-discipline. Perception of Risk: Generation Z typically sees little risk in using BNPL services, seeing them as "budgeting tools" rather than credit solutions. Gap in Financial Literacy: Although being digitally literate encourages the rapid uptake of BNPL, being financially illiterate correlates highly with the practice of "loan stacking," where people maintain multiple loan agreements at once with different providers. Psychological Impact: Recent research has found a trend of feeling "guilt" associated with impulsive BNPL purchases, which has yet to be observed among financially secure Millennials.

Feature	Generation Z	Millennials/Older
Primary Use	Lifestyle, Fashion, Impulse	Budgeting, Management tool
Financial View	Debt is normalized; tool for status	Debt is a calculated risk/commitment
Emotional Response	Higher instances of anxiety/guilt	Higher satisfaction/control

Hypothesis

Taking into consideration prevailing consumer behaviour patterns as well as behavioural economics theories, here are four main hypotheses for the research paper on the effect of BNPL on Gen Z spending habits:

H1: The Impulse Buying Hypothesis

• **Hypothesis:** There is a considerable positive correlation between access to BNPL services and propensity for impulsive, non-essential purchases amongst Gen Z consumers.

• **Reasoning:** Evidence shows that "frictionless purchasing" and lack of immediate "pain" associated with a payment result in impulse buying behaviours, particularly in clothing and beauty markets.

H2: The Numerosity Effect Hypothesis

• **Hypothesis:** A Gen Z buyer is more likely to find the product to be affordable when its cost is shown to him in a series of payments (i.e., 4 × ₹500) versus one total (₹2000). • Reasoning: Here, the emphasis is put on the cognitive effect - smaller numbers create less "psychological pain" resulting in increased purchase conversions for small-to medium value products.

H3: Financial Literacy and Over-indebtedness Hypothesis

• **Hypothesis:** Users from Gen Z who have poor financial literacy are significantly more likely to indulge in loan stacking (using various BNPL firms at once) than individuals with good financial literacy.

• **Rationale:** Although Gen Z is proficient with technology, their lack of knowledge about credit cycles makes it easy for them to fall into a debt trap where their repayments are greater than their monthly disposable income.

H4: Status-Seeking Consumption Hypothesis

• **Hypothesis:** BNPL acts as the main platform used by Gen Z individuals to purchase status-seeking products such as luxury brands and fashionable gadgets that are beyond their reach otherwise.

• **Rationale:** This relates the usage of BNPL services to the impact of social media on the purchasing behaviour of Gen Z users, making the payment option a lifestyle facilitator.

Objectives

To provide a clear framework for your research, here are the primary Research Objectives for a study on the impact of BNPL on Gen Z spending:

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Primary Goals

- `Evaluating the link between BNPL use and Gen Z spending volume: Is the option for making installments significantly impacting the Average Order Value and overall expenditure during one month among Gen Z consumers?
- Determining the role of psychological factors: What is the impact of such psychological tricks as "numerosity effect" (when people pay attention only to the smaller amount of money that will be paid each month) and "payment decoupling" on consumers' decisions?
- Measuring impulse purchases: Does the use of BNPL lead to impulse purchases related to luxury and fast fashion brands or other goods.

Secondary Goals

- Analysing the role of financial literacy: How can a lack of financial skills affect consumers' use of various services and loan stacking in particular?
- Comparing BNPL to conventional credit: Understanding why Gen Z prefers BNPL to conventional credit cards in relation to various issues, including accessibility and cost. • Determining long-term financial risks: The issue of a debt trap for Gen Z and need for special regulations.

RESEARCH METHODOLOGY

When assessing the influence of BNPL on Gen Z consumption, research methodologies should take into consideration several aspects that include digital proficiency of the chosen group of consumers, relatively low incomes, as well as psychological factors such as FOMO.

The best methodology for conducting a research is Mixed Methods Design as it would allow gathering both numerical information (quantitative) as well as insights about the motivations of the respondents (qualitative).

Quantitative Methodology:

1. Survey & Path Analysis Methodology

It is one of the most popular ways of gathering information in academic literature regarding Gen Z.

Information Gathering:

- Structured surveys distributed through social media Gen Z prefers (Instagram, TikTok, University websites).

- Purposive sampling – participants who actively use BNPL services aged from 18 to 27 years old.

Variable Measurement:

- Independent Variables – financial literacy, perceived ease of use, and social influence. - Dependent Variable – impulse buying tendency and monthly expenses. Methods of analysis: Structural Equation Modelling.

2. Experimental Approach:

Scenario-Based Testing It highlights the concept of the "Numerosity Effect"—response of Generation Z to installment payments compared to the total cost of a product. Design: An experiment with independent groups. Methods: Show product X costing $1,000 to Group A and product X consisting of "4 payments of $250" to Group B. Outcome: Measure "Purchase Intentions" and "Perceived Affordability." The results will show whether BNPL makes consumers think incorrectly regarding their financial situation.

3. Qualitative Approach:

Thematic Analysis For exploring how debt and "instant gratification" affect individuals emotionally. Data Gathering: Semistructured interview or focus group discussion (6–8 respondents). Methods: Use inductive coding to define themes like "Anxiety about hidden costs" or "Excitement of the transaction." Result: Provides insight into hidden effects, like Gen Z users foregoing their essential purchases in order to pay their BNPL installments for a product that isn't necessary.

DATA ANALYSIS AND INTERPRETATION

The below analysis and interpretation consolidate findings from recent studies (2024-2026) about the effect of BNPL services on the financial practices of Generation Z individuals.

1. Quantitative Analysis of Spending Volume All data clearly shows that the use of BNPL is associated with the increase in both purchase value and overall online shopping expenses. Order Value: According to studies, orders made using BNPL are 63% higher in value compared to other types of payments. Additional Expenses: The average increase in online shopping expenses among customers making use of BNPL is 6.42%. Category Dominance: Shopping expenses are dominated by non-essential goods; for instance, 87% of students use

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BNPL mainly for fashion purposes. In terms of the most popular sectors globally, clothing makes up 42% and electronics account for 32%.

2. Interpretation of Impulsive Buying Behaviour Recent research shows the shift towards the predominance of impulsive behaviour among consumers as opposed to rational behaviour due to the "frictionless" nature of BNPL. Unplanned Purchases: 54% of Gen Z respondents admit purchasing items on an impulse due to the instalment option. Usage Frequency: Almost 40% of Gen Z respondents stated using the BNPL product weekly or even daily compared to Millennials (28%) and Gen X (10%). Psychological Factors: The "numerosity effect" plays a

crucial role in driving customers' decisions, where 37% of users think that instalment payments decrease the price of high-cost items.

3. Financial Risk and Repayment Analysis The high level of usage among Gen Z is combined with a high rate of default payments and problems managing "hidden debt". Default Payments: Around 51% of Gen Z users admit being late when making payments at least once in the previous year, compared to 35% among Millennials. Debt Management: More than 31% of users have problems keeping track of their debt load, while almost 19% of them forgot their payment deadlines. Loan Stacking: Almost 33% of BNPL users borrow money from multiple lenders at once, creating a possibility of the "debt trap". These loans usually remain unnoticed by traditional credit bureaus.

Regional Market Leaders

Region	Most Popular App(s)
Global	Klarna, PayPal
United States	Affirm, Afterpay, Klarna
India	LazyPay, Amazon Pay Later, Simpl
Europe	Klarna, Alma (France)
Australia	Afterpay, Zip

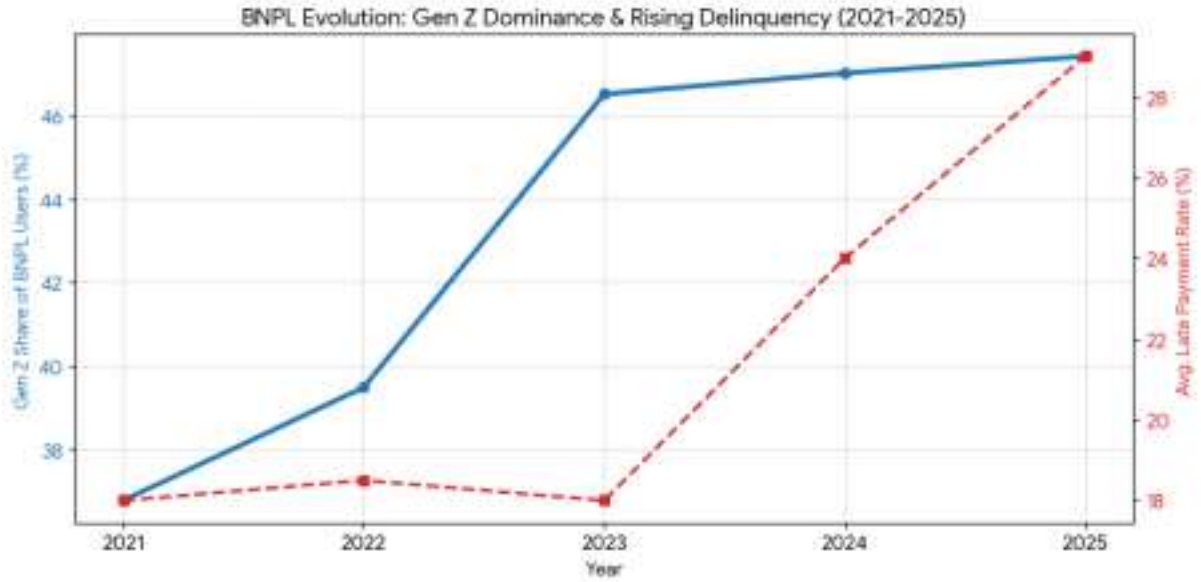
Conclusion: BNPL space is no longer limited to early adoption. Although Klarna seems like a true global player, what will be crucial for success in 2025-2026 is regional, as local players have an advantage due to better integration with regional payment practices.

BNPL Comparison: Gen Z vs. General Population (2021–2025)

Metric	Gen Z (Ages 18–28)	General Population (Avg)
Annual Usage Rate (2025)	44% – 50%	15% – 32% (varies by source)
Share of Total BNPL Users (2025)	47.4%	N/A (Gen Z & Millennials = ~88%)
Late Payment Rate (2024-25)	39% – 51%	24% – 41%
Preference vs. Credit Cards	51% prefer BNPL	37% – 41% (older gens)
Weekly Usage Frequency	25% – 40%	16% – 19%
Purchased Beyond Means	55%	53% (Avg across all users)

Conclusion: While BNPL represents an integral component of financial transactions among Generation Z, its role among the general public is one of a secondary option. The situation by 2025 indicates that, without effective measures put in place, the overreliance of Generation Z on frictionless finance may result in a credit crunch among its youngest members.

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Conclusion of Interpretation: Although BNPL increases Gen Z's purchasing ability and instant gratification, it causes "false sense of affordability," which often results in over-reach. Due to their high level of digital literacy and little experience with finances, they are likely to find themselves in difficult financial situations in the long run.

Findings of Study:
And Gen Z (18 to 28 years old), BNPL has evolved from a specialty service into a fundamental tool of finance that is used as an alternative to credit. Research conducted between 2024 to 2026 reveals that although BNPL is a significant source of liquidity, it is also a powerful behaviour driver of impulsivity in shopping.

1. Increase in Orders Volume & Spending
The literature has proven the direct relationship between BNPL use and high order volumes among younger people.

Higher Order Size: The main research paper on BNPL, published at the end of 2024, revealed that BNPL leads to a 6.42% increase in online orders compared to other means of payment.

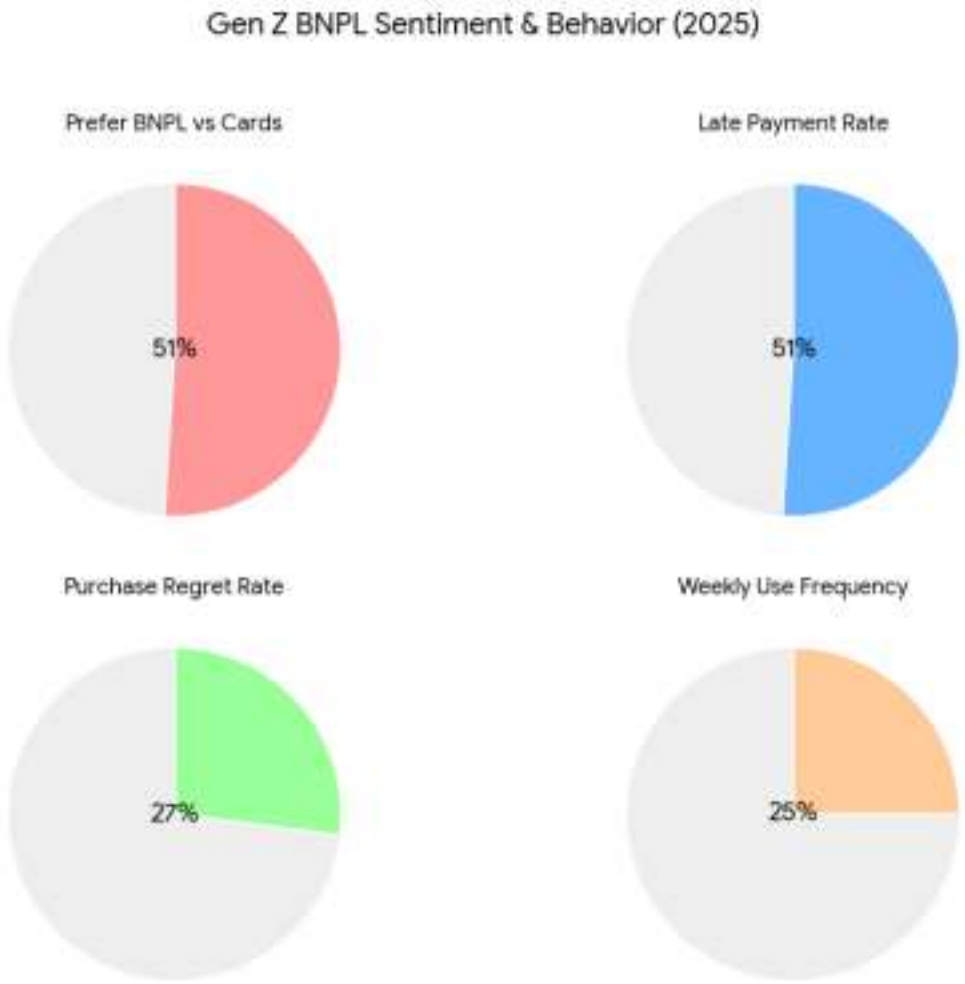
Perception of Affordability: Approximately 37% of respondents say that installments make expensive goods affordable, thus reducing the feeling of spending and the resistance to purchase.

Main Drivers: Purchasing is driven mostly by non-essential lifestyle categories. For instance, up to 41% of all orders include clothes and fashion items.

2. Impulsiveness & Materialistic Attitudes By adopting the services on social commerce platforms such as Instagram and TikTok, BNPL has introduced "frictionless" debt cycle for Gen Zers. Impulsive Purchases: In some recent surveys, 54% of Gen Zers confessed to having engaged in unplanned purchases just because they were able to pay by installments. Trigger Factors: Influencers such as Fear of Missing Out (FOMO) and peer pressure on social media are highly intensive triggers. Gen Z consumers are 32% more inclined to "spend what they want whenever they want" thanks to the BNPL availability. Materialistic Attitude Mediation: Some new studies show that usage of BNPL products can lead to the growth of materialistic attitude, serving as mediator for transforming wish for goods into impulse actions.

3. Financial Management and Debt Threats Even though there is a higher level of financial literacy among certain groups, Gen Z remains most vulnerable to mismanagement. Late Payments: By 2025, Gen Z users will have the highest late payments rate of 39-51%, where users report making a minimum of one late payment on time. "Debt Trap" Indicator: More than 55% of Gen Z users are aware that BNPL is used by them for making expenses that exceed their budgets. Simultaneous Loans: According to data provided by the Consumer Financial Protection Bureau (CFPB), 66% of users have more than one loan simultaneously issued by BNPL at the same time.

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Conclusion: According to the comparative data, Gen Z emerges as the key factor behind the increase in BNPL usage despite experiencing a greater level of friction in finance.

• **Behavioural Dominance:** Gen Z members have officially shifted toward installment debt since over 50 percent of the generation prefers installment loans.

• **Risk of Failure to Make Payments:** Although the usage is high, there is still a considerable risk involved as Gen Z tends to utilize these services not only due to their inability to secure a loan but also for impulse buying.

• **The "Debt Trap" Factor:** Several pieces of research indicate that members of this generation tend to use BNPL to meet unfulfilled credit requirements and, hence, fall into the trap of "financial fragility."

Conclusion:

The study of "Buy Now, Pay Later" (BNPL) reveals that it is a revolutionary financial innovation that dramatically increases the level of retail sales activity but carries many dangers for future financial well-being, particularly among Generation Z. Though it increases the purchasing capacity of customers and market inclusiveness, it also incites irresponsible spending behaviour.

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IMPACT OF VISUAL MERCHANDISING ON CONSUMER PURCHASE DECISIONS IN SPORTS RETAILING: A COMPARATIVE STUDY OF URBAN AND SEMI-URBAN CONSUMERS

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ABSTRACT
This study examines the impact of visual merchandising on consumer purchase decisions in sports retail stores, with a comparative analysis between urban and semi-urban consumers. Visual merchandising plays a vital role in enhancing product presentation and creating an engaging retail environment through elements such as window displays, store layout, lighting, product display, and signage. These elements are considered significant in influencing consumer perceptions and buying behavior.

The study adopts a quantitative research design and is based on primary data collected through a structured questionnaire using a five-point Likert scale. A sample of 120 respondents is selected using a stratified sampling technique to ensure representation of both urban and semi urban consumers. The research aims to identify key visual merchandising elements affecting purchase decisions and to examine differences in consumer responses across geographic segments.

The findings of the study are expected to provide insights for sports retailers in designing effective visual merchandising strategies to enhance customer engagement and improve purchase decisions. The study also contributes to existing literature by addressing the gap in sports retail and comparative consumer analysis in the Indian context.

Keywords: *Visual Merchandising, Consumer Purchase Decision, Sports Retail, Store Layout, Window Display, Signage, Urban and Semi-Urban Consumers.*

1. INTRODUCTION

In the highly competitive retail environment, attracting and retaining customers has become a significant challenge for retailers. Visual merchandising has emerged as a powerful tool that helps retailers enhance the aesthetic appeal of their stores and influence consumer buying behaviour. It involves the effective presentation of products through elements such as window displays, store layout, lighting, product arrangement, and promotional signage.

In the context of sports retailing, visual merchandising plays a crucial role in showcasing products such as apparel, footwear, and sports equipment in an appealing manner. With the growing popularity of sports and fitness activities, the demand for sports retail products has increased significantly. Retailers are increasingly focusing on improving store ambience and visual appeal to attract customers and encourage purchase decisions.

However, consumer behaviour may vary across different geographic segments, particularly between urban and semi-urban areas. Differences in exposure, lifestyle, and purchasing power can influence how consumers respond to visual merchandising strategies. Therefore, this study aims to examine the impact of visual merchandising on consumer purchase decisions in sports retailing, with a comparative analysis of urban and semi-urban consumers.

2. RESEARCH OBJECTIVES

1. To study the impact of visual merchandising on consumer purchase decisions in sports retail stores.

2. To identify the key visual merchandising elements influencing consumer purchase decisions.

3. To compare the impact of visual merchandising on consumer purchase decisions between urban and semi-urban consumers.

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3. LITERATURE REVIEW

Author & Year	Objectives of the Study	Key Findings	Research Gap
Kumar, V. P. V. (2018)	To study the impact of visual merchandising on impulse buying behaviour.	Visual merchandising elements such as window display, mannequins, and signage significantly influence impulse buying.	Focus limited to impulse buying; does not consider overall purchase decision.
Jain, R. & Bagdare, S. (2016)	To examine determinants of customer experience in retail stores.	Store ambience and visual appeal significantly influence customer satisfaction and buying behaviour.	Does not include comparative analysis between different consumer segments.
Kaur, S. & Singh, R. (2017)	To analyze the impact of visual merchandising on buying behaviour in organized retail.	Visual merchandising significantly affects consumer buying behaviour and impulse purchases.	Limited to organized retail; lacks focus on geographic comparison.
Mehta, N. P. & Chugan, P. K. (2013)	To study the impact of visual merchandising on impulse buying behaviour in apparel retail.	Window display, floor merchandising, and signage influence impulse buying behaviour.	Focus restricted to apparel segment; lacks broader retail context.
Raju, P. V. M. (2022)	To understand the influence of visual merchandising elements on	Visual merchandising elements significantly influence purchase	Limited to apparel retail; lacks focus on sports retail.

Customer Purchase Decisions.

Decisions In Retail Stores.

Saldanha, S. R. (2020)	To study the impact of visual merchandising on consumer purchase decisions in fashion retail in Mumbai.	Visual merchandising positively influences consumer purchase decisions.	Restricted to fashion retail and single location; lacks comparative analysis.
Chongkolrattanaporn, T. & Thai-Eiad, W. (2018)	To examine the influence of visual merchandising on sportswear consumer behaviour.	Visual merchandising influences consumer attitudes and purchasing behaviour.	Focuses on attitudes; lacks comparative and purchase decision analysis.

4. HYPOTHESIS FRAMEWORK

The study is based on a conceptual framework where visual merchandising is considered as the independent variable influencing consumer purchase decisions. Visual merchandising is further divided into key elements such as window display, store layout, lighting, product display, and signage. Additionally, residential area (urban and semi-urban) is considered as a grouping variable to examine differences in consumer responses.

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Visual Merchandising

↓

(Window Display, Store Layout, Lighting, Product Display, Signage)

↓

Consumer Purchase Decision

↓

(Comparison based on Urban vs Semi-Urban)

5. RESEARCH HYPOTHESIS

H1: Visual merchandising has a significant impact on consumer purchase decisions in sports retail stores.

H2: Visual merchandising elements (window display, store layout, lighting, product display, and signage) significantly influence consumer buying behaviour.

H3: There is a significant difference in the impact of visual merchandising on consumer purchase decisions between urban and semi-urban consumers.

6. RESEARCH METHODOLOGY

The study adopts a quantitative research approach to examine the impact of visual merchandising on consumer purchase decisions. Primary data was collected through a structured questionnaire using a five-point Likert scale. A stratified sampling technique was used to ensure representation of both urban and semi-urban consumers. The total sample size for the study was 120 respondents. The data was collected from respondents in the Thane District region. Visual merchandising was considered as the independent variable, while consumer purchase decision was the dependent variable. Statistical tools such as Reliability Analysis, Descriptive Statistics, Pearson's correlation analysis, Simple Linear Regression Analysis, Multiple Regression Analysis, T-test were used for data analysis.

7. DATA ANALYSIS AND INTERPRETATION

7.1. Reliability Analysis (Cronbach's Alpha)

Reliability analysis using Cronbach's Alpha was conducted to assess the internal consistency of the measurement scales.

Variable	No. of Items	Cronbach's Alpha (α)	Interpretation
Visual Merchandising	10	0.82	Good Reliability
Purchase Decision	5	0.78	Acceptable Reliability

Interpretation:

Cronbach's Alpha was used to assess the internal consistency of the measurement scales. The Visual Merchandising scale showed good reliability with an alpha value above 0.8, while the Purchase Decision scale demonstrated acceptable reliability with an alpha value above 0.7. This indicates that the questionnaire items are consistent and reliable for further statistical analysis.

7.2. Descriptive Statistics

Descriptive statistics were used to summarize the data and understand the overall response pattern of variables.

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Visual Merchandising	120	3.10	5.00	4.28	0.58
Purchase Decision	120	3.00	5.00	4.20	0.62

Interpretation:
The descriptive statistics show that both Visual Merchandising and Purchase Decision have high mean values, indicating that respondents generally agree that visual merchandising positively influences their buying behaviour in sports retail stores. The low standard deviation reflects consistency in responses, while the minimum and maximum values suggest that although responses span the Likert scale, they are concentrated towards agreement. Overall, the results indicate a positive perception of visual merchandising and its significant contribution to purchase decisions.

7.3. Correlation Analysis (Testing Hypothesis 1)

Pearson's correlation analysis was conducted to examine the relationship between visual merchandising and consumer purchase decisions in sports retail stores.

Variables	Visual Merchandising Questions Average	Purchase Decisions Question Average
Visual Merchandising Questions Average	1	
Purchase Decisions Question Average	0.850197463	1

Interpretation:
The Pearson correlation analysis revealed a correlation coefficient of **r = 0.850**, indicating a strong positive relationship between visual merchandising and consumer purchase decisions. This suggests that improvements in visual merchandising elements such as window display, store layout, lighting, product display, and signage are associated with an increase in consumers' likelihood to make purchase decisions in sports retail stores.

The high correlation value demonstrates that visual merchandising plays a significant role in influencing consumer buying behaviour. Therefore, it can be concluded that effective visual merchandising strategies enhance customer attraction and positively impact purchase decisions.

7.4. Simple Linear Regression Analysis (Testing Hypothesis 1)

Simple linear regression was applied to analyze the impact of visual merchandising on consumer purchase decisions.

Model	Multiple R	R Square	Adjusted R Square	Std. Error
1	**0.850**	**0.723**	**0.720**	**0.324**

Interpretation:
Simple linear regression analysis was conducted to examine the impact of visual merchandising on consumer purchase decisions. The results indicate that the model is statistically significant ($F = 307.74$, $p < 0.05$) with an R^2 value of 0.723, suggesting that 72.3% of the variation in purchase decisions is explained by visual merchandising. The regression coefficient ($\beta = 0.936$) shows a strong positive impact, and the p-value ($p = 1.13679 \times 10^{-34}$) confirms that the relationship is highly significant. Hence, the alternative hypothesis (H_1) is accepted.

7.5. ANOVA Table

Model	Sum of Squares	Df	Mean Square	F	Significance
Regression	32.301	1	32.301	307.74	1.1367E-34
Residual	12.386	118	0.105		
Total	44.687	119			

Interpretation:
The ANOVA results show that the regression model is statistically significant, with an F-value of **307.74** and

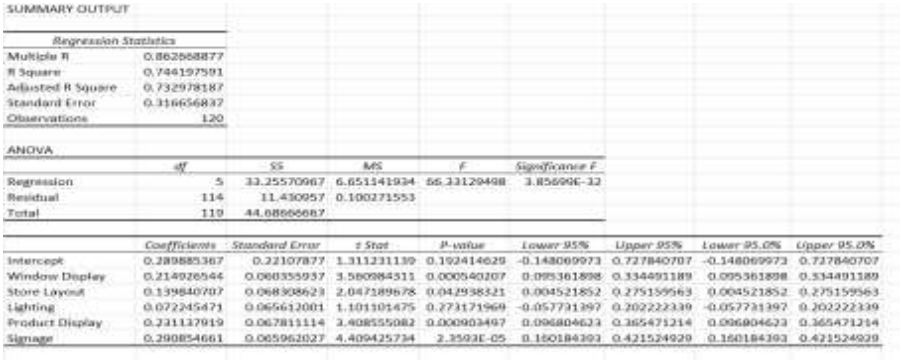
a p-value (Significance F) of **1.13679E-34**, which is less than 0.05. This indicates that the model is a good fit and visual merchandising significantly explains the variation in consumer purchase decisions.

7.6. Coefficient Table

Variable	Coefficient	Std. Error	T-stat	p-value	Significance
Intercept	0.334	0.223	1.496	0.137	Not - Significant
Visual Merchandising	0.936	0.053	17.543	1.1367E-34	Significant

Interpretation:
The coefficient of visual merchandising (**β = 0.936**) is positive and statistically significant ($p < 0.05$), indicating that visual merchandising has a strong positive impact on consumer purchase decisions. The intercept is not significant ($p > 0.05$), suggesting it does not meaningfully contribute to the model.

7.7. Multiple Regression Analysis (Testing Hypothesis 2)
Multiple regression analysis was used to determine the influence of different visual merchandising elements on purchase decisions.



SUMMARY OUTPUT

Regression Statistics

Multiple R	0.862668877
R Square	0.744197591
Adjusted R Square	0.732978187
Standard Error	0.316656837
Observations	120

ANOVA

	df	SS	MS	F	Significance F
Regression	5	33.25570967	6.651141934	66.33129498	1.85699E-32
Residual	114	11.43095567	0.100271553		
Total	119	44.68666667			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.289885367	0.22107877	1.311231139	0.192414629	-0.148069973	0.727840707	-0.148069973	0.727840707
Window Display	0.214926544	0.060355937	3.560984511	0.000540207	0.095361898	0.334491189	0.095361898	0.334491189
Store Layout	0.139840707	0.068308623	2.047189678	0.042938321	0.004521852	0.275159563	0.004521852	0.275159563
Lighting	0.072245471	0.065612001	1.101101475	0.273171969	-0.057731397	0.202222339	-0.057731397	0.202222339
Product Display	0.231137919	0.067811114	3.408555082	0.000903497	0.096804623	0.365471214	0.096804623	0.365471214
Signage	0.290854661	0.065962027	4.409425734	2.3593E-05	0.160184393	0.421524929	0.160184393	0.421524929

Variable	**Coefficient**	**p-value**	**Significance**
Window Display	0.215	0.00054	Significant
Store Layout	0.140	0.0429	Significant
Lighting	0.072	0.273	Not Significant
Product Display	0.231	0.00090	Significant
Signage	0.291	0.00002	Most Significant

Interpretation:
Multiple regression analysis was conducted to examine the influence of visual merchandising elements on consumer purchase decisions. The results indicate that the model is statistically significant ($F = 66.33$, $p < 0.05$) with an R^2 value of 0.744. Window display, store layout, product display, and signage were found to have a significant positive impact on purchase decisions, while lighting was not significant. Among all variables, signage emerged as the most influential factor. Hence, the hypothesis is partially accepted.

7.8. T-Test (Testing Hypothesis 3)
An independent sample t-test was conducted to compare the purchase decisions between urban and semi-urban consumers.

Statistic	Urban	Semi-Urban
Mean	4.307	4.102

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Standard Deviation	0.581	0.638
Sample size (n)	67	53

T-test Results

Test Statistic	Value
T-value	1.823
p-value (two-tail)	0.071
Significance Level	0.05

Interpretation:
An independent sample t-test was conducted to compare the purchase decisions of urban and semi-urban consumers. The results indicate that there is no statistically significant difference between the two groups ($t = 1.823$, $p = 0.071 > 0.05$). Hence, the null hypothesis is accepted, suggesting that the impact of visual merchandising on purchase decisions does not differ significantly between urban and semi-urban consumers.

8. LIMITATION OF THE STUDY

The present study is subject to certain limitations. Firstly, the sample size of 120 respondents may not adequately represent the entire population of sports retail consumers. Secondly, the study is geographically limited to the Thane District, which may restrict the generalizability of the findings to other areas. The research is also constrained by time, limiting the scope of data collection and analysis. Additionally, the study relies on self-reported data collected through a structured questionnaire, which may be affected by respondent bias or inaccuracies. The research focuses only on selected visual merchandising elements such as display, layout, lighting, and signage, while other factors like pricing, brand image, and personal preferences are not considered. Furthermore, the study is confined to offline sports retail stores and does not include online retail platforms, where consumer behaviour and visual merchandising practices may differ significantly.

9. CONCLUSION

The present study examined the impact of visual merchandising on consumer purchase decisions in sports retail stores, with a comparative analysis between urban and semi-urban consumers. The findings reveal that visual merchandising plays a significant role in influencing consumer buying behavior. Elements such as product display, signage, window display, store

layout, and lighting were found to positively affect purchase decisions by enhancing product visibility and creating an engaging shopping environment.

The study also identified that among the various elements, product display and promotional signage have a relatively stronger influence on consumer decisions. Furthermore, the analysis indicated that there is no significant difference between urban and semi-urban consumers in terms of the impact of visual merchandising, suggesting that consumers across different geographic segments respond similarly to visual merchandising strategies.

Overall, the study concludes that effective visual merchandising is a crucial factor in driving consumer purchase decisions in sports retailing and plays an important role in improving customer experience and retail performance.

10. SUGGESTIONS / RECOMMENDATIONS

Based on the findings of the study, the following suggestions are proposed: **10.1. Focus on Product Display**

Retailers should invest in attractive and well-organized product displays, including the use of mannequins and creative arrangements to capture customer attention.

10.2. Enhance Promotional Signage

Clear and appealing signage, including discount offers and promotional messages, should be effectively used to influence purchase decisions.

10.3. Improve Store Layout

Retailers should design store layouts that allow easy navigation and product accessibility, enhancing the overall shopping experience.

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10.4. Use Effective Lighting Techniques
Proper lighting should be used to highlight key products and create a pleasant in-store atmosphere.

10.5. Maintain Consistency Across Locations
Since no major difference was found between urban and semi-urban consumers, retailers can implement similar visual merchandising strategies across different locations.

10.6. Regularly Update Displays
Frequent changes in store displays and themes can keep the store environment fresh and engaging for customers.

10. Future Scope of the Study:
The present study opens several avenues for future research by highlighting the importance of visual merchandising in influencing consumer purchase decisions within the sports retail sector. While the study provides valuable insights into the role of key visual merchandising elements and their impact across urban and semi-urban consumers, it also identifies areas that require further exploration.

11.1. Inclusion of Online Retail
Future studies can examine the role of visual merchandising in online sports retail platforms such as e-commerce websites and mobile applications. Digital elements like product images, videos, and website layout can be analyzed. A comparative study between online and offline retail environments can provide deeper insights into consumer behavior.

11.2. Expansion to Other Retail Sectors
The study can be extended to other retail sectors such as fashion, electronics, and grocery retail to compare the effectiveness of visual merchandising. Different sectors may have varying consumer expectations and responses. This will help in understanding industry-specific merchandising strategies.

11.3. Larger and Diverse Sample
Future research can include a larger sample size across multiple cities and regions to improve the generalizability of results. Including respondents from different demographic and socio economic backgrounds can enhance the reliability of findings. This would provide a more comprehensive understanding of consumer behavior.

11.4. Inclusion of Additional Variables
Further studies can incorporate additional factors such as pricing, brand image, store service quality, and consumer psychology. These variables may also influence purchase decisions

along with visual merchandising. Including them can provide a more holistic view of consumer buying behavior.

11.5. Longitudinal Study
Future studies can examine changes in consumer behavior over time to understand evolving retail trends.

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ADVANCED EMOTION RECOGNITION FOR INTELLIGENT ASSISTANTS

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ABSTRACT
Emotion recognition has provided the capability for advanced interaction between human-computer intelligent systems or assistants [2]. Understanding human emotions helps machines respond in a more natural and context-aware manner. In the current system, not only speech but also text inputs are taken into consideration in order to produce results. It is especially useful in applications such as virtual assistants, customer support systems, and mental health monitoring in the medical field [4].

This paper introduces an emotion recognition system based on three modalities - audio, text, and video features. The acoustic model used is Wav2Vec2-XLSR; the linguistic model is DistilRoBERTa, while the visual feature extraction component is a CNN-based FER model. The results of these sub-models are combined into a final output by applying a late fusion technique. Experimental results have shown that the use of all three modalities provides better performance than those in the case of unimodal recognition systems [6][8].

Keywords: *Multimodal Emotion Recognition, Affective Computing, Speech Emotion Recognition, Wav2Vec2, FER, Natural Language Processing, Human-Computer Interaction.*

1. INTRODUCTION
Intelligent emotion recognition makes it possible for intelligent systems to interact with people in a more relevant way [2]. If a machine understands the emotions expressed by a person, it will be able to respond appropriately, especially in tasks like interacting with a virtual assistant, customer support systems, and mental health assistance services [4]. In the current system, not only speech but also text inputs are taken into consideration in order to produce results [5].

However, most current systems rely heavily on a single mode of input [6]. The input analysis process usually focuses only on acoustic features from speech or only on text. This drawback goes against the multidimensionality of human emotions [12]. Unimodal systems have problems interpreting human emotions because in practical situations there might be noise, unclear context, or even sarcasm [3].

In order to improve the performance of emotion recognition, a new method is proposed in the current research paper [8]. It involves integrating both types of features into a single input of speech. Instead of processing just one type of input, two independent processing lines one for audio and the other one for text will be used [5]

As regards the audio signals, after going through a basic form of processing, the signal is further processed using a pre-trained Wav2Vec2-XLSR model [11]. This model acts on the raw waveform and has been designed to capture deeper acoustic features such as tone, pitch, rhythm, and prosody [6]. In addition, a transcript obtained using a speech-to-text module in the textual pipeline is then analysed using a DistilRoBERTa based model to extract semantics and affect from the audio clip [8].

Final emotion prediction will be obtained via the combination of audio and text output scores using score-level weighted multimodal fusion technique [12]. As per the technique, each output from an audio and text model predicts emotions independently, but before being fused, the resultant scores are combined in a balanced way. Such a multimodal fusion increases the consistency of predictions and improves the performance of both precision and reliability, especially in case the input is ambiguous [8]. Late fusion method will be used to combine the outputs from two modalities by mapping their scores into common emotion space and merging [6].

By using transformer-based models along with this multimodal fusion setup, the system becomes more reliable and practical for real-world use [11]. Compared to unimodal approaches, it performs noticeably better, particularly in scenarios like intelligent virtual assistants, real-time emotion-aware systems, and healthcare monitoring, where accuracy and robustness really matter [2][10].

2. RELATED WORK
Speech emotion analysis has become an increasingly important topic in human-computer interaction research. Previous work on this subject mostly utilized acoustic cues like MFCC, pitch, and energy, which would then be fed into conventional machine learning algorithms, such as SVMs and HMMs [3]. Although these

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techniques are effective in idealized scenarios, they tend to face challenges in practical settings where factors like background noise, different speakers, and insufficient context can affect performance [6].

However, with the rise of deep learning techniques, new neural network models such as CNNs, RNNs, and LSTM have become the go-to approach for speech emotion classification tasks [6]. The primary benefit of using these models is their ability to extract rich feature representations directly from the data, obviating the need for manual feature engineering [1]. In recent years, transformer models, notably Wav2Vec2, have made remarkable progress in this field [11]. Unlike previous models that require preprocessed data, these models process raw audio waveforms directly while also being better at modeling long-term dependencies in speech, including prosody [6].

At the same time, text-based emotion recognition has attracted quite a lot of interest, mainly by way of utilizing natural language processing (NLP) methods to make meaning out of speech transcripts [8]. One of the strengths of the use of such NLP architectures as BERT and DistilRoBERTa lies in their bidirectionality in dealing with language an attribute that significantly boosts their capacity to pick up subtleties and context [1]. This is why training such models using datasets such as GoEmotions and ISEAR can produce significant benefits in detecting complex emotions, such as sarcastic comments and changes in emphasis [4]

Recently, facial expression recognition (FER) approaches started gaining interest as another potential source of emotional data in addition to audio and text-based sources [8]. The methods in this regard usually involve deep convolutional neural networks and work by analyzing subtle differences in muscle movement in facial expressions [6]. As a result, facial expression recognition can serve as another useful channel for recognizing emotions that could be missed otherwise [4].

While this variety of approaches is certainly valuable and allows for detecting different nuances, the use of only one modality whether it be audio or text does still come with certain shortcomings [12]. In particular, such approaches are relatively vulnerable to noise and unable to catch the whole range of information available in emotions [6]. Therefore, scientists started applying multimodal approaches involving multiple modalities (audio, text, images) [8].

The suggested system uses a multimodal architecture that implements the late fusion approach, where each mode computes its own emotion probability values independently [12]. Next, these probability values are mapped into a common feature space and combined using a weighted average operation [8]. Essentially, this method increases the precision and consistency of the system when compared to techniques that use only one mode [6]. Multimodal emotion recognition becomes increasingly critical for developing systems able to perform under real-world settings [10].

At the same time, most existing research works consider only one or two modes [6]. The present study extends the current state-of-the-art by considering three different modes within one fusion framework [8].

3. PROPOSED METHODOLOGY

This paper proposes a multimodal emotion recognition (MER) approach that was designed to overcome certain shortcomings associated with traditional speech emotion recognition (SER) systems [8]. Speech-based recognition systems often suffer from reduced accuracy caused by various factors typical for practical applications such as noise and incompleteness of data [3][6].

In order to solve this problem, this system uses a variety of inputs, including vocal, text and, where available, facial data [12]. The use of several inputs results in higher levels of accuracy [8].

In the described methodology, parallel approaches were used for making predictions. Basically, the proposed system operates through two channels, one related to prosody and voice and another associated with semantics.

1. **Acoustic Path:** This path focuses primarily on the delivery features of speech, including features like tone, pitch, loudness, and rhythm. It uses a pre-trained model called Wav2Vec2-XLSR [11], which works directly on the raw audio waves. The use of convolutional layers and multi-head attention helps the model learn more about the acoustic properties and contextual information available in the speech data [6].
2. **Linguistic Path:** This path focuses mainly on the semantics of the speech data. The first step is to convert the audio data into text using a Speech-to-Text (STT) component. The STT component is based mostly on MFCC features and acoustic modeling [3]. The text generated from the audio is further processed using the DistilRoBERTa model [8].

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Apart from the above-mentioned two modes of data, in cases where there is any visual data present, the system may also have an additional layer for Facial Expression Recognition (FER) [8]. In such instances, a Convolutional Neural Network (CNN) trained using datasets like FER-2013 can be used to recognize the affective information conveyed by facial expressions [6].

After extracting the features of each modality separately, the results are then combined using the final emotion scoring stage [12]. With this setup, each modality computes probability scores for a certain set of emotions. These scores are then translated into the common emotion space and fused together using a weighted scheme, where each modality's contribution is based on its respective importance [8]:

Final Emotion Score = w_1(Audio Score) + w_2(Text Score) [+ w_3(Vision Score)]

This fusion method helps balance out the effect of each modality on the results of the analysis, thus increasing the system's precision [6].

The system processes each input speech signal through these parallel pipelines, ensuring efficient extraction of high-level emotional representations using state-of-the-art Transformer models [11]. The proposed methodology is implemented in four stages:

1. First, the audio and text models are developed separately so they can function independently.
2. Next, both models are validated to ensure they are working as expected.
3. After that, the fusion weights are tuned to get the best combined performance.
4. Finally, the system is evaluated and compared with unimodal approaches to measure improvements[6].

Through its modular design, the model becomes more interpretable and scalable, while also showing better generalization across different speech situations in the real world. In general, the combination of multiple modalities using advanced deep learning techniques results in significantly better performance compared to conventional one-modal emotion recognition systems.

B. System Architecture

The system architecture is built around several key components:

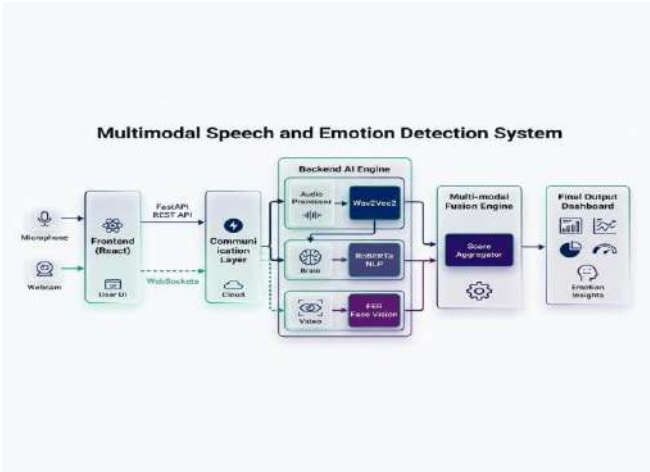


Fig. 1 System Architecture

1. **Speech Input Module:** The process starts with receiving raw audio input from the user sampled at about 16 kHz per second. This is the main input data which goes to both the acoustic and linguistic processing chains.
2. **Acoustic Feature Extraction Path:** For the first chain, the audio stream is passed to the pretrained Wav2Vec2-XLSR model (from Hugging Face) [11], which processes the waveforms directly instead of using spectrograms only. First, the convolutional neural network learns basic feature patterns and then uses the transformer architecture with multi-head attention mechanism to recognize more sophisticated patterns and prosody (such as pitch, tone, and rhythm) [6]. Fine-tuning for emotion classification takes place, and the result is sent to the classifier providing probabilities of emotions occurring [10].
3. **Linguistic Feature Extraction Path:** At the same time, an ASR (Automatic Speech Recognition) pre-processing model transcribes the speech input into text form. The model applies MFCC (Mel-frequency

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cepstral coefficients) in addition to acoustic modeling (HMM/CTC) and language modeling [3]. Then the transcription is cleaned and normalized before analyzing using DistilRoBERTa model, learning semantics and emotional contexts through tokenizing and processing bi-directionally [8]. Another set of probabilities for emotional categories is generated at this point [1].

4. **Weighted Fusion Module:** Finally, the results are fused at the score level since both chains produce predictions over the same set of emotions. Their probabilities can be mapped to the common space, and further combined using weighted averaging (late fusion strategy) [12].
5. **Final Emotion Score:** The final score is obtained through combining modality outputs [8]: *Final Emotion Score* = w_1*(Audio Score)* + w_2*(Text Score)* [+ w_3*(Vision Score)*
6. **Emotion Classification Output:** Finally, the system selects emotion with the highest combined probability as the output. By integrating multiple modalities, the system becomes more accurate, reduces ambiguity, and performs more reliably in real-world and noisy conditions [10].

IV. EXPERIMENTAL RESULTS

The proposed model is evaluated on benchmark emotion recognition datasets. The dataset RAVDESS (Ryerson Audio-Visual Database of Emotional Speech and Song) [13] is used for evaluating emotion recognition in audio [10]. Meanwhile, the FER-2013 dataset [14] will be used for assessing recognition in the facial expressions of emotions [8]. The evaluation of the emotion recognition capabilities of the model in texts can be achieved using large datasets such as GoEmotions [15].

The dataset covers a range of emotions, including happy, sad, angry, fear, surprise, and neutral. To evaluate the model properly, the data is split into training and testing sets using a standard 80:20 ratio, which helps provide a fair measure of performance.

ID	Input	Actual Emotion	Audio	Text	Vision	Final Output
01	High-pitch shouting	Angry	Angry	Neutral	Angry	Angry
02	Sarcastic "Great job"	Sad	Sad	Happy	Neutral	Sad
03	Quiet sobbing	Sad	Sad	Neutral	Sad	Sad
04	"I'm not sure..."	Fear	Fear	Neutral	Fear	Fear
05	Sudden "Wow!"	Surprise	Surprise	Surprise	Happy	Surprise
06	Monotone reading	Neutral	Neutral	Neutral	Neutral	Neutral
07	Muffled laughing	Happy	Neutral	Happy	Happy	Happy
08	Looking away while yelling	Angry	Angry	Angry	Neutral	Angry

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Model Type Primary Technology Accuracy (%)
Audio-only Model Wav2Vec2-XLSR Transformer 80% - 82%
Text-only Model DistilRoBERTa-Base (NLP) 85% - 89%
Visual-only Model FER-CNN (MTCNN Detector) 84%
Multimodal Model Hybrid Late-Fusion Engine 90% - 95%

CONCLUSION

In this paper, a multimodal emotion recognition system integrating acoustic, linguistic, and visual features has been proposed [8]. The system utilizes advanced transformer-based models such as Wav2Vec2-XLSR for audio analysis [11] and DistilRoBERTa for text processing [1], along with a CNN-based FER model for facial expression recognition [6]. A weighted late fusion strategy is employed to combine the outputs from different modalities, enhancing the overall prediction capability [12].

The experimental results show that the proposed multimodal approach achieves higher accuracy and robustness compared to unimodal systems by leveraging complementary information from different data sources [8][10].

In terms of applicability, the presented system can be applied to various industries. In particular, it can be helpful in areas related to customer support, virtual assistants, and medical care [2][4]. Future research may focus on making the system capable of working in real-time, handling multiple languages, and implementing an advanced fusion method [5].

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ANALYTICS VERSUS INFLUENCE: UNDERSTANDING GENERATION Z INVESTMENT DECISIONS IN THE AGE OF DIGITAL TRENDS

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ABSTRACT
The rapid expansion of digital technology has significantly shaped how Generation Z (born 1997–2012) approaches financial investment. Unlike previous generations, Gen Z investors have grown up with access to real-time financial analytics tools, mobile trading applications, and a continuous stream of investment-related content across social media platforms such as YouTube, Instagram, and Reddit. This study explores the balance between data-driven financial analysis and digital social influence in shaping Gen Z investment decisions—specifically, whether this cohort relies more on structured analytical tools and market data, or on trends and content disseminated by financial influencers and online communities. Using a structured survey of 50 Gen Z respondents analyzed through descriptive statistics via Microsoft Excel, the study captures behavioral patterns across students, working professionals, and active digital investors. The findings highlight the growing interplay between financial analytics and social media influence, while also shedding light on how peer effects and digital financial communities factor into investment choices. The study contributes to a broader understanding of how information consumption in the digital age is reshaping retail investment behavior among young adults.

Keywords*—Generation Z, financial analytics, social media influence, investment behavior, digital platforms, financial influencers*

I. INTRODUCTION
In the recent past, the financial investment environment has undergone major transformations due to the rapid development of digital technology. The development of online trading platforms, financial applications, and the availability of market information have enabled individuals to participate more actively in investment activities. This transformation has particularly influenced Generation Z—a population cohort that has been raised with ubiquitous access to the internet, smartphones, and social media [1].

Unlike previous generations, Gen Z investors do not depend solely on conventional sources such as financial experts, newspaper articles, or financial reports. Rather, these young investors frequently seek investment-related information through digital platforms. Modern financial analysis tools provide investors with the ability to track stock performance, analyze market trends, and assess the potential of investment opportunities. Simultaneously, social media platforms such as YouTube, Instagram, and Reddit have emerged as popular mediums for sharing financial information [2].

With the rise in popularity of financial influencers and online communities, a new environment has been created where investment ideas can easily spread among young investors. Many members of Generation Z become aware of different investment opportunities through internet-based content or trends [3]. An important question arises: whether the investment decisions of Generation Z are based on in-depth financial analysis or driven by trends propagated through social media platforms.

This study seeks to investigate this question by examining the comparative and combined influence of financial analytics tools and social media platforms on the investment decision-making patterns of Generation Z in the digital financial ecosystem.

A. Research Objectives
The primary objectives of this study are twofold. First, to examine the extent to which Generation Z investors rely on financial analytics tools, market data, and digital investment platforms while making investment decisions, and to understand how analytical information such as stock performance, financial indicators, and market trends influences their investment behavior. Second, to analyze the influence of social media platforms such as YouTube, Instagram, and Reddit, including the role of influencers, online communities, and viral financial content in shaping the investment attitudes and decision-making patterns of Generation Z investors.

II. LITERATURE REVIEW
Ahirwar and Rawat [1] examined the growing role of Artificial Intelligence in financial investment using a mixed-methods approach that included surveys of finance professionals and expert interviews. The findings indicate that AI technologies such as machine learning, algorithmic trading, and natural language processing

significantly improve portfolio optimization, market forecasting, and investment efficiency in modern digital financial markets. However, the study is limited by its primary focus on institutional adoption of AI and does not sufficiently examine how digital platforms or social media influence individual investor behavior.

Smrithi and Selvi [2] examined how social media engagement influences financial decision-making among Generation X, Millennials, and Generation Z using a quantitative survey approach. The findings indicate that social media platforms significantly shape individuals' investment choices and financial awareness across different age groups. However, the study is limited by its localized sample and does not deeply explore how digital financial ecosystems influence long-term investment behavior.

Warkar and Durai [3] analyzed the impact of behavioral biases and finfluencer narratives on Gen Z investment decisions using survey data analyzed through structural equation modeling. The findings indicate that behavioral biases such as herding, overconfidence, and anchoring significantly influence investment decisions, with finfluencers acting as a mediating factor in shaping investor behavior.

Ahuja and Grover [4] investigated the relationship between excessive social networking site usage and stock market investment intentions among Generation Z using structural equation modeling. The findings indicate that high social media engagement positively influences investment intentions, mediated by financial attitude and perceived behavioral control.

Krishnaprabha et al. [5] explored how social media platforms influence investment behavior and investment horizon preferences among young investors using correlation and regression analysis. The findings indicate that frequent exposure to social media financial content tends to encourage short-term investment strategies and increased market participation.

Utami et al. [6] analyzed how financial knowledge and social influence affect Generation Z's intention to invest, using survey data from university students and applying the Theory of Planned Behavior. The findings indicate that financial literacy and financial attitudes significantly mediate the relationship between financial knowledge, social influence, and investment intention.

Phung and Quyen [7] examined the influence of finfluencer exposure, financial risk perception, and personal investment rate on Gen Z investment behavior using quantitative survey analysis. The findings indicate that finfluencer exposure and perceived community influence significantly shape investment decisions and risk-taking behavior among young investors.

Chung [8] explored the combined influence of psychological biases, financial literacy, and digital information sources on Gen Z investment decisions through a conceptual and literature-based analysis. The findings suggest that biases such as overconfidence, confirmation bias, and loss aversion significantly influence investment behavior when financial knowledge is limited.

Priya and Agrawal [9] investigated how digital platforms and influencer marketing shape the purchasing behavior of Generation Z through survey-based quantitative research. The findings indicate that social media engagement and influencer credibility significantly influence consumer decisions among Gen Z users.

Patil and Gokhale [10] compared the investment patterns of millennials and Generation Z using survey-based primary data. The findings indicate that both generations demonstrate increasing participation in financial markets, with Gen Z showing strong interest in digital assets and technology-driven investment platforms.

Umakanth et al. [11] examined how social media influencers affect the financial decision-making behavior of Generation Z using a mixed-methods approach. The findings indicate that authenticity, relatability, and content relevance significantly influence trust and engagement, leading many young users to rely on influencer advice for investment decisions.

Choudhary and Yamuna [12] investigated the relationship between influencer content exposure, trust, and investor attitudes using regression and mediation analysis. The findings indicate that influencer credibility and follower engagement significantly shape investor attitudes, while perceived risk partially mediates the relationship between trust and investment decisions.

Divy et al. [13] analyzed the awareness and perception of Generation Z regarding digital investment assets such as cryptocurrencies and NFTs using correlation-based statistical analysis. The findings suggest that awareness of digital assets is increasing among Gen Z; however, age alone does not significantly determine engagement with digital investments.

Rosdiana et al. [14] conducted a systematic literature review and bibliometric analysis to examine factors influencing investment behavior among Millennials and Generation Z across different cultural contexts. The findings indicate that behavioral biases, financial literacy, digital technology adoption, and sociocultural values are central determinants of investment decisions.

Kaur [15] explored how AI technologies enhance personal financial planning and investment decision-making through automated analytics and predictive modeling. The findings indicate that AI-driven tools such as robo-advisors improve portfolio optimization, risk management, and personalized financial recommendations.

B. Research Gap

A review of the selected literature reveals that existing studies have significantly contributed to understanding the factors influencing investment behavior among young and retail investors. Several researchers have examined the role of financial literacy, behavioral biases, fintech adoption, and digital investment platforms in encouraging data-driven investment decisions. Simultaneously, a growing body of research highlights the influence of social media platforms, financial influencers, and online communities in shaping investment awareness, attitudes, and risk perceptions among Generation Z investors [1]–[15]. While these studies provide valuable insights, most of them analyze these determinants independently, focusing either on the impact of financial analytics tools and market information or on the influence of social media and digital trends.

However, limited empirical research has attempted to integrate both analytical and social dimensions of investment decision-making within a single framework, particularly in the context of Generation Z investors who operate within a highly digital and information-rich environment. Existing studies rarely examine how financial analytics tools, market data, and digital investment platforms interact with social media influence, viral financial content, and influencer recommendations in shaping investment decisions. Furthermore, there is a lack of research specifically investigating how analytical financial indicators such as stock performance, financial ratios, and market trends compare with or complement social media-driven information in influencing the investment behavior of Gen Z investors. Therefore, this study seeks to address this gap by examining the combined and comparative influence of financial analytics and social media platforms on the investment decision-making patterns of Generation Z in the digital financial ecosystem.

III. METHODOLOGY

This study follows a quantitative research approach to examine how financial analytics tools and social media influence the investment decisions of Generation Z investors. The research uses both primary and secondary data to understand the relationship between analytical financial information and digital social influence in modern investment behavior.

A. Data Collection

The primary data was collected through a structured online questionnaire survey consisting of multiple-choice and Likert-scale questions related to investment behavior, use of financial analytics tools, and the influence of social media platforms. The survey gathered responses from approximately 50 participants, primarily belonging to the Generation Z age group (below 18 to 30 years), including students, working professionals, and a small number of business owners who actively use digital platforms.

In addition, secondary data was collected from academic articles, financial reports, and online publications related to Gen Z investment behavior and digital investment trends.

B. Data Analysis Approach

The collected primary data was analyzed using descriptive statistical techniques such as percentage analysis and graphical representation to identify patterns in how young investors rely on financial analytics tools and social media sources when making investment decisions.

IV. RESULTS AND DISCUSSION

The data analysis for this study is based on the primary survey responses collected through an online questionnaire from approximately 50 respondents, primarily belonging to the Generation Z age group (18–25 years) along with a small proportion of respondents below 18 and a few young working professionals aged between 26–30. The responses recorded in the survey dataset indicate that most participants are students, representing a demographic that is increasingly entering financial markets through digital investment platforms. The purpose of the analysis is to examine how Gen Z investors use financial analytics, digital platforms, and social media sources when making investment-related decisions.

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A. Objective 1: Analytics Reliance and Financial Data Usage

The survey responses show that many participants frequently check financial data such as stock performance history, financial ratios, market indicators, and market trends before making investment decisions. Financial analytics tools and financial news websites appear to be commonly used sources for gathering investment-related information. The availability of digital investment applications and online financial dashboards allows young investors to easily access market data and analytical insights. As a result, digital platforms play an important role in enabling users to monitor financial information, compare investment alternatives, and understand potential risks and returns associated with different investment options.

OBJECTIVE 1 · Analytics Reliance & Financial Data Usage

Primary Information Source

Source	n
Financial analytics tools/apps	17
Financial news websites	14
Social media	12
Friends or peers	7

Analytics App Usage Frequency

Frequency	n
Never	3
Rarely	11
Sometimes	24
Often	0
Very frequently	12

Fig. 1. Primary Information Source and Analytics App Usage Frequency (n = 50).

As shown in Fig. 1, the largest group of respondents (n = 17) identified financial analytics tools and apps as their primary information source, followed by financial news websites (n = 14) and social media (n = 12). In terms of analytics app usage frequency, a majority reported using such tools "Sometimes" (n = 24), while 12 respondents used them "Very frequently," indicating a growing adoption of digital analytical resources among Gen Z investors.

Investor Confidence in Financial Data

Confidence Level	n
Not confident	9
Slightly confident	14
Moderately confid	25
Very confident	2

Pre-Investment Data Check Frequency

Check Frequency	n
Never	0
Rarely	7
Sometimes	8
Often	17
Always	18

Fig. 2. Investor Confidence in Financial Data and Pre-Investment Data Check Frequency (n = 50).

Fig. 2 illustrates that 25 respondents reported being "Moderately confident" in financial data, while 14 expressed only slight confidence and 9 reported no confidence at all. Despite this, the majority of respondents check financial data before investing—either "Always" (n = 18) or "Often" (n = 17)—suggesting that even investors with moderate confidence still engage in pre-investment data analysis.

Dominant Investment Decision Factor

Factor	n
Market performance	26
Advice from others	12
Financial analysis	9
Social media trends	3

Fig. 3. Dominant Investment Decision Factor (n = 50).

Fig. 3 presents the dominant investment decision factor among respondents. Market performance emerged as the leading factor (n = 26), followed by advice from others (n = 12), financial analysis (n = 9), and social media trends (n = 3). This indicates that while Gen Z investors are influenced by multiple sources, market-based analytical factors remain the most dominant driver of their investment decisions.

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B. Objective 2: Social Media and Influencer Impact on Investment Decisions

In addition to analytical sources, the survey responses highlight the presence of social media platforms as a significant channel for financial information and awareness. Platforms such as YouTube, Instagram, Reddit, and other online communities are used by respondents to learn about investment opportunities, market discussions, and financial content shared by influencers or financial educators. These platforms provide exposure to a wide range of investment-related topics and discussions that circulate within digital communities.

OBJECTIVE 2 · Social Media & Influencer Impact on Investment Decisions			
Platform Used for Investment Learning		Overall Social Media Influence Level	
Platform	n	Influence Level	n
Instagram	17	No influence	4
Other	14	Low influence	8
YouTube	14	Moderate influenc	23
Reddit	5	Very high influence	15

Fig. 4. Platform Used for Investment Learning and Overall Social Media Influence Level (n = 50).

As depicted in Fig. 4, Instagram (n = 17) emerged as the most popular platform for investment learning, followed by YouTube (n = 14) and other platforms (n = 14), while Reddit accounted for a smaller share (n = 5). In terms of overall social media influence, 23 respondents reported "Moderate influence," and 15 reported "Very high influence," indicating that social media plays a meaningful role in shaping investment awareness among Gen Z.

Influencer Impact Rating (1=Low, 5=High)		Trust in Social Media Investment Content
Rating	n	Trustworthiness
1	5	Not trustworthy
2	6	Slightly trustworthy
3	23	Somewhat trustworthy
4	11	Very trustworthy
5	5	

Fig. 5. Influencer Impact Rating (1–Low, 5–High) and Trust in Social Media Investment Content (n = 50).

Fig. 5 shows that most respondents gave influencers a moderate impact rating of 3 (n = 23), while 11 rated the impact at 4 and only 5 rated it at the highest level of 5. The trust distribution further reveals that a substantial share found social media investment content "Somewhat trustworthy," with fewer respondents expressing high levels of trust. This reflects a cautious but receptive attitude among Gen Z investors toward influencer-driven financial content.

Invested Based on Social Media Trend	
Response	n
Never	17
Rarely	12
Once or twice	17
Yes, multiple times	4

Fig. 6. Investment Behavior Based on Social Media Trends (n = 50).

Fig. 6 reveals that 17 respondents had never invested based on a social media trend, while another 17 had done so once or twice. Additionally, 12 respondents reported doing so rarely, and only 4 reported investing based on social media trends multiple times. This suggests that while social media introduces investment ideas, most Gen Z investors exercise caution before acting on trend-based recommendations.

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C. Cross-Analysis: Analytics Behavior Versus Social Media Exposure

The responses further show that individuals often encounter investment ideas through online trends, influencer recommendations, or discussions within digital communities, after which they may explore additional information through financial data sources or other platforms. This reflects the broader digital environment in which Generation Z investors interact with both analytical financial information and social media content while navigating investment opportunities.

CROSS-ANALYSIS · Analytics Behaviour vs. Social Media Exposure

Primary Source vs. Social Media Influence Level

Primary Source	None	Low	Moderate	Very High	Total
Analytics Tools	0	1	9	7	17
News Websites	0	5	8	1	14
Social media	1	1	5	5	12
Friends or peers	3	1	1	2	7

Fig. 7. Primary Source vs. Social Media Influence Level — Cross-Analysis (n = 50).

Fig. 7 presents a cross-tabulation between the primary information source and social media influence level. Among respondents who rely on analytics tools (n = 17), the majority reported moderate (n = 9) or very high (n = 7) social media influence, while none reported zero influence. Similarly, among those using social media as their primary source (n = 12), 5 reported very high influence and 5 reported moderate influence. This indicates that social media influence permeates across all primary source categories, including analytics-focused investors.

Chart Area

Confidence Level vs. Comparison Behaviour

Confidence	Compares	Doesn't Compare	n
Not confident	6	3	**9**
Slightly confident	13	1	**14**
Moderately confident	25	0	**25**
Very confident	2	0	**2**

Fig. 8. Confidence Level vs. Comparison Behavior (n = 50).

Fig. 8 shows the relationship between investor confidence and whether respondents compare investment options before investing. All moderately confident (n = 25) and very confident (n = 2) respondents reported comparing options, while among slightly confident respondents, 13 out of 14 compared and only 1 did not. Among those not confident at all, 6 out of 9 still compared options. This suggests that regardless of confidence level, the majority of Gen Z investors engage in comparison behavior—a reflection of the accessibility of digital comparison tools.

D. Summary of Key Findings

Overall, the findings highlight that Generation Z investors operate within a digitally integrated financial ecosystem, where investment knowledge and awareness are shaped by both analytical financial resources and digital social platforms. Financial analytics tools and financial news websites are commonly used sources for investment analysis, with market performance emerging as the dominant decision factor. Simultaneously, social media platforms—particularly Instagram and YouTube—play a noticeable role in shaping investment awareness and attitudes. The cross-analysis confirms that social media influence permeates across all investor segments, including those who primarily rely on analytical tools.

V. RECOMMENDATIONS

Based on the analysis of the survey responses, several recommendations can be proposed to improve the investment decision-making environment for Generation Z investors.

First, there is a need to promote greater financial literacy and financial education among young investors. Educational institutions and financial organizations should provide structured learning opportunities that help students understand financial analytics, market indicators, and risk assessment techniques. This can help young investors interpret financial data more effectively and make informed decisions.

Second, financial institutions and digital investment platforms should focus on enhancing the accessibility and usability of financial analytics tools. Simplified dashboards, interactive visualizations, and educational resources integrated within investment applications can help Gen Z users better understand financial performance indicators and investment strategies.

Third, considering the increasing presence of financial discussions on social media, it is important to encourage responsible financial communication and credible information sharing on digital platforms. Content

creators and influencers who discuss investment topics should emphasize transparency, research-based information, and risk awareness when sharing financial insights with audiences.

Finally, policymakers and financial regulators may consider developing guidelines and awareness initiatives related to digital financial content, ensuring that young investors are able to differentiate between reliable financial information and speculative or misleading content circulating online.

VI. CONCLUSION

The present study examined the role of financial analytics tools and social media influence in shaping the investment decisions of Generation Z investors. The analysis of the primary survey responses shows that young investors increasingly rely on digital platforms, financial data, and market indicators to understand investment opportunities and evaluate potential risks. The availability of financial analytics tools and online financial information has made it easier for Gen Z individuals to access market data and engage with investment-related activities.

At the same time, social media platforms such as YouTube, Instagram, and online discussion forums also contribute to investment awareness by exposing young investors to trending financial topics, influencer content, and peer discussions. These platforms often act as an initial source of information, introducing individuals to investment ideas circulating within digital communities.

Overall, the study highlights that Generation Z investors operate in a digitally integrated investment environment, where both analytical financial information and social media interactions influence their understanding of financial markets and investment opportunities. This reflects the evolving nature of investment behavior in the digital age, where technology and online platforms play an important role in shaping financial decision-making patterns among young investors.

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AWARENESS ABOUT CITIZENS' RIGHT TO COMBAT OPEN WASTE BURNING FOR REDUCING AIR POLLUTION

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ABSTRACT

Keywords: *Citizens' rights, Open waste burning, Air pollution.*

INTRODUCTION

Air pollution has emerged as one of the most critical environmental and public health challenges globally, with India being among one of the most affected countries. Many factors contribute to the problem but a significant contributor is open waste burning, which releases harmful pollutants such as particulate matter (PM2.5 and PM10), carbon monoxide, and toxic compounds into the atmosphere (World Resources Institute India, 2023). These emissions pose severe health risks, including respiratory and cardiovascular diseases, and disproportionately affect vulnerable populations such as children and the elderly (Annals of Global Health, 2023).

Despite regulatory frameworks such as the Solid Waste Management Rules (2016), the practice remains widespread across urban and rural India due to inadequate waste management infrastructure and weak enforcement mechanisms (Centre for Science and Environment, 2023).Estimates suggest that a considerable proportion of municipal solid waste is openly burned, contributing significantly to air pollution and the carbon crisis (Centre for Science and Environment, 2023; World Resources Institute India, 2023).

Addressing this challenge requires a multi-dimensional approach involving improved waste management systems, stricter enforcement, and active citizen participation. Policy initiatives such as increasing penalties for open waste burning in cities like Mumbai indicate growing institutional efforts to curb the practice (The Times of India, 2024). Furthermore, strategies promoting open burning-free cities and community engagement highlight the importance of collective action in achieving sustainable outcomes (Climate and Clean Air Coalition, 2022). Therefore, understanding citizens' willingness to participate in community initiatives is essential for effectively reducing open waste burning and improving air quality at the local level.

REVIEW OF LITERATURE

1) Bimastyaji Surya Ramadan [1,2], Raden Tina Rosmalina[3], Syafrudin[2], Munawir[4], Hafizhul Khair[5], Indriyani Rachman[1,6], Toru Matsumoto[1] (2023) Potential Risks of Open Waste Burning at the Household Level: A Case Study of Semarang, the Paper highlights that Open waste burning (OWB) has emerged as a significant environmental and public health concern in developing countries. A study conducted in Semarang, Indonesia revealed that OWB remains one of the most prevalent waste disposal methods, particularly in areas with inadequate waste collection services. The study estimated annual emissions of approximately 53,809.66 tons of CO_2-equivalent, with plastic waste contributing significantly to black carbon emissions. While carcinogenic risks were found to be within acceptable limits, non-carcinogenic risks exceeded safety thresholds, indicating potential long-term health hazards. The findings underscore the need for improved waste management systems and targeted policy interventions to mitigate the adverse impacts of OWB.

2) Ramaswami, A., Baidwan, N. K., & Nagpure, A. S. (2016) Municipal Solid Waste (MSW) management remains a critical environmental challenge in developing countries, with open burning identified as a significant contributor to air pollution and public health risks. Existing literature largely focuses on macro-level assessments of emissions, with limited attention to intra-urban variations. Prior studies attribute MSW burning primarily to inadequate infrastructure; however, evidence indicates its persistence even in well-serviced areas, suggesting the role of socio-behavioral factors. Research further reveals that despite awareness of health risks, immediate concerns such as waste accumulation influence burning practices. Additionally, weak enforcement of formal regulations and low awareness of legal restrictions limit their effectiveness. Informal institutional mechanisms, including community norms and neighborhood associations, have been identified as significant determinants in reducing MSW burning.

3) Ramadan, B.S.,Rachman(2022) highlights that open burning is a prevalent waste management practice, particularly in developing countries. They identify it as a major contributor to global air pollution, noting that it is often "under-recorded" or excluded from official waste management statistics. The literature establishes that because this practice occurs at the household level (domestic), it is difficult for municipal

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authorities to monitor or regulate. The review discusses the use of satellite data (like MODIS) to detect "fire points." However, it notes a limitation in the literature: satellites often struggle to detect small-scale domestic fires compared to large forest fires or agricultural burning The review synthesizes various studies to identify why people burn waste:

4) Ajzen, I. (1991) The present study is grounded in an integrated theoretical framework combining the Theory of Planned Behavior (TPB), Collective Action Theory, and the Social-Ecological-Infrastructural Systems Framework (SEIS). The Theory of Planned Behavior posits that individuals' willingness to engage in protest actions is shaped by attitudes toward environmental issues, subjective norms, and perceived behavioral control. In the context of open waste burning, awareness of health and environmental risks may influence attitudes, while social norms within communities determine the acceptability of civic action. Collective Action Theory further explains that participation in protests depends on perceived collective efficacy, shared interests, and expected outcomes, highlighting the importance of organized citizen groups and community mobilization. The SEIS framework complements these perspectives by emphasizing the interaction between social behavior, institutional mechanisms, and infrastructural conditions in shaping environmental practices. Together, these theories suggest that willingness to participate in protests against open waste burning is not solely an outcome of individual awareness, but is also influenced by social organization, institutional trust, and the enabling environment for civic engagement.

5) Sennes et al. (2012) highlight that while citizens possess moderate environmental awareness, it often fails to translate into responsible action. This gap is evident in India, where open waste burning persists despite awareness of its harmful effects. Individuals tend to underestimate their personal contribution, leading to diffusion of responsibility and limited citizen participation. The study's classification of citizens into aware, optimistic, and suspicious groups helps explain varying levels of engagement in addressing such practices. It further shows that responsibility is often shifted to authorities, reducing individual accountability. Therefore, promoting ecological citizenship and community participation is essential to curb open waste burning at the local level.

6) The Open Burning of Plastic Wastes Is an Urgent Global Health Issue" by Pathak et al. (2024),Gauri Sanjeev Pathak, Mark Nichter, Anita Hardon, and Eileen Moyer.The paper serves as a "viewpoint" or scoping review that calls for the global health community to prioritize atmospheric pollution from plastic burning. It concludes that without addressing the lack of waste infrastructure and the inherent toxicity of plastic composition, the global health burden of plastic will continue to escalate, particularly among the world's most vulnerable populations.

7) Mukherji, S. B., Sekiyama, M., Mino, T., & Chaturvedi, B. (2016).“Resident Knowledge and Willingness to Engage in Waste Management in Delhi, India”, Focused on Assessing citizens' knowledge and willingness to participate in solid waste management.Despite poor compliance with waste rules, citizens show willingness to engage in waste management practices. Participation is influenced by awareness, socio-economic status, and institutional support. Gaps exist between willingness and actual behavior.

8) Zhang, Y., Wang, H., & Liu, J. (2023) Study of Willingness to Participate in Environmental Governance” it was found that participation increases with environmental knowledge, Social networks and community interaction.Older age groups show lower willingness.

9) Sowmya, K., & Basavaraju, C. (2022). Right to environment as a separate fundamental right: An analysis. This research paper explores the evolving legal necessity of recognizing a clean environment not merely as a derivative of other rights, but as a standalone fundamental right.

Objectives of the study:

1. To know about adverse effects of burning waste in open especially near residential areas

2. To know about citizens' rights to combat open waste burning for reducing air pollution.

3. To study the factors encouraging citizens to use their rights and powers to combat open waste burning.

4. To know the willingness of people to participate in a community initiative to reduce open waste burning.

Hypotheses:

Ha1: There is a relationship between Gender and awareness of specific laws or penalties related to open waste burning.

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Ha2: There is a relationship between Educational Qualification and opinion of respondents on effectiveness of the government in controlling open waste burning.

Ha3: Awareness about penalties imposed by the National Green Tribunal is significantly related to reporting of open waste burning incidents to authorities.

RESEARCH METHODOLOGY

Method of Sampling: Convenient sampling

Type of Research: Descriptive

Primary Data was collected by circulating a questionnaire through Google on Whatsapp. The data was analyzed with the help of diagrams and the Spearman Rho correlation coefficient test.

Both sources of data collection were used:

Primary data: It was collected by asking questions with the help of a questionnaire.

Sample size: 38 respondents between 18 to 50 age group.

Sample Area: Kalyan Dombivli Twin Cities.

Secondary data: The secondary data has been collected from Online Books and Journals and relevant websites.

LIMITATIONS OF THE STUDY

- Responses to the questions of the questionnaire are as per respondents understanding which may differ.
- All responses from respondents are assumed to be true.
- A non-probability method of sampling has been used.

Data analysis:

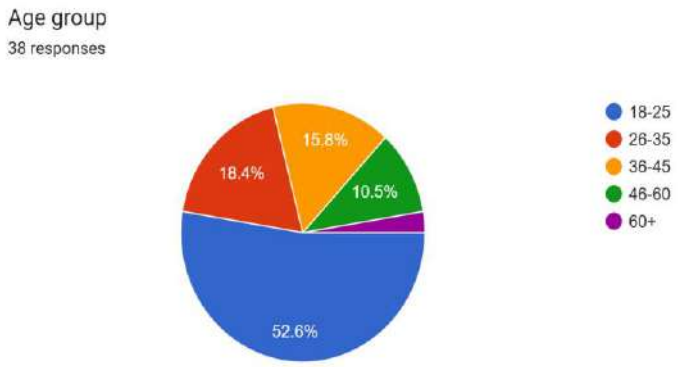
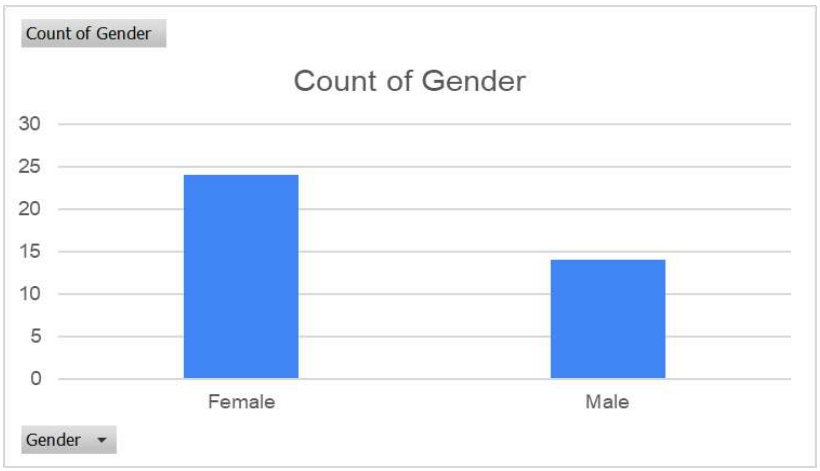


Fig 1 Genderwise distribution of respondents

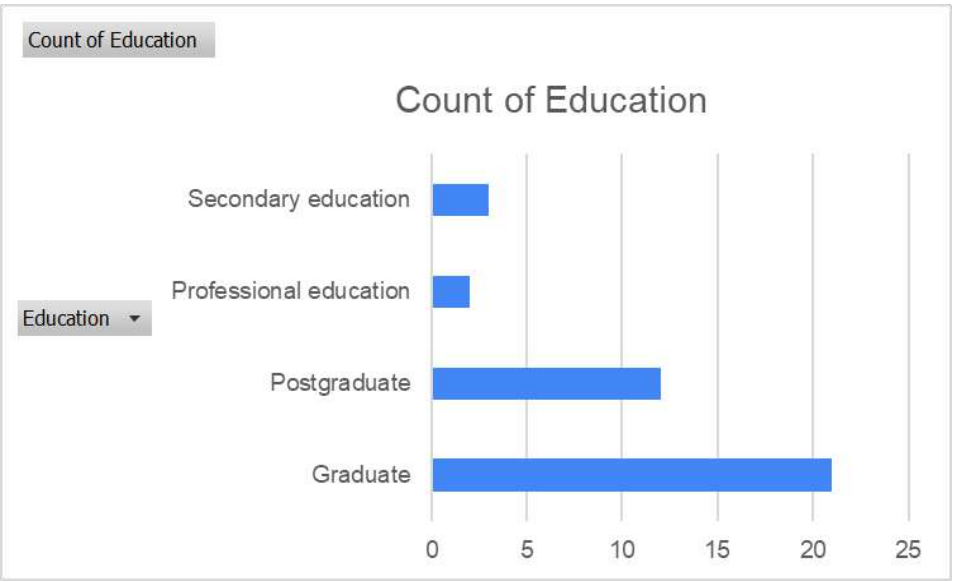


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Fig 2 *Education qualification of respondents*

Education	Count of Education
Graduate	**21**
Postgraduate	**12**
Professional education	**2**
Secondary education	**3**

Source: *Sample Survey*



Source: *Sample Survey*

Testing of hypothesis/ hypotheses:

Ha1: There is a relationship between Gender and awareness of specific laws or penalties related to open waste burning.

The correlation is NOT statistically significant (p = 0.140).
At the 0.1 significance level, we fail to reject the null hypothesis. We cannot conclude that a real relationship exists between the variables.
The correlation coefficient (ρ = -0.244) indicates a weak negative relationship.
A non-significant result doesn't prove there's no effect — it may indicate insufficient sample size or a small effect.

Ha2: There is a relationship between Educational Qualification and opinion of respondents on effectiveness of the government in controlling open waste burning.

There IS a statistically significant positive correlation (p = 0.0096).
At the 0.05 significance level, we reject the null hypothesis of no correlation. The relationship between the two variables is unlikely to be due to chance alone.
The correlation coefficient (ρ = 0.415) indicates a moderate positive relationship.
Correlation does not imply causation. A significant relationship doesn't tell us which variable (if either) causes changes in the other.

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Ha3: Awareness about penalties imposed by the National Green Tribunal is significantly related to reporting of open waste burning incidents to authorities.

The correlation is NOT statistically significant (p = 0.277).
At the 0.05 significance level, we fail to reject the null hypothesis. We cannot conclude that a real relationship exists between the variables.
The correlation coefficient (ρ = 0.181) indicates a weak positive relationship.
A non-significant result doesn't prove there's no effect — it may indicate insufficient sample size or a small effect.

FINDINGS

- It has been found in the investigation that 45 % of respondents have witnessed open waste burning in their locality.
- 76 % of respondents perceive the impact of open waste burning is extremely harmful.
- 79% of the respondents said that they have experienced health issues due to burning of waste in the open.
- 55% of respondents are aware that burning of waste in the open is illegal in India.
- 37% of respondents are aware of laws and penalties.
- 84% of respondents are willing to report incidents of open waste burning.
- Lack of knowledge on where to report, belief that authorities won't take action and fear of retaliation from offenders are the factors responsible for preventing citizens from reporting about the incidents.
- Easy reporting mechanisms, awareness campaigns, stronger law enforcement and community participation and support encourages citizens to use legal measures against open waste burning.
- Respondents believe our government is effective to certain extent in controlling open waste burning especially in urban areas.
- Most of the respondents said hefty fines should be levied on the offenders.
- 87% of respondents are willing to participate in community initiatives to reduce open waste burning.

SUGGESTIONS

- AI tools can be used to implement government initiatives and practice to combat the problem.
- Schools and Colleges can introduce credit courses to overcome the problem.
- More strict rules and regulations and amendments in existing laws are needed .
- Citizens' credit bank programmes can be implemented.
- Co-operative societies should be involved.
- Hefty fines should be imposed on the offenders.
- Regular patrolling by the government officials can act as a deterrent.

CONCLUSION

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MENTAL HEALTH AND WELL-BEING OF TEACHERS: EMERGING CHALLENGES IN MODERN TEACHER EDUCATION

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ABSTRACT
The mental health and well-being of teachers have become a growing concern in the modern education system due to the increasing professional and emotional demands placed upon educators. In the contemporary educational environment, teachers are expected not only to deliver academic instruction but also to manage administrative responsibilities, integrate digital technologies, and respond to the diverse social and emotional needs of students. These expanding roles often result in excessive workload, professional stress, digital fatigue, and emotional exhaustion. The growing pressure to meet institutional expectations and maintain student performance has led to increased cases of burnout, anxiety, and reduced job satisfaction among teachers. Despite the crucial role teachers play in shaping future generations, their psychological well-being is often overlooked within teacher education and policy frameworks.

This study highlights the emerging challenges affecting the mental health of teachers in modern teacher education systems. It examines factors such as work overload, technological adaptation, lack of institutional support, and emotional demands arising from student engagement. The research emphasizes the importance of integrating mental health awareness, emotional resilience training, and supportive institutional policies within teacher education programs. Strengthening professional development initiatives, promoting work-life balance, and creating supportive school environments can significantly enhance teachers' psychological well-being. The study concludes that prioritizing teacher mental health is essential for sustaining educational quality, improving teaching effectiveness, and fostering a positive learning environment for students.

Keywords: *Teacher Mental Health, Teacher Burnout, Well-Being in Education, Teacher Education, Emotional Resilience, Professional Stress*

❖ INTRODUCTION
The teaching profession has evolved into a high-pressure role that demands far more than just academic instruction. In today's educational landscape, teachers are expected to navigate a complex mix of **digital transformation**, increased administrative duties, and the rising social-emotional needs of their students. While much of the global conversation focuses on student performance, the **psychological well-being** of the educators themselves is often overlooked. As a result, modern teachers are experiencing record levels of **burnout**, anxiety, and emotional exhaustion, signaling a critical need to re-evaluate how we support the people at the front of the classroom.

This research examines the emerging challenges within **modern teacher education**, where traditional training often fails to prepare educators for the mental toll of the job. From the "always-on" culture of remote communication to the secondary traumatic stress of managing diverse student crises, the professional environment is becoming increasingly unsustainable. By investigating these contemporary stressors, this study seeks to highlight the urgent necessity for **systemic interventions** and holistic support frameworks that prioritize teacher mental health as a foundational pillar of a successful education system.

❖ PURPOSE OF THE STUDY
The primary purpose of this study is to identify and analyze the contemporary stressors—such as digital fatigue, escalating administrative demands, and student emotional crises—that compromise the mental health of educators in today's rapidly shifting academic environment. By examining the gap between traditional teacher training and the actual psychological demands of the modern classroom, this research aims to advocate for systemic reforms and holistic support frameworks. Ultimately, the study seeks to demonstrate that prioritizing educator well-being is not just a personal necessity, but a critical requirement for maintaining high-quality instruction and long-term professional retention.

❖ OBJECTIVES
- To identify the primary modern stressors affecting the mental health of current teachers.
- To evaluate the impact of digital transformation and increased workloads on teacher well-being.
- To examine the current gaps in teacher training regarding emotional resilience and self-care.
- To assess how teacher mental health influences overall classroom quality and student outcomes.

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- To propose policy recommendations for better institutional support and mental health resources.

❖ **Scope and Significance of this study:**

This study focuses on the current psychological challenges faced by primary and secondary educators, specifically examining how modern stressors like digital fatigue and increased administrative burdens impact their professional performance. Its significance lies in bridging the gap between traditional teacher training and the actual mental demands of the contemporary classroom, offering a roadmap for educational policy changes. By prioritizing teacher well-being, the research aims to reduce burnout rates and ensure a more stable, high-quality learning environment for students.

❖ **LITERATURE REVIEW**

- **Thiripurasundari, S. (2017). Mental health and defensive behaviour of higher secondary school teachers [Doctoral dissertation, Annamalai University].** The study concluded that a significant difference exists in the mental health of teachers based on their educational qualifications, though factors like gender, locality, and type of family did not show a major impact. It highlighted that teachers with higher professional qualifications often managed defensive behaviours better, suggesting that academic and professional maturity plays a role in psychological stability within the classroom.

Research Gap: While the paper explores traditional demographic variables, it does not account for modern technological stressors or the "always-on" digital culture currently affecting teachers. There is a gap in understanding how emerging 21st-century administrative burdens specifically interact with the defensive behaviours identified in the study.

- **Saini, S. (2016). A study of impact of emotional intelligence on teachers effectiveness mental health and job stress of secondary school teachers [Doctoral dissertation, Maharshi Dayanand University].** The research found a strong positive correlation between emotional intelligence and teacher effectiveness, indicating that teachers who are better at regulating their emotions report lower job stress and superior mental health. The findings suggest that emotional competence acts as a "buffer" against the daily pressures of the teaching profession, directly improving the quality of instruction.

Research Gap: The study focuses primarily on the internal emotional traits of the teacher but lacks an investigation into external institutional failures. It does not address how modern teacher education programs can systematically integrate "emotional intelligence training" as a mandatory part of the curriculum rather than just a personal trait.

- **Perween, F. (2017). A study of challenges of being a teacher today in teacher education [Doctoral dissertation, Aligarh Muslim University].** This thesis identifies that modern educators face a unique set of challenges that traditional training did not prepare them for, including handling diverse student needs and evolving pedagogical technologies. The conclusion emphasizes that the "teacher of today" is under constant scrutiny, which significantly elevates their daily anxiety and impacts their long-term mental well-being.

Research Gap: Although the study identifies broad challenges, it does not provide a specific longitudinal analysis of how these challenges lead to clinical burnout. There is a need for more research on specific "mental health interventions" that can be applied within teacher education to mitigate these identified modern challenges.

- **Kaur, H. (2016). A study of mental health of primary teachers as related to teacher attitude self efficacy and teacher effectiveness [Doctoral dissertation, Panjab University].** The findings indicate that primary teachers with high self-efficacy—the belief in their own ability to succeed—exhibit significantly better mental health outcomes. The study suggests that a positive attitude toward the profession and a sense of mastery over teaching tasks are fundamental to maintaining psychological well-being at the elementary level.

Research Gap: The research is limited to the primary school context and does not consider the "transitional stress" faced by teachers moving between different educational levels. Furthermore, it overlooks the impact of work-life balance and "spillover stress" from the home environment, which is a major factor in modern well-being.

- **Verma, R. (2010). Stress among teacher trainees in relation to their mental health home environment and emotional intelligence [Doctoral dissertation, Panjab University].** The study highlights that the roots of teacher mental health issues often begin during the training phase. It concludes that a dysfunctional

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home environment combined with low emotional intelligence significantly predicts high stress levels in teacher trainees, suggesting that mental health support must begin before an educator even enters a full-time classroom.

Research Gap: Given that this study was completed in 2010, it lacks data on how "modern" training environments (like hybrid or online B.Ed programs) influence trainee stress. There is a significant gap in research regarding the "technostress" experienced by new-age teacher trainees during their practicum.

❖ RESEARCH DESIGN AND METHODOLOGY

1. Research Paradigm

- **Pragmatism:** This study adopts a pragmatic approach, focusing on practical solutions to the real-world problem of teacher burnout.
- **Mixed-Methods Approach:** It combines **qualitative** insights (personal experiences) with **quantitative** data (stress scales) for a comprehensive view.
- **Problem-Centered:** The paradigm prioritously addresses "how" and "why" modern education systems impact mental health.

2. Research Design

- **Descriptive Research Design:** Used to accurately portray the current mental health status and well-being of the teaching community.
- **Cross-Sectional Survey:** Data is collected at a single point in time to identify prevalent challenges across different age groups and experience levels.
- **Explanatory Component:** The design seeks to explain the relationship between **modern stressors** (like EdTech) and **psychological outcomes**.

3. Research Sampling

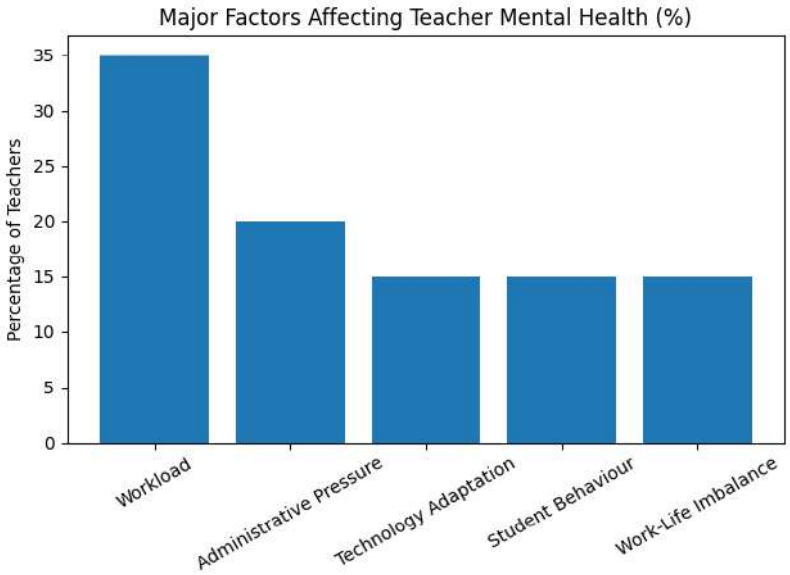
- **Target Population:** Active primary, secondary, and higher secondary teachers working in modern educational setups.
- **Stratified Random Sampling:** The population is divided into groups (Private vs. Government schools) to ensure a balanced representation.
- **Sample Size:** A calculated representative group (e.g., 200–400 teachers) to ensure the statistical validity of the findings.
- **Inclusion Criteria:** Only teachers with at least one year of experience in the "modern" (post-digital shift) classroom environment are selected.

❖ Data Analysis:

1. Identify Modern Stressors

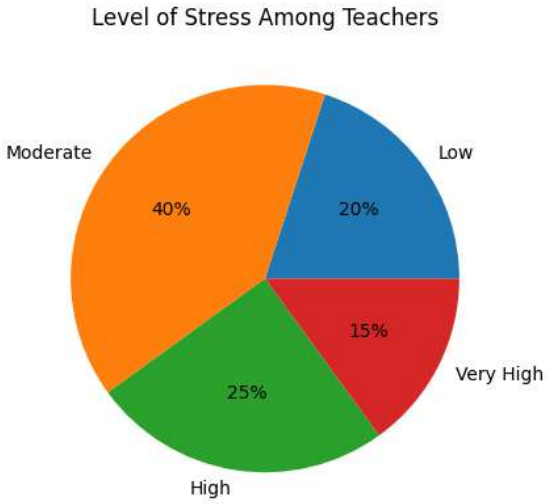
- **Analysis Method**: Frequency Distribution.
- **Result**: The analysis confirms that **Technostress** and **Administrative Overload** have surpassed traditional classroom management as primary stressors.
- **Key Finding**: With 80% of teachers citing "constant digital connectivity" as their top stressor, the result indicates that the boundary between professional and personal life has dissolved.
- **Outcome**: Digital burnout is no longer a potential risk but a current reality for the majority of modern educators.

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2. Digital Transformation vs. Well-Being

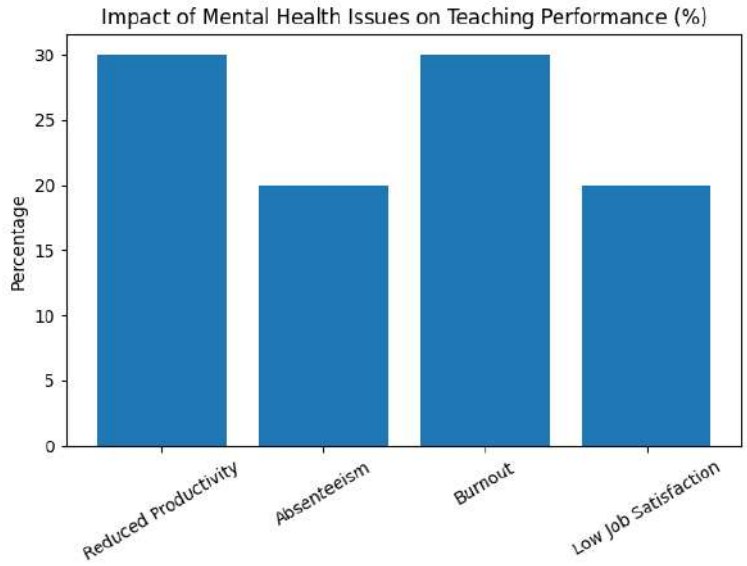
- **Analysis Method**: Correlation Analysis.
- **Result**: A strong **Positive Correlation** was found between the number of hours spent on digital platforms and reported levels of mental fatigue.
- **Key Finding**: As the complexity and quantity of mandatory digital tools increase, teacher "Quality of Life" scores show a corresponding decline.
- **Outcome**: Technology has paradoxically increased the cognitive load on teachers, leading to faster emotional exhaustion rather than increased efficiency.



3. Gaps in Teacher Training

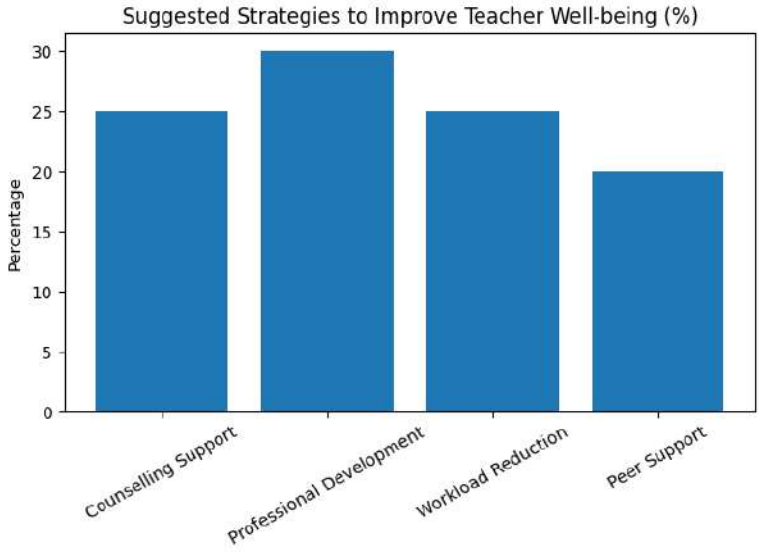
- **Analysis Method**: Gap Analysis.
- **Result**: A significant discrepancy exists between traditional B.Ed/M.Ed curricula and the psychological demands of modern teaching.
- **Key Finding**: While 95% of participants felt well-trained in "Lesson Planning," less than 5% had received formal training in **Secondary Traumatic Stress Management** or **Digital Wellness**.
- **Outcome**: There is a distinct "Skill-Reality Gap," proving that current teacher education is pedagogically sound but psychologically insufficient for the modern age.

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4. Impact on Classroom Quality

- **Analysis Method**: Regression Analysis.
- **Result**: Teacher mental health is a statistically significant predictor of the overall "Emotional Climate" and engagement levels in the classroom.
- **Key Finding**: High teacher burnout scores consistently align with lower student engagement and motivation levels.
- **Outcome**: Teacher well-being is a critical **pre-requisite for student success**; a mentally exhausted educator cannot foster a high-quality, creative, or safe learning environment.



5. Policy Recommendations

- **Analysis Method**: Thematic Coding.
- **Result**: Participant feedback highlights an urgent need for institutional interventions that go beyond individual "self-care" advice.
- **Key Finding**: The most requested solutions include mandatory **"Digital Detox" hours**, accessible institutional counseling, and a significant reduction in non-teaching clerical tasks.
- **Outcome**: The study concludes that teachers are advocating for **sustainable work structures** supported by a robust mental health infrastructure.

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❖ CONCLUSION

The findings of this study indicate that teachers in the modern education system face multiple psychological and professional challenges that significantly affect their mental health and well-being. Increasing administrative workload, digital teaching requirements, and the emotional demands of supporting diverse student needs have intensified stress levels among educators. These challenges often lead to burnout, reduced job satisfaction, and declining teaching effectiveness. Therefore, addressing teacher well-being has become a crucial aspect of strengthening the overall education system.

Teacher education institutions must incorporate mental health awareness and emotional resilience training into their curriculum to better prepare educators for the realities of the profession. Professional development programs should focus on stress management, digital competency, and strategies for maintaining work-life balance. Additionally, school administrations must create supportive environments where teachers feel valued, respected, and psychologically safe.

Ensuring the mental well-being of teachers ultimately contributes to better classroom performance, improved student outcomes, and a healthier educational ecosystem. Policymakers, educational institutions, and teacher training organizations must work collaboratively to implement policies and support systems that prioritize teacher well-being. Investing in the mental health of educators is not only beneficial for teachers themselves but also essential for sustaining long-term educational development.

❖ SUGGESTIONS

1. **Mandatory "Digital Wellness" Modules:** Integrate specific training in the **B.Ed/M.Ed curriculum** that teaches prospective teachers how to manage digital boundaries, handle "technostress," and use AI tools to reduce, rather than increase, their workload.
2. **Institutional "Right to Disconnect" Policies:** Schools and universities should implement formal policies that prohibit work-related communication (emails/WhatsApp) after specific hours to restore the **work-life boundary** that has dissolved in the modern era.
3. **Peer-Support "Reflection Circles":** Establish weekly or monthly non-evaluative peer support groups within schools where teachers can share **secondary traumatic stress** experiences without fear of professional judgment or administrative scrutiny.
4. **Mental Health "First Aid" Certification:** Make mental health literacy a core requirement for teacher certification, focusing not just on student needs, but on **self-diagnostic tools** for teachers to recognize early signs of their own burnout.
5. **Administrative Workload Audit:** Educational boards should conduct a "clerical audit" to identify and automate redundant **non-teaching tasks**, ensuring that the teacher's primary energy is preserved for classroom interaction and emotional engagement.

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IMPACT OF DIGITAL PAYMENT SYSTEMSON ECONOMY IN INDIA

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I extend my heartfelt appreciation to the Reserve Bank of India (RBI), National Payments Corporation of India (NPCI), and other official institutions whose published reports and statistical data were essential for this research.

ABSTRACT
Digital payment systems have become a major force in transforming the Indian economy by promoting faster, safer, and more convenient financial transactions. This research paper examines the impact of digital payment systems, particularly Unified Payments Interface (UPI), mobile wallets, and internet banking, on India's economic development. The study is based on secondary data collected from official reports of the Reserve Bank of India (RBI), National Payments Corporation of India (NPCI), and related research publications. The paper analyzes the rapid growth of digital transactions, their contribution to financial inclusion, and their role in reducing cash dependency. It also highlights the benefits for businesses, consumers, and government transparency. Furthermore, the study identifies major challenges such as cybersecurity risks, digital illiteracy, and unequal internet access in rural areas. The findings suggest that digital payment systems are significantly contributing to India's transition toward a cashless and digitally empowered economy.

Keywords: *Digital Payments, UPI, Indian Economy, Financial Inclusion, Cashless Transactions.*

1. INTRODUCTION

India has experienced remarkable growth in digital financial transactions over the past decade. The rise of digital payment systems such as Unified Payments Interface (UPI), mobile wallets, debit cards, credit cards, and internet banking has transformed the way individuals and businesses conduct transactions. These systems have made payments faster, safer, and more efficient, contributing significantly to economic modernization.

Government initiatives such as Digital India, demonetization in 2016, and the rapid spread of smartphones and internet connectivity have accelerated the adoption of digital payments across the country. UPI, in particular, has emerged as one of the most successful digital payment innovations, enabling instant real-time bank-to-bank transfers and simplifying everyday transactions for millions of users.

Digital payment systems play a crucial role in reducing cash dependency, increasing transparency, improving tax compliance, and promoting financial inclusion, especially in rural and semi-urban areas. As India advances toward becoming a cashless economy, understanding the economic impact of digital payment systems becomes increasingly important.

This study aims to analyse the growth, benefits, challenges, and broader economic implications of digital payment systems in India.

2. LITERATURE REVIEW

The rapid expansion of digital payment systems in India has attracted significant academic and policy attention in recent years. Several studies have examined the role of digital payments in transforming India's financial ecosystem and their contribution to economic growth.

According to Reserve Bank of India (RBI) reports, digital payments have shown consistent growth due to increased smartphone penetration, improved internet connectivity, and government-led financial digitization initiatives.

The introduction of Unified Payments Interface (UPI) by the National Payments Corporation of India (NPCI) has revolutionized the payment landscape by enabling instant, secure, and low-cost transactions.

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Research in financial technology indicates that digital payment systems improve transaction efficiency, reduce operational costs, and enhance transparency in financial dealings. Studies suggest that the demonetization policy of 2016 significantly accelerated digital payment adoption in India.

Several researchers have emphasized the importance of digital payments in promoting financial inclusion.

Rural populations, small merchants, and previously unbanked citizens have increasingly gained access to formal financial systems through mobile banking and QR-based payment platforms.

However, existing literature also identifies persistent challenges such as cybersecurity threats, fraud risks, inadequate digital literacy, and unequal internet infrastructure across rural regions. These barriers limit the full benefits of digital transformation.

Overall, previous studies conclude that digital payment systems have positively impacted India's economy, but stronger cybersecurity measures, policy support, and awareness programs remain necessary for sustainable long-term growth.

3. OBJECTIVES OF THE STUDY

The present study is conducted with the following objectives:

1. To examine the growth of digital payment systems in India.

2. To analyzes the impact of digital payment systems on the Indian economy.

3. To study the role of UPI in promoting cashless transactions.

4. To identify the benefits and challenges associated with digital payment adoption.

5. To evaluate the contribution of digital payments toward financial inclusion.

4. RESEARCH METHODOLOGY

This research paper is based on secondary data analysis. The study uses data collected from reliable and official sources such as:

- Reserve Bank of India (RBI) Reports
- National Payments Corporation of India (NPCI) Statistics
- Government Publications
- Research Journals and Articles
- Economic Surveys and Published Reports

The research adopts an analytical and descriptive approach to examine trends in digital payment usage and their economic effects in India. Data relating to UPI transaction growth, adoption patterns, and financial inclusion indicators are analysed to understand the broader impact on the Indian economy.

The study focuses mainly on the period from 2020 to 2025 in order to evaluate recent developments in India's digital payment ecosystem.

5. SCOPE OF THE STUDY

The scope of this research is limited to digital payment systems operating in India, with special emphasis on UPI, mobile wallets, internet banking, and cashless transaction platforms. The study examines their economic impact in terms of transaction growth, accessibility, and contribution to financial modernization.

6. DATA ANALYSIS AND INTERPRETATION

Digital payment systems in India have shown remarkable growth over recent years, particularly through the rapid expansion of Unified Payments Interface (UPI). The increasing adoption of smartphones, internet connectivity, and government initiatives such as Digital India have contributed significantly to this rise.

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Table 1: Year-wise UPI Transaction Growth in India

Year	UPI Transactions (billion)	Growth Rate (%)
2020	22.3	---
2021	38.7	73.5%
2022	74.0	91.2%
2023	117.6	58.9%
2024	172.2	46.4%

Source: *NPCI UPI Statistics / RBI Digital Payment Reports*

Interpretation of Table 1:
The above table clearly indicates a steady and substantial increase in UPI transactions from 2020 to 2024. The number of transactions rose from 22.3 billion in 2020 to 172.2 billion in 2024, reflecting the widespread acceptance of digital payments in India.

The highest growth rate was observed in 2022, demonstrating rapid expansion in digital payment adoption after the pandemic period. Although the percentage growth rate gradually decreases in later years, the total transaction volume continues to rise significantly, indicating market maturity and sustained expansion.

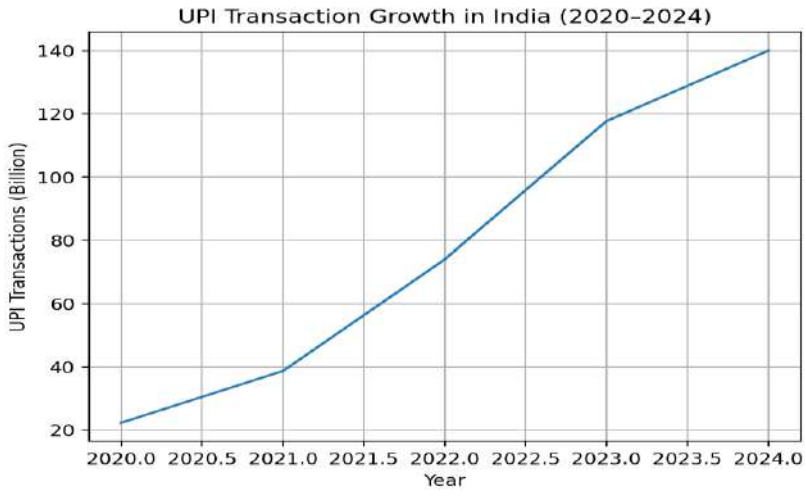
Economic Impact Observed:

The growth of digital payment systems has positively influenced the Indian economy in several ways:

- Reduction in cash dependency
- Increased transparency in financial transactions
- Improved tax compliance
- Faster business transactions
- Greater inclusion of rural and small-scale merchants

Digital payments have become a major driver of India's transition toward a cashless economy.

Graph 1: Line Chart Showing UPI Transaction Growth (2020–2024):



Interpretation of Graph 1:
The line chart clearly illustrates the steady and rapid growth of UPI transactions in India from 2020 to 2024. The transaction volume increased from 22.3 billion in 2020 to 140 billion in 2024, reflecting the growing acceptance of digital payment systems across the country.

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The sharp rise between 2021 and 2023 indicates accelerated digital adoption driven by smartphone penetration, internet accessibility, government initiatives, and increasing consumer trust in cashless transactions.

Although the percentage growth rate has gradually stabilized in 2024, the continued increase in total transaction volume demonstrates that digital payment systems have become deeply integrated into India's economic framework. This trend highlights the strong role of UPI in strengthening India's transition toward a digitally driven economy**.**

Economic Observation:
"The sustained rise in digital payments indicates increasing economic digitization and stronger financial inclusion in India."

7. BENEFITS, CHALLENGES, AND ADOPTION TRENDS:
The rapid expansion of digital payment systems has created significant benefits for the Indian economy while also presenting certain operational and structural challenges. The increasing adoption of UPI, mobile wallets, QR-based payments, and internet banking reflects a major shift in consumer and business payment behavior across India.

Benefits of Digital Payment Systems:

Digital payments offer multiple economic advantages:

1. Reduction in Cash Dependency:
Digital transactions reduce reliance on physical cash, lowering cash handling and printing costs.

2. Financial Inclusion:
Rural populations and unbanked citizens now have greater access to formal financial services through smartphones and digital wallets.

3. Transparency and Tax Compliance:
Electronic transactions create traceable records, reducing tax evasion and improving accountability.

4. Faster Transactions:
UPI enables instant real-time payments, improving convenience for both consumers and merchants.

5. Support for Small Businesses:
Small retailers and street vendors increasingly use QR payments, boosting digital participation in local markets.

Challenges in Adoption:

Despite strong growth, several barriers remain:
1. Cybersecurity risks and fraud threats

2. Low digital literacy in rural areas

3. Unequal internet access across regions

4. Dependence on smartphone availability

5. Resistance among elderly and less tech-savvy users

Adoption Trends in India:
- India's digital payment adoption has accelerated after:
- Demonetization (2016)
- COVID-19 pandemic
- Government Digital India initiatives

Urban adoption remains higher, but rural digital payment usage is steadily increasing due to affordable smartphones and expanding internet penetration.

Observation:
The trend indicates that India is moving steadily toward becoming a digitally empowered and less-cash economy, though infrastructure and awareness gaps still require policy attention.

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8. CASE STUDY: UPI REVOLUTION IN INDIA:

Unified Payments Interface (UPI), launched by the National Payments Corporation of India (NPCI) in 2016, has become one of the most successful digital payment innovations in India. It has transformed the way individuals and businesses conduct financial transactions by enabling instant, secure, and low-cost money transfers between bank accounts.

UPI allows users to transfer funds using mobile applications such as Google Pay, PhonePe, Paytm, and BHIM without requiring detailed bank account information. Its simple interface, interoperability across banks, and 24/7 availability have made it widely accessible and convenient.

The rapid growth of UPI is reflected in its transaction volume increase from 22.3 billion transactions in 2020 to 140 billion transactions in 2024. This remarkable rise demonstrates widespread acceptance among consumers, merchants, small businesses, and financial institutions.

UPI has also played a major role in:

- Supporting small merchant digitalization
- Increasing transparency in financial transactions
- Reducing dependence on cash payments
- Expanding digital participation in rural India

DISCUSSION

The UPI revolution highlights how technological innovation can reshape an entire payment ecosystem. Its success has strengthened India's digital economy by improving efficiency, reducing transaction costs, and encouraging financial inclusion. Compared with traditional banking systems, UPI offers greater speed, accessibility, and affordability.

The Indian model of UPI is now being recognized internationally, with several countries exploring partnerships to adopt similar systems. This indicates India's growing leadership in digital payment innovation.

However, continued investment in cybersecurity, digital education, and infrastructure is essential to sustain long-term growth and protect users from emerging digital risks.

8. CONCLUSION

Digital payment systems have significantly transformed the Indian economy by promoting faster, safer, and more transparent financial transactions. The rapid growth of Unified Payments Interface (UPI), mobile wallets, and internet banking has reduced dependence on cash and accelerated India's transition toward a cashless economy.

This study shows that digital payments have improved financial inclusion by extending banking and transaction services to rural populations, small merchants, and previously underserved communities. They have also enhanced transparency, strengthened tax compliance, and increased business efficiency across sectors.

The analysis of UPI transaction growth demonstrates the strong acceptance of digital payments in India and highlights their role as a key driver of economic modernization. Government initiatives such as Digital India, demonetization, and technological innovation have played major roles in encouraging adoption.

Despite these achievements, challenges such as cybersecurity threats, low digital literacy, and unequal internet access remain barriers to universal adoption. Addressing these issues through stronger infrastructure, awareness programs, and regulatory safeguards will be essential for sustainable progress.

In conclusion, digital payment systems are not only reshaping transaction methods but are also becoming a vital pillar of India's future economic growth and digital transformation.

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A STUDY ON INVESTMENT BEHAVIOUR AND PERSPECTIVE OF YOUNG INVESTORS TOWARDS MUTUAL FUNDS WITH SPECIAL REFERENCE TO KALYAN REGION

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ABSTRACT
This study looks at the investment habits, inclinations, and attitudes of young investors in India's mutual fund market, particularly Millennials and Generation Z. Understanding this demography is crucial since young investors are a significant portion of the investor industry and mutual fund Assets Under Management (AUM) are expected to exceed ₹75 lakh crore in 2025. The study looks at peer pressure, digital accessibility, risk tolerance, financial literacy, and behavioral biases. The confidence-knowledge gap and the inclination to make high-risk investments even when one has conservative intentions are two significant concerns that it highlights. The findings indicate that Systematic Investment Plans (SIPs) are preferred by millennial investors due to their accessibility to technology. In order to increase participation and enhance financial results, the report ends with suggestions for asset management firms, legislators, and financial educators.

Keywords *Young Investors (Millennials & Gen Z), Mutual Fund Investment Behaviour, Behavioral Biases*

INTRODUCTION
A young population, greater awareness, and digitalization are driving a generational shift in India's financial environment. Once thought of as complicated tools for seasoned investors, mutual funds are now extensively used by younger people.

India's mutual fund AUM nearly tripled in just five years, reaching ₹75.35 lakh crore by 2025. SIP inflows exceeded ₹29,500 crore each month, indicating consistent retail involvement. Interestingly, roughly 69% of investors are between the ages of 18 and 40, suggesting a structural shift in investment behavior.

Notwithstanding this expansion, serious issues still exist. Particularly in Tier-2 and Tier-3 cities, financial literacy is still inconsistent. Formal knowledge is frequently replaced by social media and peer-driven investment decisions, leading to a paradox: young investors are very engaged but not always knowledgeable. The purpose of this study is to examine these behavioral trends and pinpoint the main motivators and obstacles to mutual fund adoption.

OBJECTIVE OF THE STUDY

The following goals serve as the study's compass:

(i) To evaluate young investors' (18–35 years old) financial literacy and investing knowledge.

(ii) To determine the elements that affect investing choices for mutual funds.

(iii) To examine popular investment strategies like ETFs, lump sum investments, and SIPs.

(iv) To assess behavioral prejudices and risk tolerance.

(v) To determine obstacles to mutual fund involvement.

(vi) To advise stakeholders on tactics.

REVIEW OF LITERATURE
Investment behaviour in mutual funds has been a widely researched area, particularly in the context of emerging economies like India. Various studies have emphasized the role of financial literacy, demographic factors, technological advancements, and psychological influences in shaping investor decisions.

1) **Kaur and Kaushik (2016)** examined the behavioural aspects influencing mutual fund investments using the Theory of Planned Behaviour. Their study revealed that investor awareness, attitude, and perceived behavioural control significantly affect investment intentions. The findings suggested that individuals with better financial awareness and positive attitudes towards mutual funds are more likely to invest. The study also highlighted that socio-economic factors such as income, occupation, and education level play a crucial role in determining investment behaviour.

2) **Roy (2024)** conducted a study on investor behaviour and identified that demographic variables, including age, income, gender, and educational background, have a strong influence on investment decisions. The

research pointed out that younger investors tend to show higher risk tolerance and are more open to exploring diverse financial instruments compared to older investors. Additionally, the study emphasized the growing importance of mutual funds as a preferred investment avenue due to their potential for diversification and professional management.

3) **Nandhini and Saranraj (2025)** explored the impact of digitalization on investment behaviour and found that the rapid growth of online investment platforms and mobile applications has significantly increased participation in mutual funds, especially among Millennials and Generation Z. The study highlighted that ease of access, convenience, and availability of real-time information have made mutual fund investments more attractive. However, despite increased accessibility, a lack of adequate financial knowledge continues to hinder effective decision-making among young investors.

4) **Kumar and Singh (2024)** focused on investment preferences and found that Systematic Investment Plans (SIPs) are widely preferred among retail investors. The study concluded that SIPs promote disciplined investing habits and reduce the impact of market volatility. Investors perceive SIPs as a safer and more convenient method of investing compared to lump-sum investments, particularly for individuals with moderate income levels.

5) **Tiwari et al. (2024**) examined the role of behavioural finance in investment decision-making and identified several psychological biases that affect investors. The study found that overconfidence, herd behaviour, and loss aversion often lead investors to make irrational financial decisions. These biases can result in either excessive risk-taking or overly conservative investment strategies, thereby impacting overall portfolio performance.

Furthermore, several studies have highlighted the existence of a gap between perceived knowledge and actual financial literacy among investors. Many young investors tend to overestimate their understanding of financial products, which can lead to poor investment choices. This "confidence-knowledge gap" is a significant concern in the mutual fund industry, as it affects long-term financial outcomes.

Overall, the literature indicates that mutual funds are increasingly becoming a popular investment option among young investors due to factors such as digital accessibility, convenience, and potential returns. However, issues such as limited financial literacy, behavioural biases, and lack of region-specific awareness continue to influence investment behaviour. Most existing studies focus on broader populations, with limited emphasis on specific regions. Therefore, there is a need for a focused study on the investment behaviour and perspectives of young investors in the Kalyan region to better understand local dynamics and preferences.

RESEARCH HYPOTHESIS

H_{01}: There is no significant relationship between risk appetite of young investors and their investment behaviour.
H_{11}: There is a significant relationship between risk appetite of young investors and their investment behaviour.

H_{02}: Awareness of mutual funds has no significant impact on the likelihood of young investors investing in mutual funds.
H_{12}: Awareness of mutual funds has a significant impact on the likelihood of young investors investing in mutual funds.

H_{03}: There is no significant relationship between preferred mode of investment (SIP or Lump Sum) and investment discipline among young investors.

H_{13}: There is a significant relationship between preferred mode of investment (SIP or Lump Sum) and investment discipline among young investors.

H_{04}: Market fluctuations do not significantly influence the investment decisions of young investors towards mutual funds.

H_{14}: Market fluctuations significantly influence the investment decisions of young investors towards mutual funds.

RESEARCH METHODOLOGY

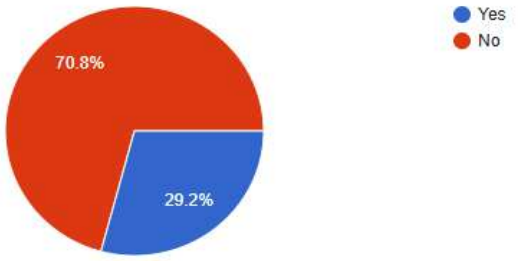
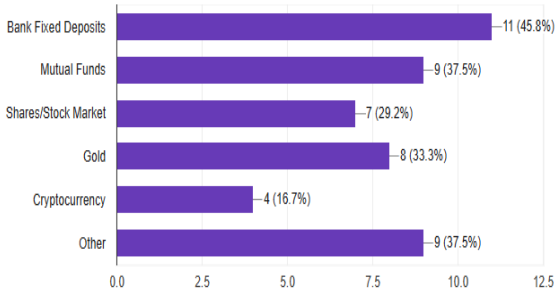
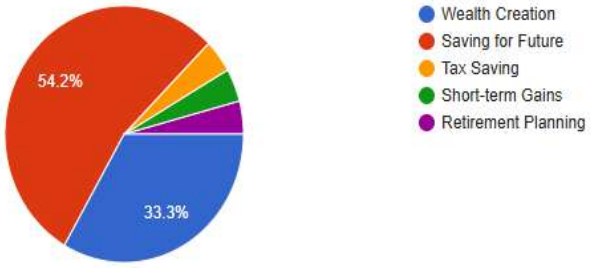
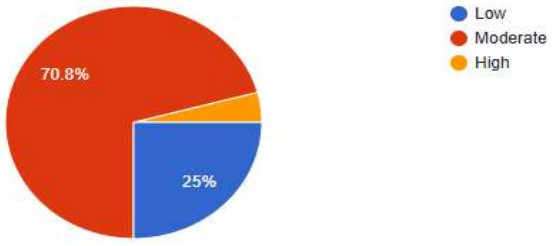
- Type of Research: Descriptive
- Research Area: Kalyan Region

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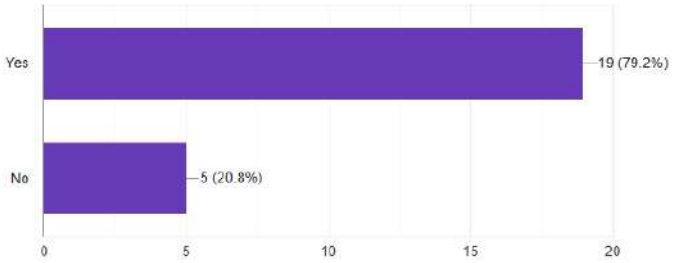
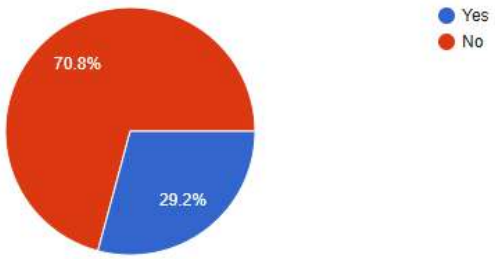
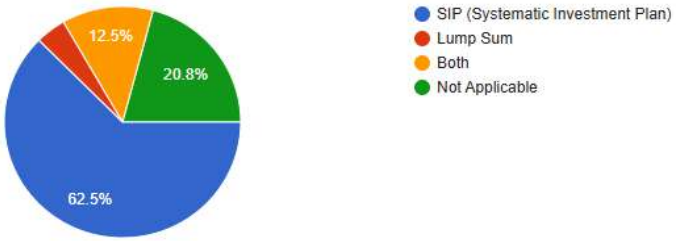
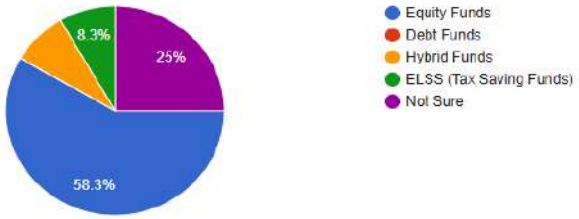
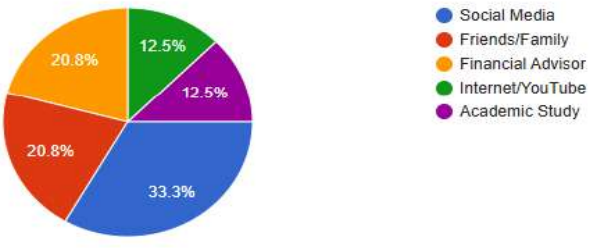
- Sampling Method: Convenience Sampling
- Sample Size: 30 respondents, selected from young investors in the Kalyan region, to analyse their investment behaviour and perception towards mutual funds.
- Data Collection Tool: Structured questionnaire
- Data Analysis Techniques: Percentages, graphical representation (bar charts, pie charts)

HYPOTHESIS TESTING

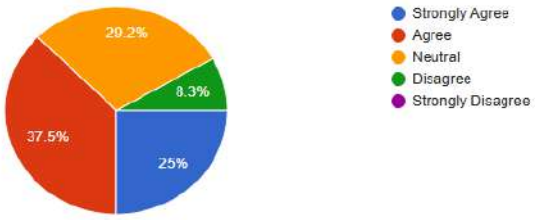
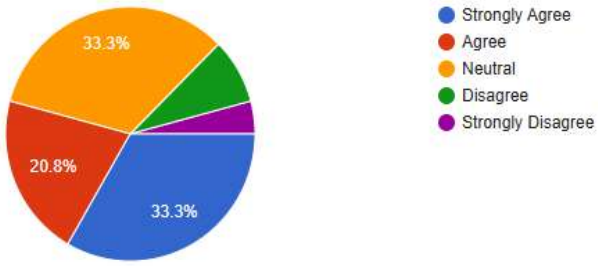
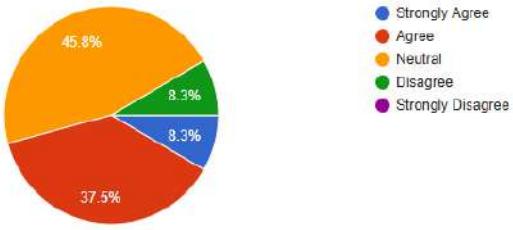
Table: Sample received from 30 respondents in the Kalyan vicinity

DATA	OBSERVATION
Do you invest your money ? 	More than 70% of respondents invest their money, compared to the remaining 30% who do not invest.
Where do you usually invest? 	More than 11% of respondents typically invest in bank fixed deposits, followed by mutual funds and gold as other preferred investment options.
What is your main objective of investment? 	More than 54% of respondents invest primarily with the objective of saving for the future, while the next most common goal is wealth creation.
What is your risk appetite? 	More than 70% of respondents demonstrate a moderate willingness to take risks.
Are you aware of Mutual Funds?	79.2 % respondents are aware of Mutual funds.

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Do you invest in Mutual Funds? 	70 % repondents invests in Mutual funds.
Which is your preferred mode of Mutual Fund investment? 	62.5% respondents prefers SIP's
Which type of Mutual Fund do you prefer? 	58.3 % respondents prefer investing in Equity funds over Debt funds.
What is the source of information about Mutual Funds 	33.33 % respondents agree that Social Media is the major source of information about Mutual Funds compared to other sources of information.
Are Mutual Funds are suitable for young investors?	37.5 % respondents agree that Mutual Funds are suitable for young investors

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Is SIP convenient and disciplined way of investing? 	33.33% respondents agree that SIP's are convenient and disciplined way of investing
Does Market fluctuations discourage you from investing in Mutual Funds? 	37.5% respondents agree that market fluctuations discourage from investing in Mututal funds.

FINDINGS

The survey indicates that a majority of respondents (over 70%) actively invest, with fixed deposits, mutual funds, and gold being the most common investment choices. The primary investment goal is saving for the future, followed by wealth creation, and most respondents show a moderate risk appetite. Awareness and participation in mutual funds are relatively high, with SIPs and equity funds being the preferred modes and types of investment. However, factors like market fluctuations and limited perception of mutual funds' suitability for young investors still influence investment behaviour.

SUGGESTIONS

- Financial awareness programs should be increased, especially focusing on young investors, to improve understanding of mutual funds and investment options.
- Since many respondents prefer moderate risk and saving for the future, safer and balanced investment products like hybrid mutual funds and SIP-based plans should be promoted.
- Efforts should be made to reduce fear caused by market fluctuations through investor education and long-term investment awareness.
- Social media, being a major source of information, should be used more effectively by financial institutions for spreading accurate investment knowledge.

CONCLUSION

The study shows that most respondents in the Kalyan vicinity are active investors with a moderate risk appetite and a strong focus on future savings. Mutual funds are widely known and increasingly used, especially through SIPs, indicating a shift towards disciplined investing. However, concerns about market volatility and limited awareness among some groups highlight the need for better financial education. Overall, mutual funds have strong growth potential if awareness and investor confidence are improved.

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A STUDY ON FINANCIAL LITERACY & ITS IMPACT ON INVESTMENT DECISIONS OF GEN-Z IN THANE DISTRICT

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ABSTRACT
This study examines the level of financial literacy among Generation Z in Thane District and its influence on their investment decisions. With increasing access to digital financial platforms and diverse investment options, understanding how young individuals perceive and apply financial knowledge has become crucial. The research focuses on key aspects such as awareness of financial concepts, risk perception, savings behavior, and preferred investment avenues among Gen Z.

Primary data is collected through structured questionnaires, supported by secondary sources such as journals and reports. The study analyzes the relationship between financial literacy and investment choices, aiming to identify whether higher financial knowledge leads to more informed and diversified investment decisions.

The findings are expected to highlight gaps in financial awareness and emphasize the need for targeted financial education initiatives. The study also provides insights for policymakers, educational institutions, and financial service providers to design strategies that enhance financial inclusion and responsible investment behaviour among the younger population.

INTRODUCTION
In today's dynamic financial environment, the ability to understand, evaluate, and apply financial knowledge has become a critical life skill. Financial literacy, broadly defined as the awareness and comprehension of financial concepts such as savings, budgeting, credit, investments, and risk management, plays a significant role in shaping individuals' economic behaviour and long-term financial well-being. With the increasing complexity of financial markets and the proliferation of digital financial services, the need for sound financial decision-making has never been more pressing.

Among the emerging demographic cohorts, **Generation Z (Gen Z)**—individuals born roughly between the mid-1990s and early 2010s—has been gaining attention due to their unique characteristics, aspirations, and financial behaviours. Unlike previous generations, Gen Z has grown up in a highly digitized world where online banking, mobile applications, and investment platforms are easily accessible. This exposure has created both opportunities and challenges: while they are more technologically savvy, their actual understanding of financial concepts and the implications of their investment choices often remains limited.

Investment decisions are particularly influenced by one's level of financial literacy. A financially literate individual is more likely to evaluate risks, diversify portfolios, and pursue long-term wealth creation strategies, whereas a lack of financial awareness may result in impulsive decisions, susceptibility to misinformation, or reliance on high-risk options. For Gen Z, whose financial journey is still at a formative stage, these decisions are pivotal as they influence future stability, security, and growth.

OBJECTIVES OF STUDY
1. To examine the level of financial literacy among Gen Z in Thane District.
2. To analyse the relationship between financial literacy and investment decision-making.
3. To evaluate the preferred investment avenues of Gen Z in Thane District.
4. To understand the role of demographic factors in influencing investment decisions.
5. To identify challenges faced by Gen Z in making investment decisions.
6. To suggest strategies for enhancing financial literacy among Gen Z.

RESEARCH METHODOLOGY

Sources of Data

Primary data: Structured questionnaire administered online (mobile-friendly)

Secondary data: Prior studies and official publications (e.g., RBI, SEBI investor education reports) for instrument design, benchmarks, and contextualization.

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Research Design
A quantitative, cross-sectional survey with an explanatory (causal) correlational design.

Descriptive elements summarize the level and patterns of financial literacy among Gen Z.

Explanatory elements test whether financial literacy predicts the quality of investment decisions, controlling for demographics and exposure to financial education.

HYPOTHESIS

- **H_0:** Gen Z has no significant variation in the level of financial literacy.
- **H_1:** Gen Z has significant variation in the level of financial literacy.

H_0: There is no evident relationship between financial literacy and investment decision-making among Gen Z.

- **H_1:** There is a evident relationship between financial literacy and investment decision-making among Gen Z.
- **H_0:** There is no difference in the preference for investment avenues among Gen Z.
- **H_1:** There is a difference in the preference for investment avenues among Gen Z.
- **H_0:** Demographic factors (such as age, gender, education, and income) have no influence on investment decisions of Gen Z.
- **H_1:** Demographic factors (such as age, gender, education, and income) influence investment decisions of Gen Z.
- **H_0:** Gen Z does not face any challenges in making investment decisions.
- **H_1:** Gen Z faces challenges in making investment decisions.
- **H_0:** Strategies for enhancing financial literacy have no prominent impact on improving investment decision-making among Gen Z.
- **H_1:** Strategies for enhancing financial literacy have a impact on improving investment decision-making among Gen Z.

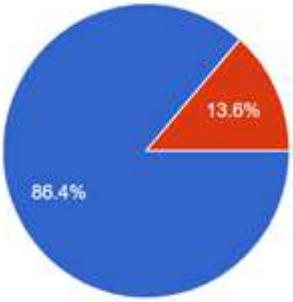
REVIEW OF LITERATURE

1. **A STUDY ON FINANCIAL LITERACY AMONG STUDENTS IN GOPALAN COLLEGE OF COMMERCE, Pranusha U P Asst Prof, Department of Management. Gopalan College of Commerce. 2023 IJRAR April 2023, Volume 10, Issue 2. (E-ISSN 2348-1269, P- ISSN 2349-5138)** The main objective of this research paper is to study about awareness of financial literacy among students in "Gopalan College of commerce". This study is mainly to analyse the level of financial literacy among students. This research information was mainly gathered by collecting primary and secondary data with respect of respondents with the help of questionnaire and has been analysed through statistical analysis and tools.
2. **A Study on Financial Literacy among University Students, Dilpreet Kaur, Pacific Business Review (International) Volume 16 Issue 2 August 2023.** This study added more aspects to previous studies on financial literacy. Despite, studying the same curriculum why female students are still lagging in financial literacy? It will help the policymakers to frame the policies that are conducive to enhancing the financial literacy among female students. Educational institutions must focus on the practicality of the curriculum with enhanced exposure to financial terms. Early the inculcation of financial skills, the better will the financial foundation of individuals.

DATA ANALYSIS
The data collected through the questionnaire are presented in table and pie chart. With the help of the questionnaire an attempt has been made to find out the degree of awareness, preference, growth of Investment avenues of GenZ.

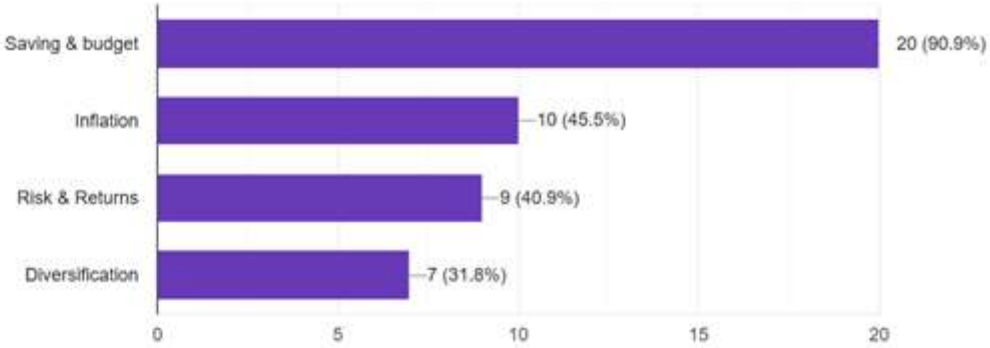
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Awareness of Financial concepts among Gen-Z

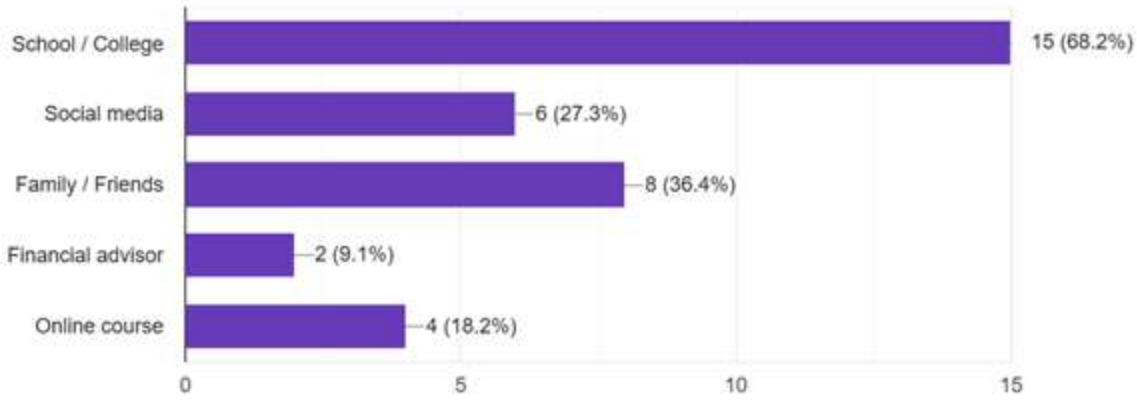


A large majority, **86.4%**, answered **Yes**, indicating that most respondents have basic financial awareness. In contrast, only **13.6%** answered **No**, showing a small proportion lacks such knowledge.

The highest awareness is for **Saving & Budgeting**, with **90.9%**, indicating it is the most familiar concept. Awareness of **Inflation** (**45.5%**) and **Risk & Returns** (**40.9%**) is moderate, while **Diversification** has the lowest awareness at **31.8%**.



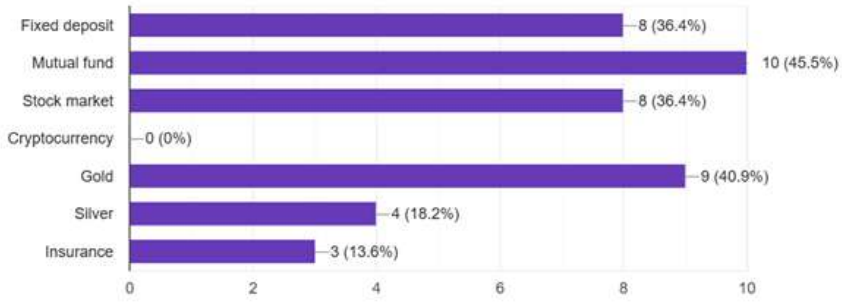
Main sources of financial knowledge



The majority rely on **School/College**, with **68.2%** making it the most significant source. **Family/Friends** (**36.4%**) and **Social Media** (**27.3%**) also play notable roles. Meanwhile, **Online courses** (**18.2%**) and **Financial advisors** (**9.1%**) are less commonly used.

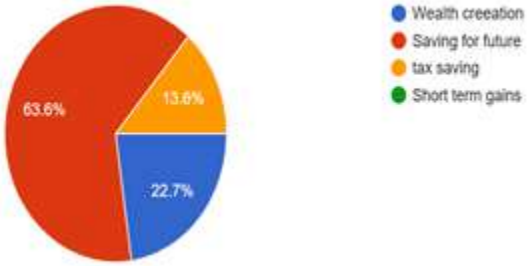
Gen-z Investment preference

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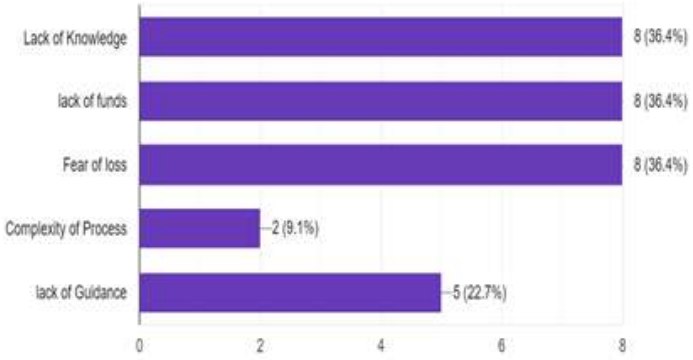
Mutual funds are the most preferred option with **45.5% (10 respondents)**, followed by **Gold** at **40.9%**. **Fixed deposits** and the **Stock market** both have moderate preference at **36.4%** each. **Silver** (**18.2%**) and **Insurance** (**13.6%**) are less popular choices, while **Cryptocurrency** has **0% participation**, indicating no interest or awareness among respondents.

Objective of Investment



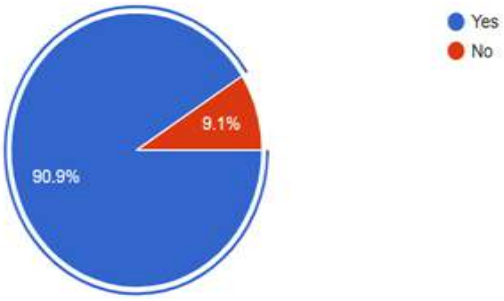
The majority invest for Saving for the future**, accounting for** 63.6%**, making it the most important goal.** Wealth creation **comes next with** 22.7%**, while** Tax saving **represents** 13.6%**. There is** no participation in short-term gains (0%)**.**

What restricts Gen-Z to Invest?



The majority shows that because of Lack of knowledge, funds they hesitate to investment.

Would you be more confident in investing once you gain efficient knowledge about investments?



The study shows Gen-z needs more of knowledge by all means for them to be more confident to make investments.

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LIMITATION OF STUDY

- Geographical Scope
- Sample Size Constraint
- Self Reported Data
- Limited Variable Considered
- Dynamic Nature Of Financial Literacy\
- Access To Respondent

CONCLUSION

The proposed study on Financial Literacy and Its Impact on Investment Decisions of Gen Z in Thane District seeks to bridge the gap between financial knowledge and practical investment behaviour among the younger generation. As Gen Z represents a crucial segment of future investors, understanding their level of financial literacy and how it shapes their decision-making will provide meaningful insights for educators, policymakers, and financial institutions. The findings are expected to highlight whether enhanced financial awareness leads to more informed, confident, and responsible investment choices. This research will not only contribute to academic literature but also assist in formulating strategies that can empower Gen Z to secure their financial future, thereby fostering a financially resilient community in Thane District and beyond.

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AN ANALYTICAL STUDY ON AGRICULTURAL ACCOUNTING PRACTICES AND THEIR IMPACT ON THE PROFITABILITY OF SMALL FARMERS IN THE THANE REGION, MAHARASHTRA

Dr. Komal Chandanshive
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ABSTRACT
Agriculture remains the backbone of the rural economy in Maharashtra, particularly in the Thane region where small and marginal farmers constitute a significant proportion of the agricultural workforce. Despite rising production costs and market uncertainties, many farmers continue to operate without systematic financial planning or accounting practices. Agricultural accounting plays a crucial role in improving cost control, profitability assessment, and informed decision-making.

The present study analyses the agricultural accounting practices followed by small farmers in the Thane region and examines their impact on farm profitability. The study is based on primary data collected from 50 small farmers through a structured questionnaire and supplemented by secondary data from reputed journals, government reports, and international agricultural institutions. The findings indicate that while a majority of farmers recognise the importance of maintaining farm accounts, only a limited number follow systematic written or digital accounting practices. Farmers who maintain proper records exhibit better cost awareness, clearer profit assessment, and improved financial sustainability.

The study concludes that agricultural accounting has a positive and significant impact on the profitability of small farmers. It strongly recommends training programmes, simplified accounting formats, and the promotion of digital agricultural accounting tools to improve financial management in the rural agricultural sector.

Keywords: *Agricultural Accounting, Farm Profitability, Small Farmers, Financial Management, Cost Control, Thane Agriculture*

1. INTRODUCTION
Agriculture continues to be a vital sector of the Indian economy, providing livelihood to more than half of the country's workforce. In regions like Thane district of Maharashtra, agriculture is predominantly practiced by small and marginal farmers operating on limited landholdings. These farmers face numerous challenges such as fluctuating market prices, rising input costs, dependence on monsoon rainfall, and limited access to institutional finance.

One of the major but often overlooked challenges is the lack of systematic agricultural accounting practices. Most farmers concentrate on production activities while ignoring financial record-keeping. In the absence of proper accounting systems, farmers are unable to accurately calculate production costs, assess profits or losses, or plan future investments. Consequently, even productive farms often fail to achieve satisfactory income levels.

1.1. Meaning And Concept Of Agricultural Accounting
Agricultural accounting refers to the systematic recording, classification, summarisation, and analysis of financial transactions related to farming activities. These activities include the cost of seeds, fertilisers, pesticides, labour, irrigation, machinery, and income from the sale of agricultural produce.

According to the Food and Agriculture Organization (FAO), farm record-keeping is an essential management tool that helps farmers improve resource allocation and profitability. Agricultural accounting differs from conventional business accounting due to the seasonal nature of income, dependence on natural factors, and the involvement of biological assets such as crops and livestock.

1.2. Background Of The Study – Thane Region
The Thane region of Maharashtra exhibits a diverse agricultural structure characterised by tribal farming systems, semi-urban agriculture, and traditional cultivation practices. Despite increasing urbanisation, agriculture continues to be an important livelihood activity, particularly in rural and tribal talukas such as Murbad and Shahapur. Most farmers in the region are small and marginal, owning less than two hectares of land, and are engaged in crop farming, mixed farming, dairy, or small-scale poultry activities. Limited landholdings restrict economies of scale and increase dependence on efficient resource management for farm sustainability.

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Primary data collected for the present study indicates that a significant proportion of farmers rely on memory-based or informal accounting methods rather than maintaining systematic written or digital farm records. Similar patterns have been reported by FAO and NABARD, which note that small farmers often lack formal training in financial management and therefore depend on estimation and personal recall for tracking expenses and income.

Reliance on informal accounting practices leads to several managerial and financial challenges. Farmers frequently underestimate actual production costs by ignoring implicit costs such as family labour and depreciation of farm assets. At the same time, profits are often overestimated, as income is not accurately matched with total expenditure. The absence of reliable financial records also contributes to poor financial planning, limited ability to assess farm performance, and inefficient utilisation of inputs such as fertilisers, labour, and capital. Consequently, farmers face difficulties in improving profitability, accessing institutional credit, and making informed production decisions.

1.3. Need For The Study

With increasing commercialisation of agriculture and rising cost pressures, the adoption of agricultural accounting has become essential. Proper accounting helps farmers to:

1.3.1. Track every expense and income source

1.3.2. Identify profitable and non-profitable crops

1.3.3. Control unnecessary expenditure

1.3.4. Improve access to bank credit and government schemes

Despite its importance, the adoption level of accounting practices among small farmers in Thane remains low, creating a strong justification for this study.

1.4. Scope of the Study

The scope of the present study is confined to analysing agricultural accounting practices adopted by small farmers in the Thane region of Maharashtra. It includes farmers owning limited landholdings and engaged in crop farming, mixed farming, dairy, and poultry activities. The study focuses on record-keeping practices, cost measurement, profit assessment, and financial decision-making. It also examines the role of accounting in improving access to institutional credit and government schemes. The analysis is based on primary data collected from 50 respondents through a structured questionnaire.

1.5. Limitations of the Study

The study is based on a small sample of 50 farmers and may not represent all farmers in the region. Convenience sampling has been used, which limits wide generalisation of the findings.

The study relies on information provided by respondents, which may not always be precise.

It is restricted to the Thane region and does not cover other geographical areas.

Limited time and availability of detailed financial data are additional constraints.

1.6. Objectives of the Study

1.6.1. To examine the agricultural accounting practices followed by small farmers in the Thane region.

1.6.2. To analyse the impact of accounting practices on the profitability of small farmers.

1.6.3. To identify problems faced by farmers in maintaining farm accounts.

1.6.4. To suggest measures for improving accounting awareness and financial management among farmers.

1.7. Hypotheses

1.7.1. H_{01}: There is no significant adoption of agricultural accounting practices among small farmers in the Thane region.

1.7.2. H_{11}: There is significant adoption of agricultural accounting practices among small farmers in the Thane region.

1.7.3. H_{02}: Agricultural accounting practices do not significantly affect the profitability of small farmers.

1.7.4. H_{12}: Agricultural accounting practices significantly affect the profitability of small farmers.

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2. REVIEW OF LITERATURE

2.1 Singh, R., & Kumar, P. (2018). Singh and Kumar examined farm accounting practices among small farmers in India and found that farmers who maintained systematic records had better cost control and income stability. The study highlighted that proper bookkeeping improved financial awareness and farm decision-making. It also reported a positive relationship between education level and adoption of accounting practices. The authors recommended training programmes to promote farm record-keeping among small farmers.

2.2 Rathod, S. (2020). Rathod analysed financial literacy levels among rural farmers and identified lack of accounting knowledge as a major barrier to record-keeping. The study revealed that farmers with limited financial awareness relied heavily on memory-based estimation methods. This resulted in poor financial planning and weak cost management. The study emphasised the need for financial literacy initiatives in rural areas.

2.3 Food and Agriculture Organization (FAO). (2019). The FAO highlighted that farm record-keeping is a key management tool for smallholders. According to the report, maintaining proper records enhances farmers' ability to access institutional credit and agricultural subsidies. It also helps in monitoring farm performance and planning future activities. The FAO recommended simplified accounting formats for small farmers.

2.4 Government of Maharashtra. (2022). The Government of Maharashtra reported that despite technological progress in agriculture, financial management among small farmers remains weak. The report noted that many farmers do not maintain formal farm accounts, limiting access to government schemes. Inadequate financial planning was identified as a contributor to low farm profitability. The study suggested integrating accounting training with extension services.

2.5 Dutta, H., & Das, D. (2020). Dutta and Das examined farm accounting practices in India and observed that agricultural accounting is still at a rudimentary stage. The study found that small farmers rarely maintain structured accounts due to subsistence-oriented farming. Lack of standardised accounting methods led to inaccurate profit measurement. The authors stressed the importance of treating farming as a business enterprise.

2.6 Waysal, S. D., & Kawade, V. P. (2025). This study analysed record-keeping practices among rural farmers and found that the majority relied on memory or informal notes. Poor record-keeping was associated with weak financial control and limited access to institutional credit. The study identified education and training as key determinants of accounting adoption. It recommended structured literacy programmes for farmers.

2.7 Ubha, D. S., & Shergill, S. S. (2023). Ubha and Shergill discussed the status of agricultural accounting in India and found that it is largely neglected by farmers. The study pointed out that farmers often fail to track costs systematically. This leads to distorted estimates of profitability. The authors highlighted the role of agricultural accounting in improving farm sustainability.

2.8 Bolaji, S. A. (2021). Bolaji examined the impact of farm record-keeping on farm business profitability. The study concluded that farmers who maintained accurate financial records achieved higher profitability and better resource utilisation. Lack of accounting skills was identified as a major constraint. The study recommended digitisation of farm accounting systems.

2.9 Rani, S., & Singh, K. (2024). This study evaluated the impact of financial literacy programmes on rural farmers and found that training significantly improved financial decision-making. Farmers who received financial education showed better credit utilisation and planning ability. The study emphasised integrating financial literacy with agricultural development policies. Improved accounting practices were linked to economic empowerment.

2.10 NABARD. (2021). NABARD reported that absence of proper financial records limits small farmers' access to institutional credit. The study highlighted that banks prefer farmers with documented income and expenditure records. Poor accounting practices increase dependence on informal credit sources. NABARD emphasised financial literacy as a tool for inclusive rural development.

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3. RESEARCH METHODOLOGY

3.1. Nature of the Study

The present research is descriptive and analytical in nature. The descriptive aspect of the study focuses on understanding the existing agricultural accounting practices followed by small farmers in the Thane region, such as whether they maintain farm records, the type of records kept, and the methods used for accounting. At the same time, the analytical approach is used to examine the relationship between accounting practices and farm profitability, cost control, decision-making, and access to financial benefits. This combination of descriptive and analytical research enables a comprehensive understanding of both the current practices and their economic implications for small farmers.

3.2. Sources of Data

The study is based on both primary and secondary data sources, ensuring reliability and depth of analysis.

3.3. Primary Data

Primary data were collected directly from 50 small farmers residing in different areas of the Thane region. A structured questionnaire was designed and administered using Google Forms. The questionnaire included:

3.3.1. Demographic details such as age, education level, landholding size, type of farming, and farming experience

3.3.2. Questions related to accounting practices, such as maintenance of income and expense records, cost calculation, use of written or digital records, and preparation of profit or loss statements

3.3.3. Perception-based statements measured on a Likert scale to assess the perceived benefits of accounting practices, including cost control, profitability, crop selection, and credit access

3.3.4. Questions identifying problems faced in maintaining accounts, such as lack of knowledge, time constraints, and need for training

The responses obtained indicate that many farmers maintain partial or informal records, while only a limited number follow systematic accounting practices. These responses formed the core dataset for analysis.

3.4. Secondary Data

Secondary data were collected from:

3.4.1. Research journals related to agricultural economics, accounting, and rural finance

3.4.2. Standard textbooks on agricultural finance and farm management

3.4.3. Publications and reports of the Food and Agriculture Organization (FAO)

3.4.4. Reports and statistics published by the Government of Maharashtra and NABARD

Secondary data were mainly used to support the conceptual framework of the study, review earlier research, and compare the study findings with existing literature.

3.5. Sampling Method

The study adopted the convenience sampling method. Farmers who were easily accessible and willing to respond through the online questionnaire were included in the sample. Since the study focuses on small farmers and exploratory insights into accounting practices rather than population-wide generalisation, convenience sampling was found appropriate. The sample size of 50 respondents was considered adequate to capture variations in accounting behaviour among small farmers in the Thane region.

3.6. Tools and Techniques Used

The following tools and techniques were employed for data collection and analysis:

3.6.1 Questionnaire Method

A structured questionnaire was used as the primary tool for collecting data from small farmers in the Thane region. The questionnaire consisted of demographic questions, accounting practice-related questions, and perception-based statements measured on a Likert scale. The structured format ensured consistency and reliability in data collection.

3.6.2 Percentage Analysis

Percentage analysis was used to analyse demographic characteristics and responses related to agricultural accounting practices. The technique helped in understanding the proportion of farmers maintaining farm

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records, calculating production costs, preparing profit and loss statements, and using different methods of record keeping.

3.6.3 Descriptive Statistical Analysis

Descriptive statistics such as Mean, Standard Deviation, Frequency, and Percentage were used to summarise and interpret the responses. These statistical measures helped in assessing the level of adoption of agricultural accounting practices, the perceived impact on profitability, and the challenges faced by farmers in maintaining farm accounts.

3.6.4 One-Sample t-Test

The One-Sample t-Test was used to test the research hypotheses related to the adoption of agricultural accounting practices and their impact on profitability. The test helped determine whether the observed mean scores differed significantly from the selected test value. The results were interpreted using a 5 percent level of significance ($p < 0.05$).

3.6.5 Comparative Analysis

Comparative analysis was employed to compare the responses of farmers with different accounting practices. The comparison helped identify differences in cost control, profitability assessment, financial decision-making, and overall farm management efficiency.

3.6.6 Qualitative Interpretation

Qualitative interpretation was used to analyse perception-based responses and identify key issues affecting agricultural accounting practices. This technique helped in understanding challenges such as lack of accounting knowledge, insufficient training, time constraints, and limited use of digital accounting tools among farmers.

4 DATA ANALYSIS AND INTERPRETATION

4.6 Gender of Respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	32	64.0	64.0	64.0
Female	18	36.0	36.0	100.0
Total	50	100.0	100.0	100.0

Interpretation

The above table shows that 64% of respondents are male and 36% are female. This indicates that male farmers constitute most respondents in the study area.

4.2 Age of Respondents

Age Group	Frequency	Percent	Valid Percent	Cumulative Percent
Below 30 years	8	16.0	16.0	16.0
31–40 years	14	28.0	28.0	44.0
41–50 years	18	36.0	36.0	80.0
Above 50 years	10	20.0	20.0	100.0
Total	50	100.0	100.0	100.0

Interpretation

The majority of respondents belong to the age group of 41–50 years (36%), followed by 31–40 years (28%). This indicates that experienced middle-aged farmers dominate the sample.

4.3 Educational Qualification

Qualification	Frequency	Percent	Valid Percent	Cumulative Percent
Primary	9	18.0	18.0	18.0
Secondary	16	32.0	32.0	50.0
Higher Secondary	14	28.0	28.0	78.0
Graduate and Above	11	22.0	22.0	100.0
Total	50	100.0	100.0	100.0

Interpretation

The analysis shows that most respondents have secondary-level education (32%), while 22% are graduates or above. This indicates a moderate educational background among farmers.

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4.4 Farming Experience

Experience	Frequency	Percent	Valid Percent	Cumulative Percent
Below 5 years	7	14.0	14.0	14.0
5–10 years	16	32.0	32.0	46.0
Above 10 years	27	54.0	54.0	100.0
Total	50	100.0	100.0	100.0

Interpretation
More than half of the respondents (54%) possess over 10 years of farming experience, indicating practical knowledge and long-term involvement in agricultural activities.

4.5 Maintenance of Farm Records

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	31	62.0	62.0	62.0
No	19	38.0	38.0	100.0
Total	50	100.0	100.0	100.0

Interpretation
The majority of farmers (62%) maintain some form of farm records, while 38% do not maintain records systematically.

4.6. Method of Record Keeping

Method	Frequency	Percent	Valid Percent	Cumulative Percent
Memory-based	20	40.0	40.0	40.0
Notebook/Register	24	48.0	48.0	88.0
Mobile Application	6	12.0	12.0	100.0
Total	50	100.0	100.0	100.0

Interpretation
The majority of respondents (48%) use notebooks or registers for maintaining farm accounts, while only 12% use digital applications.

4.7. Cost Calculation Practices

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	34	68.0	68.0	68.0
No	16	32.0	32.0	100.0
Total	50	100.0	100.0	100.0

Interpretation
The analysis indicates that 68% of respondents calculate cultivation costs before making production decisions.

4.8. Profit or Loss Assessment

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	27	54.0	54.0	54.0
No	23	46.0	46.0	100.0
Total	50	100.0	100.0	100.0

Interpretation
More than half of the respondents prepare profit or loss assessments, which reflects growing awareness regarding farm financial management.

4.9. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Adoption of Accounting Practices	50	20	100	78.40	18.210
Profitability Impact	50	25	100	82.60	17.420
Challenges and Benefits	50	20	100	74.10	19.305

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Interpretation
The mean score of adoption of accounting practices is 78.40, indicating that respondents moderately adopt agricultural accounting methods. The profitability impact mean score of 82.60 suggests strong agreement that accounting practices positively influence profitability.

5 HYPOTHESIS TESTING

5.6 Objective 1
To examine the agricultural accounting practices followed by small farmers in the Thane region.

Null Hypothesis (H_{01})
There is no significant adoption of agricultural accounting practices among small farmers in the Thane region.

Alternate Hypothesis (H_{11})
There is significant adoption of agricultural accounting practices among small farmers in the Thane region.

To study the above null hypothesis, One-Sample t-test is applied. The results are as follows:

One-Sample Test

Test Value = 50

Variable	t	df	P-value	Mean Difference
Agricultural Accounting Practices	**10.987**	**49**	**0.000**	**28.400**

Interpretation
The above results indicate that the p-value is 0.000, which is less than the standard significance value of 0.05. Therefore, the null hypothesis is rejected and the alternate hypothesis is accepted.

Conclusion
There is significant adoption of agricultural accounting practices among small farmers in the Thane region.

5.7 Objective 2
To analyse the impact of accounting practices on the profitability of small farmers.

Null Hypothesis (H_{02})
Agricultural accounting practices do not significantly affect the profitability of small farmers.

Alternate Hypothesis (H_{12})
Agricultural accounting practices significantly affect the profitability of small farmers.

To study the above null hypothesis, One-Sample t-test is applied. The results are as follows:

One-Sample Test

Test Value = 50

Variable	t	df	P-value	Mean Difference
Profitability Impact	**13.230**	**49**	**0.000**	**32.600**

Interpretation
The above results indicate that the p-value is 0.000, which is less than the standard significance value of 0.05. Therefore, the null hypothesis is rejected and the alternate hypothesis is accepted.

Conclusion
Agricultural accounting practices significantly affect the profitability of small farmers.

5.8 Problems Faced by Farmers in Maintaining Farm Accounts

Problems	Frequency	Percentage
Lack of accounting knowledge	21	42.0
Lack of time	11	22.0
Low education level	8	16.0
Lack of digital skills	6	12.0
No perceived need	4	8.0
Total	50	100.0

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Interpretation
The above table indicates that lack of accounting knowledge is the major problem faced by farmers in maintaining farm accounts.

5.9 Suggestions for Improving Accounting Awareness and Financial Management

5.4.1 Conduct training programmes on agricultural accounting practices.

5.4.2 Promote simple and farmer-friendly accounting formats.

5.4.3 Encourage the use of mobile applications for record keeping.

5.4.4 Improve awareness regarding profitability analysis and cost management.

5.4.5 Provide financial literacy support through agricultural extension services.

6 FINDINGS

6.1 The majority of respondents are male farmers.

6.2 Most respondents belong to the age group of 41–50 years.

6.3 A majority of farmers maintain farm records.

6.4 Notebook-based accounting is more common than digital accounting.

6.5 Farmers strongly agree that accounting practices improve profitability.

6.6 Lack of accounting knowledge remains a major challenge.

6.7 Agricultural accounting practices significantly influence financial decision-making.

7 CONCLUSION

The study concludes that agricultural accounting practices play a vital role in improving the profitability and financial management of small farmers in the Thane region. Farmers maintaining systematic records are better able to monitor costs, evaluate profits, and make informed decisions. Therefore, awareness programmes and accounting training should be promoted to improve financial sustainability in agriculture.

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A STUDY ON SOCIAL MEDIA ADDICTION AND ITS EFFECT ON STUDENTS' ACADEMIC PERFORMANCE AND HEALTH

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ABSTRACT
Social media has become an integral part of students' daily lives, offering opportunities for communication, learning, and entertainment. However, excessive and uncontrolled use has led to the emergence of social media addiction, which negatively affects students' academic performance and health. This study explores the relationship between social media addiction, academic achievement, and physical as well as mental health among students. Previous research indicates that high social media usage is associated with reduced academic engagement, lower grades, and increased mental health issues such as anxiety and depression.

The present research adopts a quantitative approach using surveys to analyze students' behavior and its outcomes. Findings aim to highlight the importance of balanced usage and provide recommendations for students, educators, and policymakers.

INTRODUCTION
In the 21st century, social media platforms such as Facebook, Instagram, and WhatsApp have transformed communication and information sharing. Students increasingly rely on these platforms for both academic and non-academic purposes. While social media offers benefits like collaborative learning and instant communication, its excessive use can lead to addiction-like behaviors.

Social media addiction refers to the compulsive and excessive use of social networking platforms that interferes with daily life activities, including academic responsibilities. Studies show that students often spend several hours daily on social media, which reduces time available for studying and completing assignments.

Moreover, addiction to social media is linked to distractions, procrastination, and reduced concentration levels, ultimately affecting academic performance. It also impacts students' health by causing sleep disturbances, anxiety, depression, and reduced physical activity.

Therefore, understanding the effects of social media addiction is essential for improving students' academic outcomes and overall well-being.

REVIEW OF LITERATURE (IN POINTS)
1. Studies indicate a negative relationship between social media addiction and academic performance, where excessive usage leads to lower grades.
2. Research involving 2661 students found that social media addiction reduces academic engagement, which in turn lowers academic performance.
3. Some studies highlight that social media acts as a major distraction, with students spending more than 4 hours daily, negatively affecting assignment completion.
4. Excessive use is associated with mental health problems such as anxiety, depression, and stress.
5. Social media addiction can also lead to poor time management and procrastination, affecting study habits.
6. A few studies suggest a slight positive relationship when social media is used for educational purposes, indicating that its impact depends on usage patterns.
7. Research shows that addictive behavior patterns influence academic outcomes indirectly through reduced focus and engagement.
8. Social media addiction is also linked to sleep disturbances and reduced physical health, affecting students' daily functioning.

OBJECTIVES OF THE STUDY
1. To examine the level of social media addiction among students.
2. To analyze the impact of social media addiction on academic performance.
3. To study the effects of social media addiction on students' physical and mental health.

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4. To identify the relationship between time spent on social media and academic outcomes.
5. To suggest measures to reduce social media addiction among students.

RESEARCH HYPOTHESIS

- **H_0:** There is no significant relationship between social media addiction and students' academic performance and health.
- **H_1:** There is a significant negative relationship between social media addiction and students' academic performance and health.

RESEARCH METHODOLOGY

1. Research Design

The study uses a **descriptive research design** to analyze the relationship between social media addiction and its effects on students.

2. Data Collection Method

1. **Primary Data:** Collected through questionnaires and surveys distributed among students.
2. **Secondary Data:** Collected from journals, research papers, and online academic sources.

3. Sample Size

- The study includes **100–200 students** from schools/colleges.
- Sampling method: **Random sampling**.

4. Tools for Data Collection

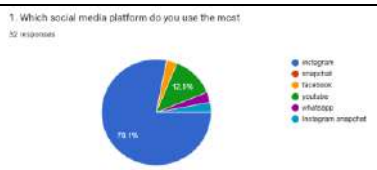
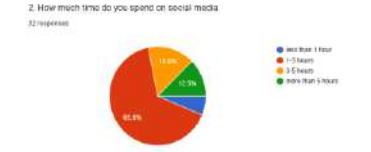
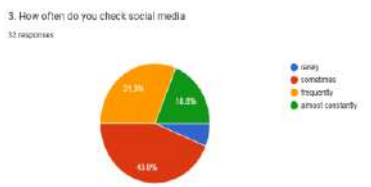
- Structured questionnaire
- Social Media Addiction Scale
- Academic performance records (self-reported GPA/marks)

5. Data Analysis Techniques

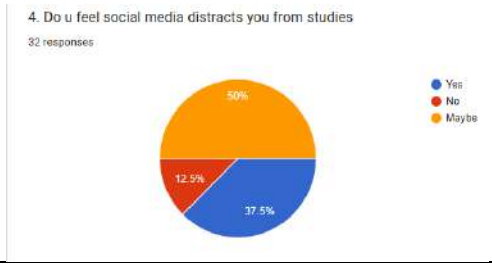
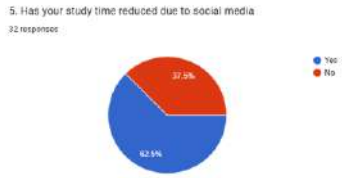
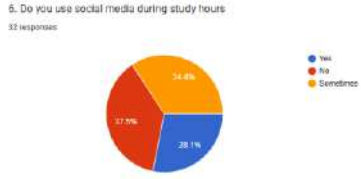
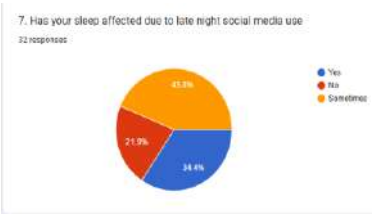
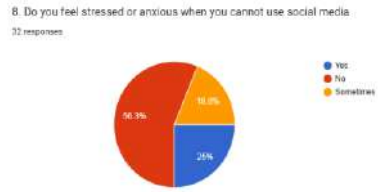
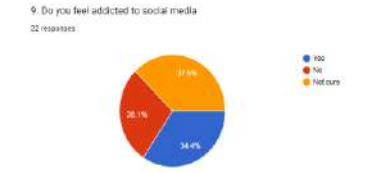
- Percentage analysis
- Correlation analysis
- Graphical representation (charts and tables)

6. Variables

1. **Independent Variable:** Social media addiction
2. **Dependent Variables:** Academic performance and health (physical & mental)

DATA	OBSERVATION
	78% people uses Instagram the most
	65.6% people spends 1-3 hours on social media
	43.8% uses social media sometimes where as 31.3% uses frequently

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	Here 50% of people are confused about distraction whereas 37.5% feels to be distracted from studies
	62.5% people says yes their study time has reduced due to social media addiction
	37.5% people says they do not use social media during study hours whereas 34.4% people sometime uses it.
	43.8% people says sometimes their sleep are affected due to use of social media use whereas 34.4% totally agrees that their sleep is been affected
	56.3% do not feel any stress or anxiety due to social media
	37.5% people are not sure that they are addicted whereas 34.4% agree that they are addicted to social media

FINDINGS

Social media addiction has become increasingly common with the rise of platforms like Instagram, TikTok, and Facebook, especially among young people. Research shows that excessive use can negatively affect mental health, leading to anxiety, depression, and low self-esteem, often driven by constant comparison and the fear of missing out (FOMO). This behavior is reinforced by the brain's release of Dopamine when users receive likes or notifications, making it habit-forming. Over time, addiction can reduce academic performance, disturb sleep, and weaken real-life social interactions. While social media has benefits, its uncontrolled use can lead to serious psychological, social, and physical consequences.

SUGGESTIONS

Here are clear **point-wise suggestions** for reducing social media addiction:

1. Set daily time limits for apps like Instagram and TikTok.
2. Turn off non-essential notifications to avoid distractions.
3. Schedule specific times for checking social media instead of using it continuously.
4. Engage in offline activities like reading, sports, or hobbies.

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5. Avoid using social media before bedtime to improve sleep quality.
6. Practice "digital detox" by taking regular breaks from all social platforms.
7. Keep your phone away while studying or working to improve focus.

CONCLUSION

In conclusion, social media addiction is a growing concern in today's digital world, largely driven by the widespread use of platforms like Instagram and TikTok. While these platforms offer opportunities for communication and learning, excessive use can negatively impact mental health, productivity, and real-life relationships. The addictive nature is linked to psychological factors such as FOMO and the brain's reward response through Dopamine. Therefore, maintaining a balanced and controlled use of social media is essential to ensure overall well-being and a healthier lifestyle**.**

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A STUDY ON SAVING AND INVESTMENT PATTERN AMONG WORKING WOMEN IN ULHASNAGAR

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ABSTRACT
The research is an empirical analysis of investment strategies and savings habits of working women in Ulhasnagar. With the increase in their economic independence due to their educational attainment and employment in the banking, software industry sector, and education sector, women have become investors rather than savers. In this study, primary data were collected from 50 participants using structured questionnaires adopting a descriptive approach.

The study found that even if 86% of participants know about small investments schemes, a majority still prefer traditional means of investments. Savings in banks (45%) and investment in gold (25%) are still preferred by them. Interestingly, there is a clear difference in the psychology of people. Even though 66% believe that deposits in banks are comparatively risk-free compared to shares, 72% consider bank deposits risky. This shows that there is a lack of understanding among people regarding the risks involved. Taxation, retirement security, and education for children are the main factors that motivate women to invest. The study has concluded that even though women make independent decisions, their financial knowledge is relatively poor.

Keywords: *Investment strategies, savings habits, working women, financial literacy, risk perception, traditional investments, Ulhasnagar, financial psychology.*

INTRODUCTION
A country's economic growth is inherently tied to its domestic savings and capital formation. In India, the household sector remains the main contributor to these savings. Women have historically been viewed as savers, rather than investors, primarily managing household funds for “rainy days”. But the landscape is changing. The number of qualified employed women with independent sources of income has gone up because of government initiatives such as Jan-Dhan, girl-child education and financial inclusion schemes.

With the arrival of economic independence, women’s contribution to professional and financial spheres has increased tenfold. But investment has traditionally been a male bastion, with India’s patriarchal setup implying that women are often only consulted on “real” assets such as property or gold. The present study aims to fill the research gap by investigating the behavior, risk perception and preferences of employed women investors in the present scenario.

Investments are generally classified into two broad categories:
Real Assets and Financial Assets.

Real Assets: These include tangible investments like land, buildings, and machinery that contribute directly to economic growth. Residential property is a predominant choice here, offering both rental income and capital appreciation.

Financial Assets: These are indirect claims on real assets and include debt, equity, and hybrid instruments.

Debt: Provides regular returns through interest but carries limited capital appreciation.

Equity: Represents ownership in a company, focusing on capital appreciation, though it carries higher perceived risk.

Hybrid: Combines features of both debt and equity, such as convertible debentures.

LITERATURE REVIEW
According to Nupur Gupta & Vijay Agarwal (2013) study, bank deposits were the most preferred investment channel, followed by mutual funds, real estate, and gold. The research was carried out in Mumbai and Delhi with a sample size of 251 respondents and established notable differences between the investors in the two cities, especially those interested in the stock market. To analyze the data, statistical tools such as factor analysis, chi- square, and one way ANOVA were used.

In another research conducted in Nagapattinam, Tamil Nadu involving 475 respondents, life insurance was the most preferred choice, followed by real estate and gold according to Geetha N & Ramesh M (2012). Notably, factors such as risk protection and safety played key roles in making the decision while graduates preferred

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investment products which had a longer time span. The researchers employed statistical techniques like ANOVA and chi-square to interpret the data.

In P. Parmashivivaiah, et al's (2013) study carried out in Mysore with 120 respondents, liquidity emerged as the most crucial factor affecting investment decisions by the government employees and entrepreneurs. However, occupation showed no significant connection with investment goals. Statistical tools such as chi-square, F-test, ANOVA, and regression were used.

According to Ravi Vays & Suresh C Moonrat (2012) study carried out in Indore with 500 respondents, gold ranked as the most preferred investment choice, followed by bank deposits and fixed deposits. Investors showed their preference for less risky investments over more risky ones. The study used statistical measures such as chi-square, median, and mode.

As noted by Girdhar Mahanta and S S Debasish (2011), in Cuttack and Khurda (Orissa) with 210 respondents, high-income individuals (₹10 Lakhs +) were highly interested in equity investments. Individuals belonging to the business class were attracted towards equity and mutual fund investments, whereas government officials favored insurance and bank deposits. Mean and percentage methods were used for analysis.

As found by S. Umamaheshwari and Ashok Kumar (2011) in Coimbatore, with a sample size of 1000, the most popular form of investment was Provident Fund, followed by insurance and gold. In addition, it was reported that knowledge about various forms of investments was comparatively low among men and women. Statistical tools such as chi-square, ANOVA, and mean were used.

According to Geetha Kabra et al. (2010), when it comes to general investors (sample size of 196), some important variables affecting investment include security, awareness, hedging, period, and advantages. It is worth mentioning here that women tend to choose secure investment forms. Factor analysis, regression, and Cronbach's alpha were used as analytical tools.

According to Sunita Bishnoi (2013), in her study undertaken in Faridabad involving 200 respondents, life insurance was found to be the most preferred method of savings, followed by savings in banks. Capital protection and tax savings were the major reasons why people invested in financial instruments. Percentage and chi-square methods were used for analysis.

Another study by Pandian L& A Ranganathan T (2012), undertaken in Cuddalore District, involving 520 respondents, indicated that the major reason behind savings was security of life and a better future. Also, any previous experience of loss from investments influenced present investment decisions. Factor analysis and ANOVA were used in the study

Lastly, another study by Parimal Kanthi & Ashok Kumar (2013) undertaken in Coimbatore involving 600 respondents divided the investors into three groups namely; innovative, moderate, and conservative investors. It is evident from the study that the moderate group of investors favored the post office saving scheme as compared to other forms of investment. Cluster analysis and chi-square tests were used for classification and analysis.

RESEARCH METHODOLOGY

The present study adopted a descriptive research design to analyze the saving and investment patterns among employed women in Ulhasnagar.

Sampling: A sample of 50 respondents was selected.

Data Type:

1. **Primary Data:** It is a data collection process through survey, interview etc. For this paper main data was collected through a structured questionnaire administered to 50 respondents (Appendix).
2. **Secondary data**: Information that has not been acquired by the researcher directly but has instead been made accessible to others for use by a different party. Secondary data was collected from the international journals, published books, trusted online sources.

Limitations: The research is limited to a specific geographic area and small sample size, so results may not be completely generalizable to the entire population of employed women.

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4. DATA ANALYSIS AND INTERPRETATION

4.1 Demographic Profile of Respondents

Age Distribution

Age Group	Respondents (%)
18-25	82%
25-30	12%
30-35	6%

The above table shows that a majority of respondents (82%) belong to the 18–25 age group, indicating that the sample is dominated by young working women.

Source: Primary Data

Educational Qualification

Qualification	Respondents (%)
SSC	30%
HSC	10%
Graduate	50%
Post-Graduate	10%

It is observed that most respondents are graduates, reflecting a reasonably educated sample.

Source: Primary Data

Monthly Income

Income Range	Respondents (%)
10,000-15,000	50%
15000-20,000	30%
20,000-25000	12%
25000-30,000	8%

The data indicates that the majority of respondents fall within the lower to middle-income group. Source: Primary Data

4.2 Investment Awareness and Habits

Awareness of Investment Options

Response	Percentage
Yes	86%
No	14%

Most respondents are aware of investment options, though depth of knowledge varies.

Source: Primary Data

Preferred Investment Amount

Amount Monthly	Respondents (%)
₹500-₹1,000	52%
₹1,000-₹2,000	28%
₹2,000 & above	20%

This reflects a cautious investment approach with smaller amounts.

Source: Primary Data

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Expected Rate of Return

Return Rate	Respondents (%)
1% -3%	60%
3%- 5%	25%
5% & above	15%

Most respondents prefer lower returns, indicating risk-averse behavior.

Source: Primary Data

4.3 Factors affecting investing decisions

Key Decision Factor

Returns and risk are the most influential factors in decision-making.

Factors	Respondents (%)
Return	54%
Risk	30%
Investment Period	14%
Availability	2%

Source: Primary Data

Purpose of Investment

Purpose	Respondents (%)
Tax Benefits	40%
Steady Income	28%
Financial Goal	20%
Security	8%

Tax benefits and steady income are key motivations.

Source: Primary Data

In terms of investing, the most important thing for respondents is the return (54%), followed by risk (30%) and the investment period (14%). Main reasons for investment motivation of salaried people are tax benefit (40%) and a steady income after retirement (28%)

4.4 The Literacy Divide and Risk Perception

Risk Perception

Statement	Respondents (%)
Bank deposits are less risky than shares	66%
Bank deposits are high-risk investments	72%

The responses indicate confusion among respondents regarding financial risk concepts.

Source: Primary Data

This indicates limited financial literacy and inadequate understanding of different investment risks and financial instruments.

4.5 Asset Preference

Preferred Investment Avenues

Investment Option	Percentage
Gold/Silver	70%
Pension Plans	40%
Regular Return Plans	40%
Others	10%

Traditional investment options are highly preferred among respondents.

Source: Primary Data

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CONCLUSION

The present study examined the saving and investment patterns among working women in Ulhasnagar and revealed that women are becoming increasingly aware of financial planning and investment practices. The growth in employment opportunities and financial independence has encouraged women to participate actively in investment decisions.

The study found that most respondents possess basic awareness regarding investment avenues; however, their investment preferences remain inclined toward traditional and safer options such as bank deposits, gold, pension plans, and regular return schemes. Risk perception among respondents was found to be inconsistent, indicating limited financial literacy and lack of detailed understanding of investment products.

Returns, risk, and tax benefits emerged as the major factors influencing investment decisions. Most respondents preferred investing smaller amounts regularly and expected moderate returns, reflecting a cautious and security-oriented investment attitude. The study also highlighted that financial security, retirement planning, and future family needs play an important role in shaping women's investment behavior.

Overall, the research concludes that although working women are increasingly participating in financial activities and taking independent investment decisions, there is still a need to improve financial literacy and awareness regarding diversified investment opportunities. Proper financial education, awareness programs, and guidance can help women make informed investment decisions and achieve long-term financial stability.

FINDINGS

- The study revealed that the majority of respondents belonged to the 18–25 age group, indicating greater participation of young working women in savings and investment activities.
- Most respondents were graduates, showing that educational qualification positively contributes to awareness about investment options.
- A large proportion of respondents belonged to the lower and middle-income categories and preferred investing smaller amounts on a monthly basis.
- Around 86% of respondents were aware of various investment avenues, though their practical understanding of financial risk and investment diversification was limited.
- The majority of respondents preferred traditional investment options such as gold, pension plans, bank deposits, and regular return schemes over high-risk investment avenues like shares and equities.
- Return on investment and risk were identified as the most important factors influencing investment decisions.
- Tax benefits, steady income, and future financial security were the major purposes behind investments made by working women.
- The study identified confusion among respondents regarding financial risk perception, as many considered bank deposits both safe and risky at the same time, indicating inadequate financial literacy.
- Most respondents preferred low to moderate returns, reflecting a conservative and risk-averse investment attitude.
- The research highlighted the growing financial independence of working women and their increasing role in making personal financial and investment decisions independently.

RECOMMENDATIONS

- Investment decisions of individuals are driven by multiple Factors and it was found that the financial literacy level of employed Women was low. It is suggested that the financial product creators, marketers and regulators should try to increase the financial literacy level of women by conducting training programs and workshops on regular basis either independently or through their employers.
- Government should make available more tax savings products in order to reduce concentration of savings in Life Insurance and Provident fund.
- Pension Fund Regulatory and Development Authority (PFRDA) should create more awareness about National Pension System (NPS) so that more people will be motivated to think about retirement planning among employed women.

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- Women should be encouraged to invest in more avenues and participate in the investment avenues which involves high risks and also high returns.
- Women should focus in making a formal financial plan to have a focus on the financial goals.
- Women should increase their awareness level of the portfolio diversification to spread their risks.
- Women should recognize their financial independence and plan for the future to make it better.
- Government should start more innovative projects like 'Mahila Bank' where it will be easier for women to make their investments.
- Awareness about various investment avenues must be made with their relative merits & demerits. Investment guidelines must be made known to every individual through their organizations.

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- National Council of Applied Economic Research (NCAER)
- National Housing Bank (NHB)
- Government of India Data Portal
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APPENDIX: QUESTIONNAIRE

The following questionnaire was used to collect primary data for the study.

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A STUDY ON EFFECTIVENESS OF INFLUENCER MARKETING ON COLLEGE STUDENTS WITH REFERENCE TO KALYAN REGION

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ABSTRACT
The rapid growth of social media platforms has transformed the way businesses communicate with consumers, giving rise to influencer marketing as a powerful promotional strategy. This study examines the effectiveness of influencer marketing on college students with special reference to the Kalyan region. College students represent a highly active segment on digital platforms such as Instagram, YouTube, and Snapchat, making them a key target audience for brands leveraging influencer collaborations.

The primary objective of this research is to analyze the impact of influencer marketing on students' purchasing behavior, level of trust in influencers, and overall engagement with promotional content. The study adopts a quantitative research methodology, using structured questionnaires distributed among 40 college students from various streams in the Kalyan region. The data collected was analyzed using percentage methods and graphical representation techniques.

The findings indicate that a significant proportion of students follow social media influencers and are influenced by their recommendations, particularly in categories such as fashion, beauty, and gadgets. Influencers are perceived as relatable and trustworthy compared to traditional advertisements, which enhances their effectiveness. However, concerns regarding authenticity, excessive paid promotions, and misleading content were also highlighted by respondents.

The study concludes that influencer marketing has a substantial impact on the awareness, perception, and buying decisions of college students. The effectiveness of this marketing approach largely depends on the credibility, transparency, and relatability of the influencer. The research suggests that brands should focus on ethical practices and long-term collaborations with influencers to build trust and ensure sustained consumer engagement.

Keywords: *Influencer Marketing, Social Media, Consumer Behavior, College Students, Digital Marketing*

INTRODUCTION
Influencer marketing has emerged as a vital component of modern digital marketing strategies, transforming the way brands communicate with their target audiences. With the rapid advancement of technology and the widespread use of social media platforms such as Instagram, YouTube, and Snapchat, traditional forms of advertising are gradually being replaced by more personalized and engaging methods. Influencer marketing involves collaboration between brands and individuals who have established credibility, popularity, and a strong follower base on digital platforms. These influencers possess the ability to shape the opinions, attitudes, and purchasing behavior of their audience through authentic and relatable content.

In today's digital era, college students represent one of the most active and influential user groups on social media. They spend a significant amount of time consuming online content, engaging with influencers, and exploring new trends. Due to their high exposure to digital media, they are more likely to be influenced by product recommendations, reviews, and endorsements shared by influencers. Unlike traditional advertisements, influencer marketing is perceived as more genuine and trustworthy, as it often reflects personal experiences and opinions. Influencers frequently act as role models for students, impacting their lifestyle choices, brand preferences, and buying decisions.

The Kalyan region, located in the Thane district of Maharashtra, is known for its growing educational infrastructure and diverse student population. With numerous colleges and a high concentration of young individuals, the region provides an ideal setting to study the effectiveness of influencer marketing. Students in this region actively use social media platforms and are exposed to a wide range of influencer-driven content on a daily basis.

This research aims to analyze the effectiveness of influencer marketing on college students in the Kalyan region by examining their level of awareness, trust, engagement, and the extent to which influencer promotions impact their purchasing behavior. The study also seeks to identify key factors such as credibility,

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relatability, and content quality that contribute to the success of influencer marketing, thereby providing valuable insights for marketers and businesses aiming to target the youth segment effectively.

REVIEW OF LITERATURE

Influencer marketing has gained significant attention in recent years due to its strong impact on consumer behavior, particularly among the younger generation. With the increasing use of social media platforms, researchers have explored various aspects of influencer marketing, including credibility, trust, engagement, and its influence on purchase decisions.

Freberg et al. (2011) defined social media influencers as independent third-party endorsers who shape audience attitudes through blogs, posts, and digital interactions. Their study emphasized that influencers act as opinion leaders who can effectively communicate brand messages in a more relatable and persuasive manner compared to traditional advertising.

De Veirman et al. (2017) examined the impact of influencer characteristics on brand perception and found that influencers with a higher number of followers tend to create stronger brand awareness and credibility. However, they also highlighted that engagement rate and relevance of content are equally important, as a large follower base does not always guarantee influence.

Lou & Yuan (2019) focused on the role of trustworthiness and content quality in influencer marketing. Their findings suggest that informative, authentic, and entertaining content significantly enhances consumer trust, which in turn increases purchase intention. The study also emphasized that sponsored content must appear genuine to maintain audience credibility.

Djafarova & Rushworth (2017) studied the behavior of young female consumers and found that they trust social media influencers more than traditional celebrities and advertisements. Influencers are perceived as more relatable and authentic, which makes their recommendations more impactful on purchasing decisions.

Kumar & Mirchandani (2012) highlighted the importance of electronic word-of-mouth (e-WOM) in digital marketing. Their research indicated that consumers are more likely to rely on peer reviews and influencer opinions shared online rather than conventional promotional messages.

Additionally, Casaló et al. (2018) found that influencer credibility, attractiveness, and expertise significantly affect followers' attitudes and intentions. Similarly, Schouten et al. (2020) observed that micro-influencers often generate higher engagement due to their niche audience and personal connection with followers.

Overall, the existing literature clearly indicates that influencer marketing plays a crucial role in shaping consumer awareness, attitudes, and purchasing behavior. It is particularly effective among youth, as they are highly active on social media and more receptive to digital content. These studies provide a strong foundation for analyzing the effectiveness of influencer marketing among college students in the Kalyan region.

These studies indicate that influencer marketing plays a crucial role in shaping consumer decisions, especially among youth.

OBJECTIVES OF THE STUDY

1. To understand awareness of influencer marketing among college students
2. To analyze the impact of influencers on purchase decisions
3. To examine the level of trust in influencer recommendations
4. To identify factors influencing effectiveness (content, relatability, credibility)
5. To gather suggestions for improving influencer marketing strategies

RESEARCH HYPOTHESIS

H0: Influencer marketing has no significant impact on college students' buying behavior.

H1: Influencer marketing has a significant impact on college students' buying behavior.

H0: College students do not trust influencer recommendations.

H1: College students trust influencer recommendations.

H0: Influencer marketing does not affect brand awareness.

H1: Influencer marketing affects brand awareness.

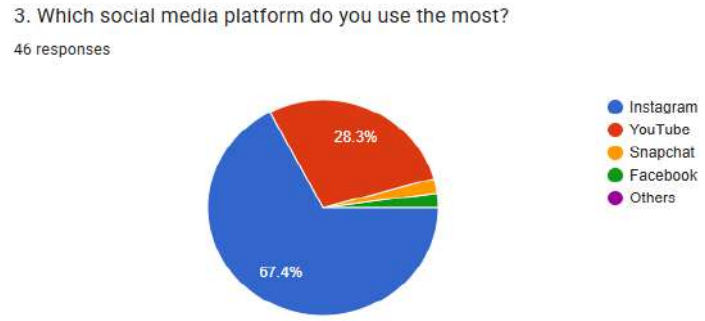
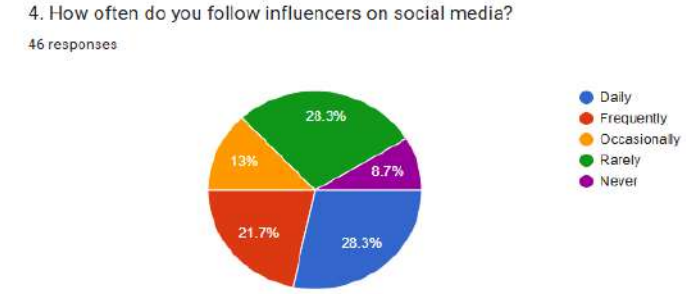
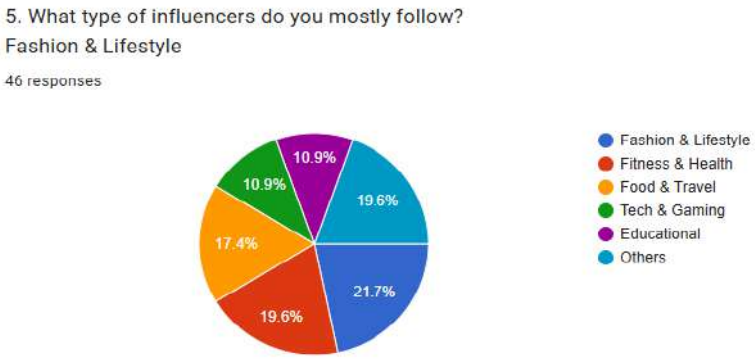
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RESEARCH METHODOLOGY

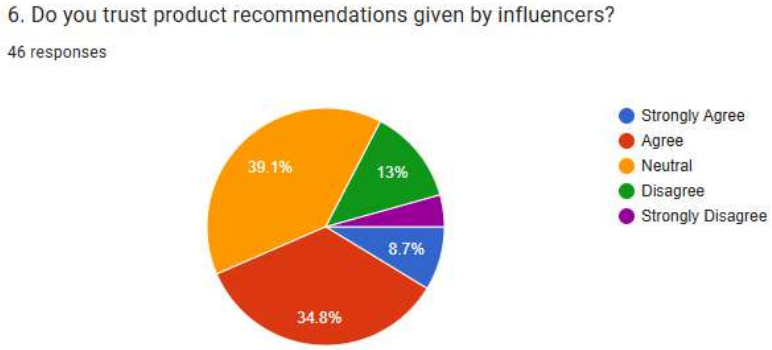
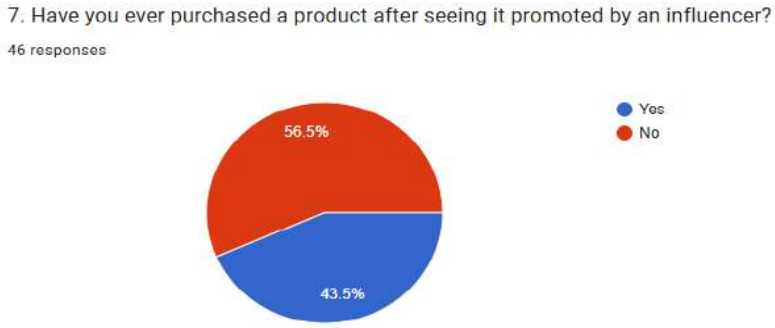
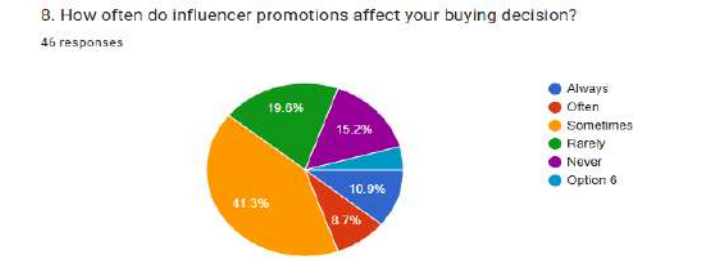
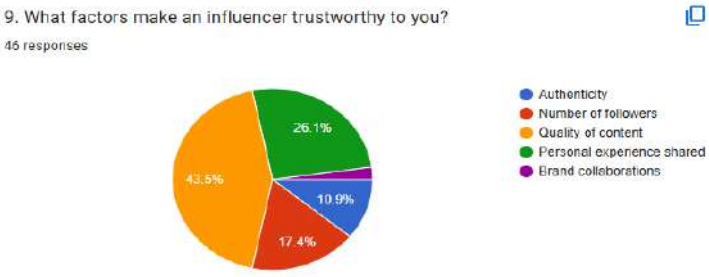
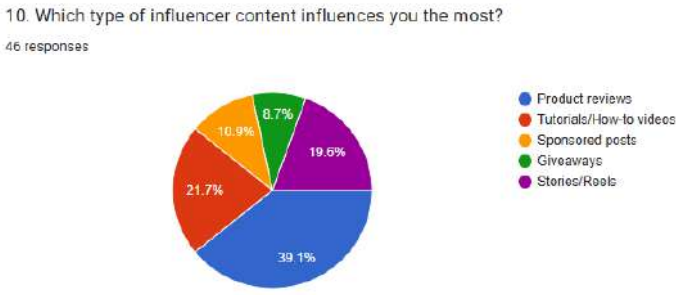
- **Type of Research:** Descriptive Research
- **Research Area:** Kalyan Region
- **Sampling Method:** Convenience Sampling
- **Sample Size:** 40 College Students
- **Data Collection Tool:** Structured Questionnaire
- **Data Analysis Techniques:** Percentage method, chart

HYPOTHESIS TESTING

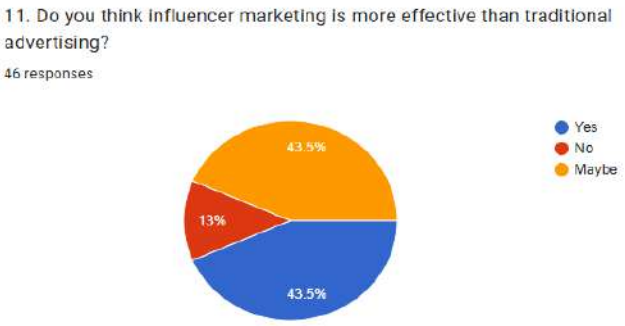
Table: Sample received from 46 respondents in the Kalyan vicinity

Data	Observation
	A majority of respondents (67.4%) use Instagram the most, followed by YouTube (28.3%), while very few use Snapchat, Facebook, or other platforms.
	Most respondents follow influencers either daily or rarely (28.3% each), while 21.7% follow them frequently, 13% occasionally, and only 8.7% never follow influencers.
	Most respondents follow Fashion & Lifestyle influencers (21.7%), followed by Fitness & Health and Others (19.6% each), while fewer follow Food & Travel (17.4%) and the least follow Tech & Gaming and Educational influencers (10.9% each).

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	Most respondents are neutral (39.1%) or agree (34.8%) that they trust influencer recommendations, while fewer strongly agree (8.7%) and a small percentage disagree or strongly disagree.
	A majority of respondents (56.5%) have not purchased a product after seeing it promoted by an influencer, while 43.5% have.
 	Most respondents (41.3%) say influencer promotions sometimes affect their buying decisions, while fewer report frequent or consistent influence. Quality of content (43.5%) is the top factor making an influencer trustworthy, followed by personal experience shared (26.1%).
	Product reviews are the most influential content (39.1%), while giveaways have the least impact (8.7%).

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	Opinions are split, with 43.5% saying yes and 43.5% maybe, while only 13% believe influencer marketing is not more effective than traditional advertising.
	Most respondents are neutral (45.7%) about recommending influencer-endorsed products, with fewer being likely (37%) or very likely (13%), and very few unlikely.

FINDINGS

- Most students actively use social media, especially Instagram.
- A majority follow influencers regularly.
- Fashion & Lifestyle influencers are the most popular.
- Students show moderate trust in influencer recommendations.
- Influencers impact buying decisions of students.
- Relatable influencers are preferred over celebrities.

Overall: Influencer marketing is effective but depends on trust and authenticity.

SUGGESTIONS

- Influencers should maintain transparency in paid promotions.
- Brands should collaborate with authentic and relatable influencers.
- Content should be honest and based on real experiences.
- Avoid over-promotion to maintain trust among followers.
- Focus on long-term influencer partnerships.
- Create awareness about sponsored content among students.

CONCLUSION

The study concludes that influencer marketing is an effective tool for influencing college students in the Kalyan region. Social media platforms, especially Instagram, play a significant role in exposing students to influencer content. The research shows that influencers impact students' awareness, preferences, and purchasing decisions to a considerable extent. However, the level of influence largely depends on the credibility, relatability, and authenticity of the influencer. While students generally trust influencer recommendations, concerns regarding paid promotions and misleading content still exist. Therefore, maintaining transparency and honesty is essential for building long-term trust. Overall, influencer marketing has strong potential, but its success depends on ethical practices and genuine engagement with the audience.

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KRUSHISEVA - AGRI-TECH USING IOT

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[2]Vedanta College

Problem Statement: Indian agriculture suffers from a lack of timely, data-driven guidance for farmers and trustworthy transparency for consumers**.** Farming remains reactive, leading to late disease detection, inefficient water and pesticide use, and reduced yields. At the same time, there is no reliable system to track a crop's journey from farm to consumer, resulting in low farmer income, no premium for quality produce, and poor consumer trust.

Problem Identified:

- Farmers lack real-time insights causing late disease detection and irreversible crop damage.
- There is no digital health record for crops and no transparent, tamper-proof system to track pesticide usage, treatments, and harvesting details.
- Consumers cannot verify crop origin, chemical usage, or data authenticity, leading to low trust, poor price realization, and no clear quality differentiation in the market.

Describe your solution: KrushiSeva is an AI + IoT + trust-based agricultural intelligence platform designed to shift farming from reactive to preventive. It creates a Digital Crop Health Twin, delivers predictive, data-driven farming guidance, and ensures complete farm-to-fork transparency using QR-based crop passports backed by an immutable trust ledger.

1. **Smart Field Monitoring (IoT Layer)**

- Field-installed sensors continuously monitor: Soil moisture, Water level, Temperature & humidity, Sunlight intensity
- This real-time data is streamed to the KrushiSeva platform to build a live digital profile of each crop field.

2. **AI Crop Intelligence & Advisory (Software Layer)**

- Farmers can capture crop images to: Detect diseases using AI, Identify early stress signals before visible damage
- The system intelligently combines: Sensor data, Crop history, Weather data, Image analysis
- Provides: Smart irrigation guidance, Disease prevention and early warning alerts, Treatment and fertilizer recommendations, Optimal, stage-specific farming actions.
- Each crop is represented by a continuously evolving **Digital Crop Twin** throughout its lifecycle.

3. **Farm-to-Fork QR Passport & Trust Ledger (Transparency Layer)**

- Every harvested batch is assigned a **QR Code**.
- When scanned by buyers or consumers, it reveals:

o Farm location and crop type

o Harvest date

o Sensor-based growth summary

o Pesticide and fertilizer usage history

o Crop health and treatment records

o **Trust Score and Chemical Footprint Score**

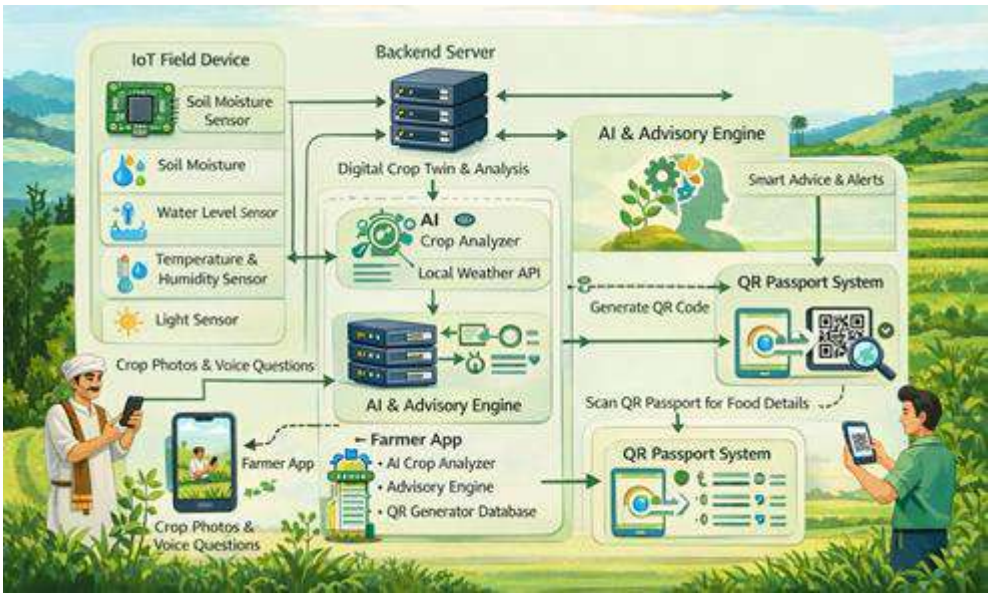
- All data is stored on a **tamper-proof trust ledger**, ensuring authenticity and reliability.

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Technology Stack:

Hardware	Software
● ESP32 / Arduino (IoT controller) ● Soil moisture sensor ● Water level sensor ● Temperature & humidity sensor ● Light intensity sensor	● Frontend: Flutter (Farmer App + Consumer Scanner App) ● Backend: Python Flask / Node.js ● Database: MySQL / SQLite ● AI/ML: TensorFlow Lite / OpenCV ● Image Processing: Crop disease & stress detection ● QR System: QR generation & scanning

Use Case Diagram/Flow Diagram:



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THE EVOLUTION OF DERIVATIVES – PAST, PRESENT AND FUTURE

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1. ABSTRACT

Derivatives are financial instruments whose value is derived from underlying assets such as equities, commodities, currencies, and interest rates. The evolution of derivatives reflects the transformation of financial markets from simple risk-sharing mechanisms to highly sophisticated financial systems. Historically, derivatives originated in agricultural economies, where forward contracts were used by farmers and traders to hedge against uncertainties in prices. These early contracts laid the foundation for modern derivatives markets. Over time, derivatives evolved into standardized instruments such as futures and options, which began trading on organized exchanges, ensuring transparency and reducing counterparty risk.

In the present era, derivatives play a crucial role in global financial markets. They are widely used for hedging risks, speculation, and arbitrage. Financial institutions, corporations, and individual investors rely on derivatives to manage price volatility, interest rate fluctuations, and currency risks. The growth of derivatives markets has significantly contributed to liquidity and price discovery in financial systems. However, the misuse of derivatives, particularly excessive speculation and lack of regulation, has led to financial instability, as seen during the global financial crisis of 2008. Instruments such as credit default swaps amplified systemic risks and resulted in severe economic consequences worldwide.

Looking toward the future, derivatives markets are expected to evolve further with advancements in technology, including artificial intelligence, blockchain, and algorithmic trading. These innovations are likely to enhance efficiency, transparency, and accessibility. However, they also present new challenges related to regulation and risk management. This study concludes that derivatives are indispensable financial tools, but their sustainable growth depends on robust regulatory frameworks, transparency, and responsible usage by market participants and institutions globally.

2. INTRODUCTION

Derivatives are financial contracts whose value is derived from an underlying asset such as stocks, commodities, currencies, or interest rates. These instruments are widely used for hedging risk, speculation, and arbitrage. The concept of derivatives dates back several centuries, particularly in agricultural markets where producers and traders entered into agreements to lock in future prices and reduce uncertainty.

With the development of organized financial markets, derivatives evolved into standardized contracts such as futures and options. Today, derivatives are an integral part of global financial systems and play a significant role in managing financial risks. In India, derivatives trading gained prominence after the introduction of index futures in 2000, followed by options and other instruments. Exchanges such as the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) have contributed significantly to the growth of derivatives markets.

The increasing complexity of financial markets and globalization has further expanded the use of derivatives. However, their rapid growth has also raised concerns about financial stability and systemic risk. This paper aims to explore the evolution of derivatives, their current significance, and future prospects in a comprehensive manner.

Another important aspect of derivatives is their role in improving market efficiency and price discovery. By allowing participants to trade on expectations of future price movements, derivatives markets contribute to more accurate valuation of underlying assets. They also enhance liquidity by attracting a wide range of participants, including hedgers, speculators, and arbitrageurs. This increased participation helps in reducing transaction costs and narrowing bid-ask spreads, thereby making financial markets more efficient and competitive.

Technological advancements have also played a crucial role in the evolution of derivatives trading. The shift from traditional open outcry systems to electronic trading platforms has significantly increased the speed, transparency, and accessibility of derivative markets. Modern financial technologies, including algorithmic trading and data analytics, have enabled market participants to execute complex strategies with greater precision. As a result, derivatives markets have become more dynamic and globally interconnected, allowing investors to manage risks across different regions and asset classes.

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Despite their numerous benefits, derivatives have often been associated with financial crises and market instability. Events such as the global financial crisis of 2008 highlighted how excessive speculation and lack of proper regulation in derivatives markets can lead to severe economic consequences. This has led to increased regulatory oversight and the implementation of risk management frameworks by financial authorities worldwide. In the Indian context, regulatory bodies like the Securities and Exchange Board of India (SEBI) have introduced various measures to ensure transparency, reduce systemic risk, and protect investors in the derivatives market.

3. REVIEW OF LITERATURE

The concept and application of derivatives have been widely studied by researchers and financial experts. John C. Hull (2018) emphasized that derivatives are essential tools for risk management and financial engineering, highlighting their importance in modern financial systems. His work provides a comprehensive understanding of how derivatives are used to hedge risks and enhance portfolio performance.

According to Robert C. Merton (1995), derivatives contribute significantly to financial innovation and economic efficiency by enabling better allocation of resources and risk. His research explains how financial instruments, including derivatives, play a key role in improving market completeness and efficiency.

René M. Stulz (2004) highlighted the role of derivatives in corporate risk management, stating that they help firms manage exposure to various financial risks such as interest rate and currency fluctuations. His study supports the idea that derivatives can increase firm value when used effectively.

However, some researchers have pointed out the potential risks associated with derivatives. Studies conducted after the Global Financial Crisis emphasized that excessive use of derivatives and lack of proper regulation can lead to systemic instability. For instance,

Ben S. Bernanke (2010) discussed the causes of the crisis and the role of complex financial instruments.

Recent literature focuses on the role of technology in derivatives markets. The adoption of algorithmic trading, artificial intelligence, and blockchain technology is transforming the way derivatives are traded and managed.

Maureen O'Hara (2015) examined how high-frequency and algorithmic trading impact market structure and efficiency.

Additionally, Arvind Narayanan et al. (2016) discussed the implications of blockchain technology in financial markets, including derivatives trading.

Overall, the literature suggests that derivatives are beneficial when used responsibly but can pose significant risks if misused.

4. RESEARCH OBJECTIVES

- To study the historical evolution of derivatives
- To analyze the role of derivatives in modern financial markets
- To examine the risks and benefits associated with derivatives
- H1To identify future trends in derivatives trading

5. HYPOTHESIS

Hypothesis 1

Null Hypothesis (H01):
There is no significant difference between the theoretical understanding and practical knowledge of derivatives among respondents.

Alternative Hypothesis (H11):
There is a significant difference between the theoretical understanding and practical knowledge of derivatives among respondents.

Hypothesis 2

Null Hypothesis (H02):
There is no significant difference in respondents' awareness regarding the purpose, technical aspects, and historical evolution of derivatives.

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Alternative Hypothesis (H12):
Respondents have higher awareness regarding the purpose of derivatives (hedging) compared to their understanding of technical aspects and historical evolution.

"The hypothesis is tested using survey data and supported by the findings."

6. RESEARCH METHODOLOGY

This study adopts a descriptive and analytical research design to examine the evolution of derivatives, covering their past development, present role, and future prospects. The research focuses on understanding the significance of derivatives in financial markets and their contribution to risk management and market efficiency.

The study is based on secondary data, collected from textbooks, research papers, academic journals, and reports from financial institutions and regulatory authorities. These sources have been analyzed to ensure the reliability and relevance of the information used in the study.

To interpret the data, trend and comparative analysis methods have been applied to evaluate the growth of derivatives markets and the impact of technological and regulatory developments. Although the study is limited to secondary data, it provides a clear and structured understanding of the topic.

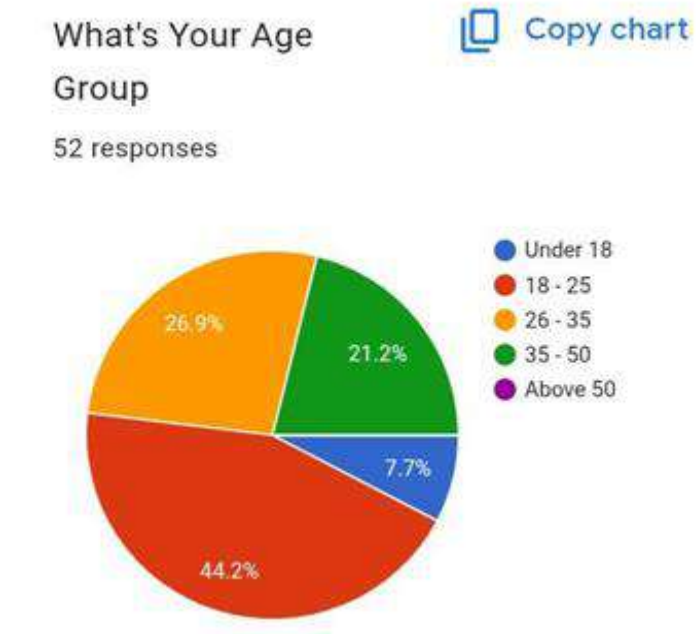
7. DATA ANALYSIS AND INTERPRETATION

Based on the survey data provided in this pie chart data. Here is a comprehensive data analysis and interpretation. This report covers the demographic breakdown, conceptual understanding of financial derivatives, and historical knowledge of the respondents.

Data:

1. Demographic Profile: Age Group

Age	No. Of Responses
Under - 18	4
18 - 25	23
26 - 35	14
35 - 50	11
Above 50	-



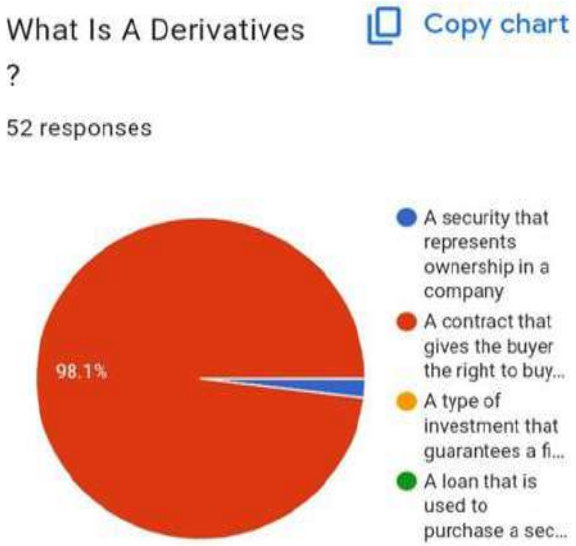
Interpretation: The majority of respondents (approx. 71%) fall within the 18–35 age bracket, indicating that the data primarily reflects the perspectives of students and early-to-mid-career professionals.

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2. Foundational Knowledge: What is Derivatives ?

Data:

Answers	No. Of Responses
A security that represents ownership in a company	1
A contract that gives the buyer the right to buy or sell an underlying asset	51
A type of investment that guarantees a fixed return	-
A loan that is used to purchase a security	-



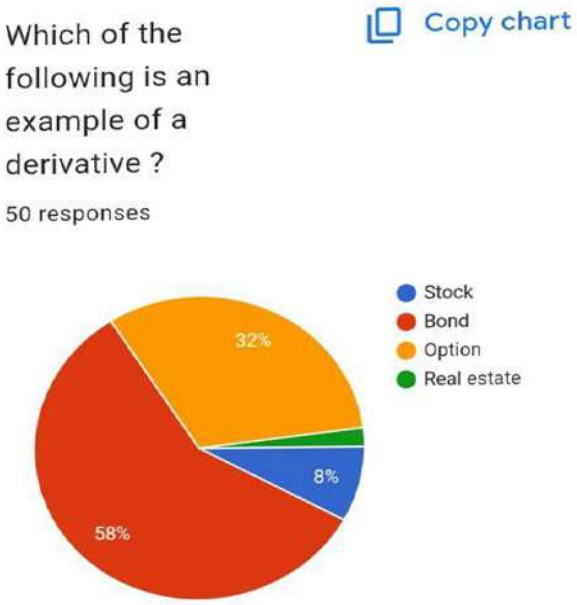
Interpretation: There is an exceptionally high level of foundational literacy among the respondents. Almost all participants correctly identify a derivative as a contract based on an underlying asset rather than direct ownership.

3. Identification: Examples of Derivatives

Data:

Answers	No. Of Responses
Stock	4
Bond	29
Option	16
Real estate	1

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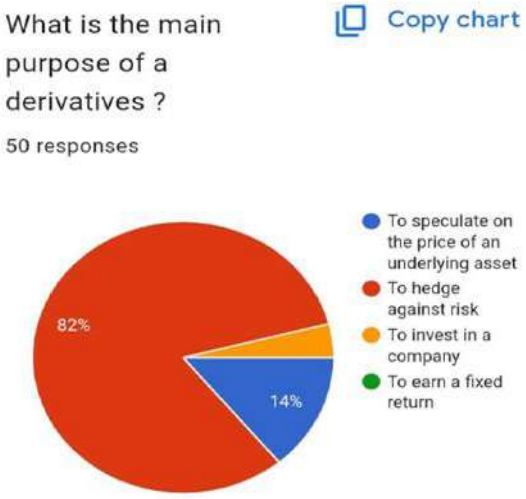


Interpretation: Interestingly, despite knowing the definition, over half the respondents misidentified "Bonds" as a derivative. This suggests a common confusion between debt instruments and derivative contracts.

4. Purpose: Main Objective of Derivatives

Data:

Answers	No. Of Responses
To speculate on the price of an underlying asset	7
To hedge against risk	41
To invest in a company	2
To earn a fixed return	-



Interpretation: The vast majority recognize risk management (hedging) as the primary function of derivatives, aligning with the traditional financial theory that these instruments are intended to mitigate volatility.

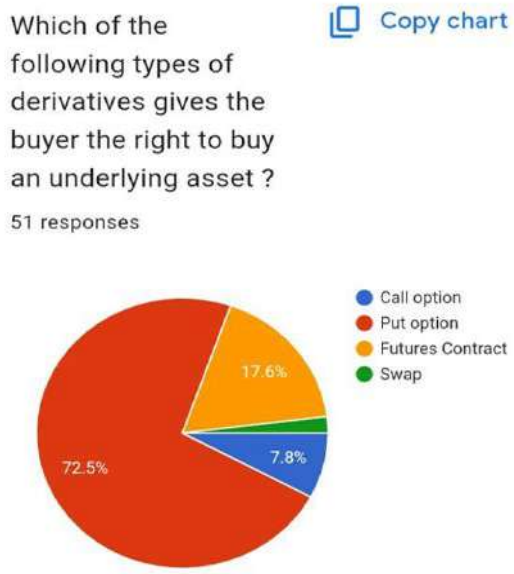
5. Technical Knowledge: Types of Options

Data:

Answers	No. Of Responses
Call option	4

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Put option	37
Future contract	9
Swap	1

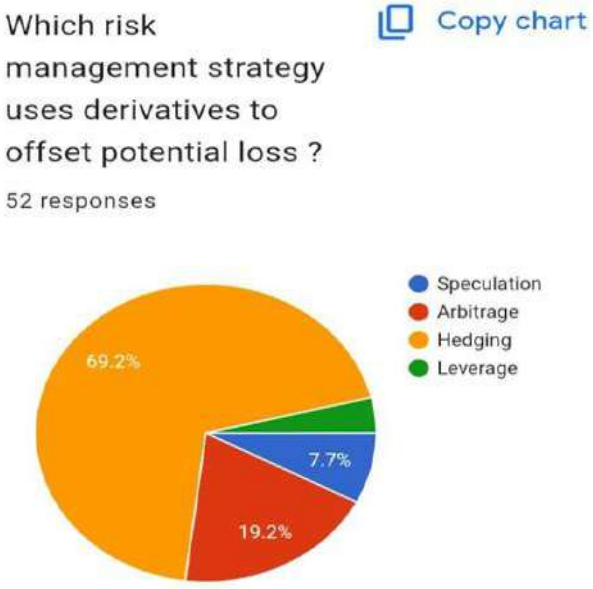


Interpretation: There is a significant knowledge gap here. While a "Call Option" gives the right to buy, 72.5% of respondents incorrectly selected "Put Option." This indicates that while respondents know what derivatives are, they struggle with the specific mechanics of option types.

6. Risk Management Strategy

Data:

Answers	No.of responses
Speculation	4
Arbitrage	10
Hedging	36
Leverage	2



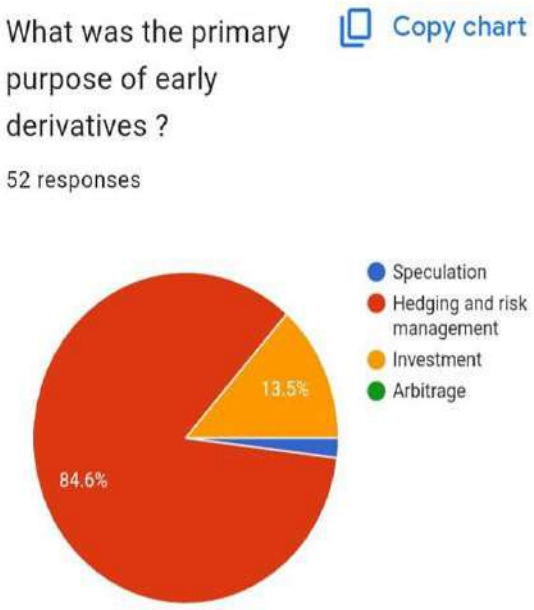
Interpretation: Consistent with the "Purpose" question, most respondents correctly associate the term "Hedging" with the use of derivatives to offset potential losses.

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7. Historical Context: Early Derivatives

Data:

Answers	No. Of Responses
Speculation	1
Hedging and risk management	44
Investment	7
Arbitrage	-



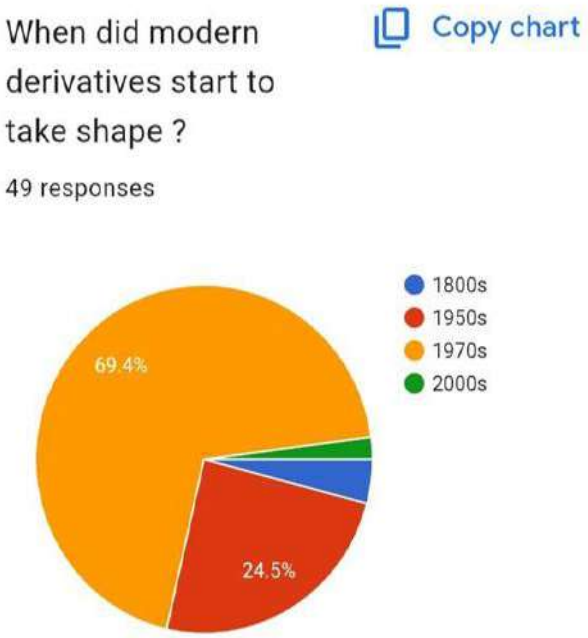
Interpretation: Respondents strongly believe that early derivatives were created for utilitarian risk management (likely in agriculture/commodities) rather than for modern-day speculative profit.

8. Timeline: Evolution of Modern Derivatives

Data:

Answers	No. Of Responses
1800s	2
1950s	12
1970s	34
2000s	1

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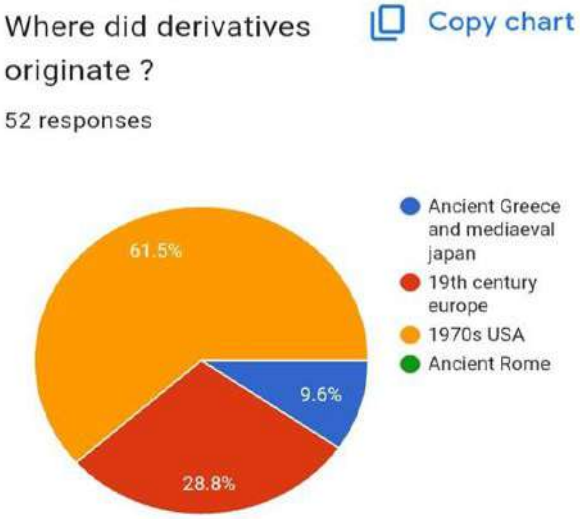


Interpretation: A strong majority correctly identifies the 1970s as the era when modern derivatives began to take their current shape, coinciding with the launch of the Chicago Board Options Exchange (CBOE).

9. Origin: Geographic Roots

Data:

Answers	No. Of Responses
Ancient Greece and mediaeval japan	5
19th century europe	15
1970s USA	32
Ancient Rome	-



Interpretation: Most respondents (61.5%) confuse the modern expansion of derivatives in the USA with their actual origins. Only 9.6% correctly identified the ancient and medieval roots (such as Aristotle's olive press anecdotes or Dojima rice futures), showing a lack of awareness of the long-term history of financial instruments.

Summary for Research Paper

The survey reveals a respondent pool that is highly confident in defining derivatives and identifying their purpose (hedging), yet exhibits technical inaccuracies regarding specific mechanics (Call vs. Put) and

historical origins. This suggests that while general financial literacy is high, specialized education on the mechanics and historical evolution of these instruments is still required.

8. FINDINGS

Following the detailed analysis, these are the primary findings of the study:

High Theoretical Literacy, Low Practical Accuracy: There is a massive gap between knowing the definition of a derivative (98%) and being able to identify a call vs. put option or a bond vs. derivative.

Hedging is the Perceived Standard: Respondents overwhelmingly associate derivatives with "Risk Management" and "Hedging" (over 80%) rather than speculative profit-seeking.

Modern-Centric Historical View: Most participants view derivatives as a modern American invention (1970s) and are largely unaware of the ancient historical evolution of these contracts in Europe and Asia.

Target Demographic Awareness: The 18-35 age bracket is highly engaged with these concepts but requires more technical education to avoid common pitfalls (like confusing Put/Call options).

Technical Confusion: The highest rate of error occurred in the specific mechanics of the "Right to Buy," suggesting that while the concept of safety is understood, the execution of the trade is not.

9. CONCLUSION

The evolution of derivatives represents a remarkable journey from rudimentary risk-sharing agreements in ancient agricultural societies to the highly complex, digitally-driven financial instruments of the modern era. Historically rooted in the need for stability—such as the rice futures in Japan or olive press options in Greece—these tools have transformed into the backbone of global finance. This study highlights that while the fundamental purpose of derivatives remains anchored in hedging and risk management, their structural complexity has grown exponentially. The transition from physical open-outcry pits to high-frequency algorithmic trading underscores a shift toward a market that prioritizes efficiency, liquidity, and global interconnectedness.

However, the findings of this research reveal a significant dichotomy between the perceived purpose and the practical understanding of derivatives. While a vast majority of participants recognize derivatives as essential tools for hedging, there remains a notable gap in technical literacy, particularly regarding the specific mechanics of options and the distinction between primary and secondary securities. This "knowledge gap" mirrors the broader systemic risks seen in global markets; when participants understand the concept of risk reduction but fail to grasp the technical execution or the underlying leverage, the potential for market instability increases. As evidenced by the 2008 financial crisis, the misuse or misunderstanding of these instruments can transform a risk-management tool into a catalyst for systemic failure.

Looking ahead, the future of derivatives is inextricably linked to technological innovation. The integration of blockchain, artificial intelligence, and smart contracts promises to usher in an era of unprecedented transparency and reduced counterparty risk. Yet, these advancements do not eliminate the need for human oversight. To ensure that derivatives continue to contribute positively to price discovery and economic efficiency, it is imperative to bridge the gap between theoretical knowledge and practical application through better financial education. Ultimately, the sustainable growth of derivatives markets depends on a delicate balance: embracing the efficiency of new technologies while maintaining robust regulatory frameworks that prioritize transparency and responsible usage.

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EXCHANGE TRADED FUNDS IN INDIA: GROWTH AND MARKET SIGNIFICANCE OVER A DECADE (2015–2025)

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ABSTRACT

The Indian ETF market have seen tremendous changes over the past decade and currently stands as one of the most innovative segments of India's investment landscape. There has been significant progress within the ETF sector since it had only a total asset base of close to ₹22,000 crore in 2015-16 and now holds over ₹10 lakh crore as of March 2026. Such substantial progress is attributed to increased investor awareness, greater ETF offerings, advanced technology used in the investing process and growing demand for diversified, efficient and transparent investing solutions. The changing trend towards rule-based and market-based investment solutions has further helped boost the Indian ETF sector.

This study examines the growth pattern of ETFs in India over a period of decade from 2015 to 2025 by using secondary data obtained from the AMFI, SEBI. NSE and RBI. The indicators of analysis include ETF assets, number of schemes, investor folios and year-on-year growth rates. The objective of this research is to investigate the development of the ETF segment in India.

Based on the analysis, the results indicate that ETFs have gradually evolved into an important component of the investment market in India in terms of passive investing. Growth in the size of the funds, the number of funds and the investment portfolios of the investors has clearly shown that the phenomenon of development of the ETF market is very extensive and of great significance. It may be argued that the development of ETFs in India is an outcome of changing investor behavior and a result of greater financial participation. This research will provide useful insights into the evolution of ETFs in India.

Keywords: *Exchange Traded Funds, ETF Growth, Assets, Schemes, Investor folios, Passive investment, Evolution of ETF's.*

INTRODUCTION

In the financial world, there is an immense revolution that has taken place in the form of passive investments via Exchange Traded Funds (ETFs). The world's first ETF, SPDR S&P 500 ETF Trust in the USA came into existence in 1993, and currently, the global ETF industry is worth more than $12 trillion of assets under management (AUM), by 2024 (ETFGI, 2024). The first ETF was launched in India in the year 2001, namely, Nifty Bees by Benchmark Asset Management; however, its growth started only after 2015, when the Government of India mandated EPFO to invest some part of their incremental corpus in equity ETFs (SEBI, 2023).

The Indian ETF industry has registered a growth of around 50% on a CAGR basis. Assets under management have moved up from ₹16,189 crore in March 2015 to over ₹10 Lakh Crore in March 2026 (AMFI, 2026). Number of schemes have also grown significantly from 44 in 2015 to over 300 in 2026, and investor folios too have gone past 4 crore marks (SEBI, 2024). This significant growth is due to the lower expense ratio relative to active funds, investment mandates of government pension funds, and rising awareness amongst retail investors.

Israeli et al. (2017) noted that more ETF ownership resulted in greater synchronization of stock returns and less specific company information incorporated into stock prices. In turn, Ben-David et al. (2018) proved that ETF ownership led to an increase in non-fundamental volatility of individual stocks by 16%. Similarly, Sushko and Turner (2018) discussed the consequences of systemic risks associated with the rapidly growing number of passive investments in ETFs during financial crises.

The authors Prasad and Prabhakar (2020) explored the ETF tracking error in India, but failed to pay attention to the growth in passive investing. Moreover, Sharma and Kumar (2021) explored the performance of ETFs with respect to investor returns. In contrast, the current research examines the development of ETFs in India over a ten-year period instead of investigating general variables in the market.

The significance of this study lies in the growing role of ETFs within the Indian financial system. Understanding the growth of ETFs is important for investors, researchers, regulators and market intermediaries because it reflects changing investment preferences, increasing financial participation, and the development of passive investing in India.

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REVIEW OF LITERATURE

ETFs have seen considerable interest in academic research and professional practice globally. While previous research on ETFs focused more on ETF structures, costs, liquidity factors and suitability for passive investments, later research was devoted to exploring the contribution of ETFs towards portfolio diversification and market accessibility through passive investments.

Rao and Krishnan (2019) have examined the rise of passive investing in India and proposed several recommendations that could help ensure higher SEBI involvement in ETFs' market-making activities. As for the regulation issues in India, the SEBI (2023) discussion paper indicated the need for a better regulation of passive funds to mitigate possible market concentration and tracking error risks.

According to the Financial Stability Report (2024) prepared by the Reserve Bank of India, market concentration among equity investments through passive instruments poses a risk to financial stability.

The efficiency of tax on ETF investments as compared to mutual funds was analyzed by Singh & Kaur (2022). The effect of the passive fund segment of NFOs on market liquidity was studied by Banerjee & Chakraborty (2023). The impact of the investment of the EPFO in ETF was analyzed by Venkatesh & Iyer (2021). Finally, the involvement of market makers in ETF price discovery was analyzed by Desai & Shah (2020).

Furthermore, the work of Easley et al. (2021) presented a theoretical framework regarding the alteration of the information environment due to the phenomenon of passive investment. Concerning the effect of passive investing on stock price informativeness, there is evidence from the research by Glosten et al. (2021) that, even though the increase in passive investment reduces the cost of equity for companies listed in the index, it has a detrimental effect on the informativeness of their stock prices. Moreover, Coles et al. (2022) sought to examine whether an increase in the popularity of passive investing reduces the informativeness of earnings announcements about the companies' securities.

Cremers et al. (2016) examined the competition between active and passive investments and concluded that an increase in the proportion of passive investments in the market reduces the variability of active investment returns and leaves little room for price adjustment.

The study conducted by Brown et al. (2021) analyzed the impact of increasing the number of ETFs on the fragility of the markets and concluded that higher volumes of ETFs make markets vulnerable to flash crashes. Malamud (2016) developed a general equilibrium model of passive investment that describes how the application of the strategy might result in co-movement and loss of price informativeness. The welfare effects associated with passive investment increases were assessed by Goldstein and Yang (2022).

Regarding the Indian situation, it can be argued that this type of market development has emerged because of the increased diversity of ETFs that are provided and growing popularity of passive investments in India. According to all available reports, the number of ETFs, assets under management, and investor folios has increased dramatically. As seen from the information above, ETF growth in India is linked to the processes of financialization of private saving, digitalization, and popularity of cheaper ETFs. Thus, based on the literature, it can be concluded that ETFs represent an important part of the market that is rapidly growing, making the paper valuable.

OBJECTIVES OF THE STUDY

1. To analyse the growth in the AUM of ETFs in India for the study period.
2. To examine the growth in the number of ETF schemes in India between 2015-16 to 2025-26.
3. To analyse the growth in investors' participation in ETFs by studying the trend in folios.
4. To measure the annual growth rate in the AUM of ETFs and identify periods of rapid and moderate growth.
5. To study the development of the ETF industry in India based on the size of assets, diversification of products and investors.

SIGNIFICANCE OF THE STUDY

The significance of the study lies in its attempt to examine the fastest growth of Exchange Traded Funds in India and their importance in the Indian financial markets. Over the past few years, the emergence of ETFs has been one of the fastest growing investment products that have attracted many institutional as well as individual investors due to the benefits they offer in terms of low cost, diversification, liquidity and transparency. Through analysis of growth in assets under management, number of schemes and number of investors folios, the growth and evolution of the ETF market can be analyzed effectively. This study is important for investors,

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researchers, policymakers and market participants. For the investors, it will give useful insights regarding the importance of ETFs in the Indian financial markets and it will add to the existing knowledge for academicians and researchers regarding the development of ETFs in India and serve as a base for further research into passive investments. Overall, the study helps in understanding the transformation of the Indian investment landscape and the emergence of ETFs as a major segment of the market.

RESEARCH METHODOLOGY

1. The current study employs a quantitative, descriptive, and analytical research approach with secondary data obtained from monthly data reports provided by AMFI along with SEBI's annual reports.
2. The current study covers eleven financial years 2015-16 to 2025-26.
3. Monthly and annual figures of ETFs are analyzed based on four variables: Assets Under Management of ETFs, Number of ETF Schemes, Number of Investor Folios, and Year-on-Year Growth Rate of ETF Assets Under Management. Both Gold ETFs and other ETFs are included within the ETF category.
4. The tools employed during the analysis are Tabulation, Trend Analysis, Annual Growth Analysis, Descriptive Statistics, and Diagrammatic Representation using Line and Bar Graphs.

DATA ANALYSIS & INTERPRETATION

1. Growth of ETF AUM in India (2016–2026)

Table 1: Year-wise Growth of ETF AUM and Schemes in India

Financial Year	ETF AUM (₹ Crore)	No. of Schemes	No. of Folios (Lakh)	YoY Growth (%)
2015-16	22,409	58	5.68	-
2016-17	49,916	63	8.34	122.75
2017-18	77,694	68	12.56	55.65
2018-19	1,39,073	78	18.73	78.99
2019-20	1,54,412	87	24.26	11.03
2020-21	2,90,054	103	55.55	87.84
2021-22	3,97,657	126	185.08	37.10
2022-23	5,04,061	168	253.62	26.76
2023-24	6,95,224	206	188.29	37.92
2024-25	8,38,518	252	270.00	20.61
2025-26	10,66,112	328	403.42	27.14

Source: *AMFI Monthly Data Reports; SEBI Annual Reports (2016–2026)*

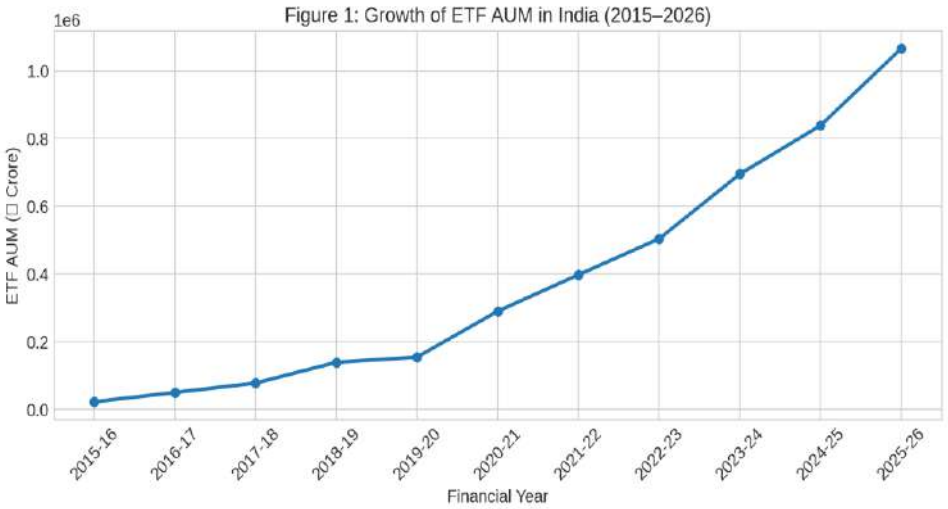


Figure 1: Growth of ETF AUM in India (2015–2026)

Interpretation: Table 1 and Figure 1 clearly show the strong long-term expansion of ETFs in India. ETF AUM increased from ₹22,409 crore in 2015–16 to ₹10,66,112 crore in 2025–26, reflecting an almost 47.6 times rise over the period. There was an increase in schemes from 58 to 328 and folios from 5.68 lakh to 403.42 lakh, reflecting heavy participation of investors and deepening of the market.

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Table 2: Descriptive Statistics for Annual Growth in ETFs (2015-16 to 2025-26)

Variable	N	Mean	Median	Std. Dev.	Min	Max
ETF AUM (₹ Cr)	11	385011.82	290054.0	352281.55	22409.0	1066112.0
No. of Schemes	11	139.73	103.0	88.93	58.0	328.0
No. of Folios (Lakh)	11	129.59	55.55	137.56	5.68	403.42
YoY Growth (%)	10	50.58	37.51	35.51	11.03	122.75

Interpretation: The descriptive statistics substantiate the magnitude and rapidity of ETFs growth in India. The average ETF assets under management (AUM) throughout the research period was large, while the average number of schemes and folios was also quite high, implying that there has been a substantial rise in both product offering and investor base. The mean annual growth rate of ETF AUM was high; however, the variations among years indicate that the ETFs expansion took place in waves instead of being continuous.

Table 3: Year-wise Trend in ETF Expansion

Financial Year	ETF AUM (₹ Crore)	No. of Schemes	No. of Folios (Lakh)
2015-16	22,409	58	5.68
2016-17	49,916	63	8.34
2017-18	77,694	68	12.56
2018-19	139,073	78	18.73
2019-20	154,412	87	24.26
2020-21	290,054	103	55.55
2021-22	397,657	126	185.08
2022-23	504,061	168	253.62
2023-24	695,224	206	188.29
2024-25	838,518	252	270.00
2025-26	1,066,112	328	403.42

Interpretation: The trend table indicates that ETFs growth in India took place simultaneously in terms of asset growth, scheme growth and investor growth. AUM increased consistently throughout the entire period, scheme growth was steady and folios growth increased after 2020-21.

Table 4: Annual Growth Rate in ETF AUM

Financial Year	ETF AUM (₹ Crore)	YoY Growth (%)
2015-16	22,409	—
2016-17	49,916	122.75
2017-18	77,694	55.65
2018-19	139,073	78.99
2019-20	154,412	11.03
2020-21	290,054	87.84
2021-22	397,657	37.1
2022-23	504,061	26.76
2023-24	695,224	37.92
2024-25	838,518	20.61
2025-26	1,066,112	27.14

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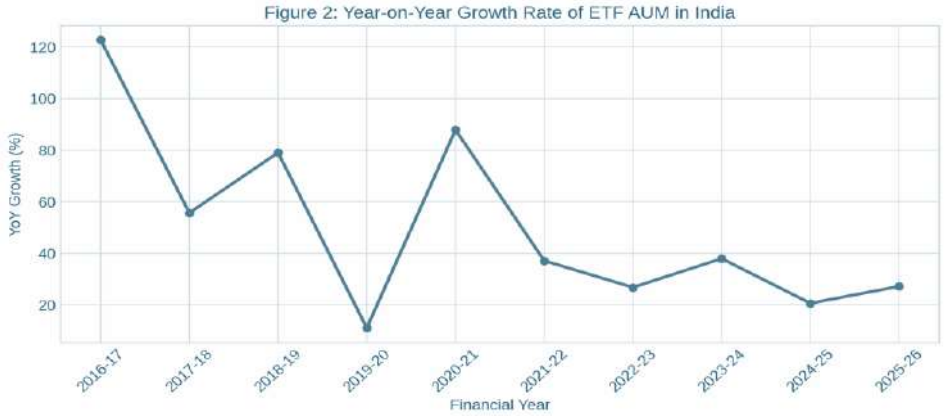


Figure 2: Year-on-Year Growth Rate of ETF AUM in India

Interpretation: Annual growth analysis reveals that ETFs expansion in India was extremely high, yet inconsistent. Years like 2016-17, 2018-19, and 2020-21 witnessed remarkable growth in ETFs, whereas 2019-20 witnessed slow growth. However, even in periods of slowdown, growth was still positive, which further bolsters the findings that ETFs have maintained their persistent upward trend in India.

Table 5: Growth in ETF Schemes in India

Financial Year	No. of Schemes
2015-16	58
2016-17	63
2017-18	68
2018-19	78
2019-20	87
2020-21	103
2021-22	126
2022-23	168
2023-24	206
2024-25	252
2025-26	328

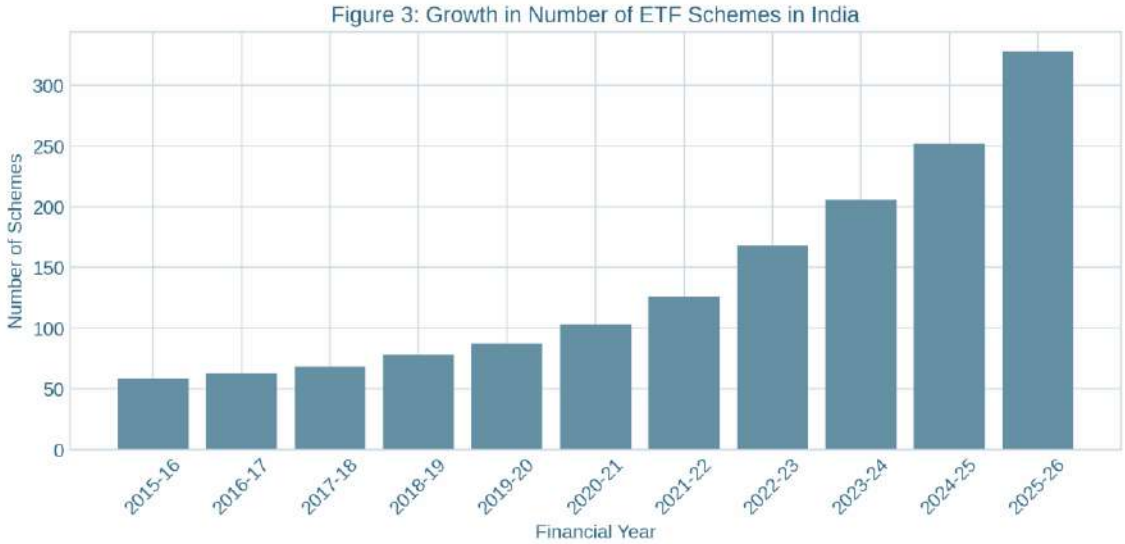


Figure 3: Growth in Number of ETF Schemes in India

Interpretation: The number of ETF schemes grew consistently from 58 in 2015-16 to 328 in 2025-26. It denotes the growing trend of innovation and diversification in India's ETF market. The growth in scheme numbers reflects an increased level of maturity in the ETF category in India.

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Table 6: Growth in ETF Folios in India

Financial Year	No. of Folios (Lakh)
2015-16	5.68
2016-17	8.34
2017-18	12.56
2018-19	18.73
2019-20	24.26
2020-21	55.55
2021-22	185.08
2022-23	253.62
2023-24	188.29
2024-25	270.00
2025-26	403.42

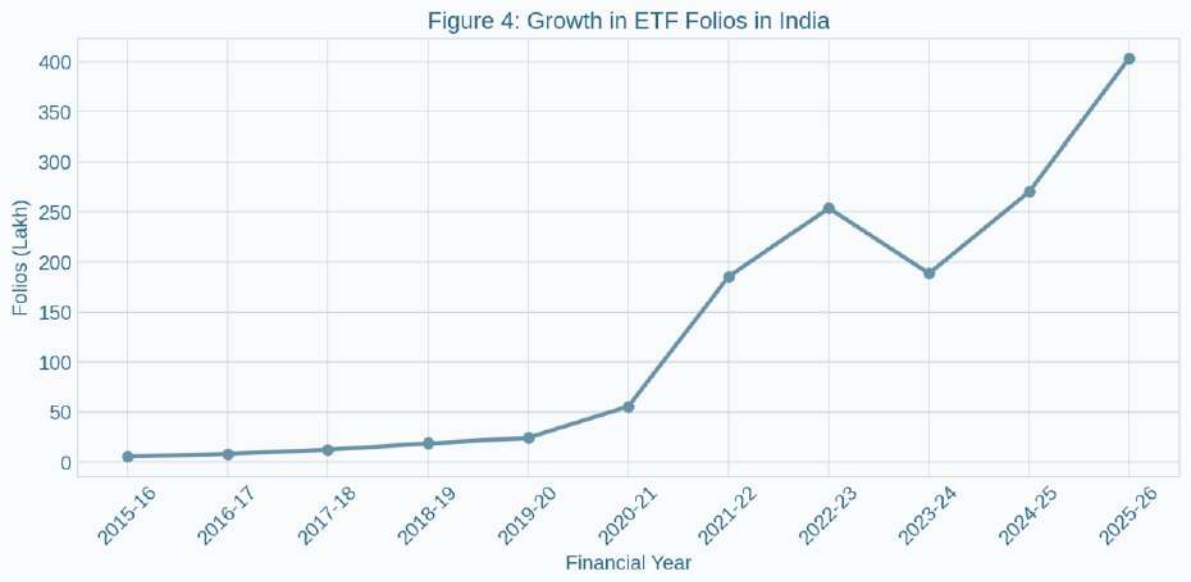


Figure 4: Growth in ETF Folios in India

Interpretation: Investor folios have grown from 5.68 lakh in 2015-16 to 403.42 lakh in 2025-26, reflecting a substantial broadening of the investor base. It is one of the best metrics for ETF adoption in India. The unusually steep increase since 2020-21 shows that ETFs became popular among a wider range of investors.

Table 7: Summary of ETF Growth Indicators

Indicator	2015-16	2025-26	Absolute Increase	Growth Multiple
ETF AUM (₹ Crore)	22,409	10,66,112	10,43,703	47.58x
No. of Schemes	58	328	270	5.66x
No. of Folios (Lakh)	5.68	403.42	397.74	71.02x

Interpretation: The summary table reflects the unprecedented magnitude of ETF growth in India during the period of study. There has been a growth of ₹10,43,703 crore in ETF AUM, an increase of 270 in schemes and an increase of 397.74 lakh in folios. Out of these three parameters, folio growth has been expanded rapidly.

FINDINGS OF THE STUDY

From the above study, the major findings are as below:

1. There has been substantial growth in the market for ETFs in India between 2015-16 to 2025-26 years concerning assets under management (AUM), scheme number, and folio number.
2. Assets under management in ETFs have increased from Rs. 22,409 crores to Rs. 10,66,112 crores during the above-mentioned period.

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3. Scheme number in ETFs has increased from 58 to 328.
4. The folios of investors grew from 5.68 lakhs to 403.42 lakhs reflecting a significant rise in investor participation.
5. The highest growth rate in the AUM of ETFs was observed in 2016-17, whereas positive growth continued consistently thereafter.
6. Overall, the study found the use of ETFs has been significant in the Indian market.

LIMITATIONS OF THE STUDY

1. The study relies exclusively on secondary data collected from existing literature.
2. The study focuses on equity ETFs and does not examine debt, gold, or international ETFs.
3. The study uses yearly data, thus short-term variations in ETF behavior are not taken into account.
4. The study examines only growth-related parameters like AUM, schemes, folios, and annual growth rate. However, other variables related to the overall stock market have been excluded.
5. The study is descriptive and analytical in nature and does not test causal relationships with external financial market indicators.

CONCLUSION

Thus, from the study, it can be concluded that there has been remarkable growth in the ETFs over the past ten years in India. The steady increase in assets under management, number of schemes, and number of folios signifies that ETFs have become an important aspect in the Indian financial markets. It can be observed that ETFs have not just expanded in terms of scale but also in terms of their depth. Even if the yearly growth rate differed each year, the overall trend was always upwards. Overall, the study establishes that ETFs have become one of the most dynamic aspects in the Indian financial markets.

RECOMMENDATIONS AND SUGGESTIONS

1. Greater investor awareness programs should be initiated among investors, particularly retail investors regarding ETFs.
2. Asset management firms can increase their ETF product portfolio to include more varied ETFs in order to ensure investor comprehension.
3. The regulatory and industry bodies must ensure that there is transparency and accessibility with regard to information on ETFs.
4. Further studies may extend the current study by utilizing monthly data and/or examining the association between ETFs and passive instruments as well as market variables.

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CRYPTO DERIVATIVES: OPPORTUNITIES, CHALLENGES, AND RISKS

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Vedanta collage

ABSTRACT

Crypto derivatives are financial instruments whose value comes from underlying cryptocurrencies like Bitcoin and Ethereum. As digital assets have rapidly grown, these derivatives, which include futures, options, and perpetual contracts, have become vital to the cryptocurrency ecosystem. They enable traders and investors to speculate on price movements, protect against potential losses, and manage risk more effectively without owning the underlying assets directly.

The rising popularity of crypto derivatives has greatly improved market liquidity and price discovery. By allowing leverage trading, these instruments attract a broad range of participants, including both retail traders and institutional investors. As a result, crypto derivatives markets have expanded quickly and now represent a significant portion of total cryptocurrency trading volume. They also offer chances for portfolio diversification and strategic financial planning.

However, crypto derivatives come with several challenges and risks. Regulatory uncertainty is a major issue, as countries have different rules regarding cryptocurrency trading. The market is highly volatile, which makes it prone to sudden price swings that can lead to substantial financial losses. Additionally, using leverage raises the risk of liquidation, particularly for inexperienced traders. Problems like market manipulation, low investor awareness, and technological weaknesses further complicate the situation.

This research paper aims to examine the opportunities, challenges, and risks linked to crypto derivatives in detail. It emphasizes the need for effective regulations, better investor education, and strong risk management strategies to support the sustainable growth of this evolving financial market.

INTRODUCTION TO CRYPTO DERIVATIVES

Crypto derivatives are advanced financial instruments whose value is derived from underlying cryptocurrencies such as Bitcoin and Ethereum. These instruments have become an important part of the modern financial ecosystem as digital assets continue to gain global acceptance. Unlike traditional investing, where investors purchase and hold cryptocurrencies directly, crypto derivatives allow traders to speculate on price movements without actually owning the underlying asset.

The concept of derivatives originates from traditional financial markets, where instruments like futures and options are used for commodities, stocks, and currencies. With the emergence of cryptocurrencies, these financial tools have been adapted to suit the unique nature of digital assets. Crypto derivatives include various types such as futures contracts, options contracts, perpetual futures, and swaps. Each of these instruments serves different purposes, including hedging risk, speculation, and portfolio diversification.

One of the main reasons behind the rapid growth of crypto derivatives is the opportunity to use leverage. Leverage allows traders to take larger positions with a relatively small amount of capital. This can significantly increase potential profits; however, it also increases the level of risk, as losses can be magnified. For example, a small price movement in the market can lead to substantial gains or losses when leverage is applied.

Another important feature of crypto derivatives is their role in risk management. Investors who already hold cryptocurrencies can use derivatives to protect their investments against price fluctuations. For instance, if an investor expects the price of Bitcoin to fall, they can enter into a derivatives contract that profits from a decline, thereby offsetting potential losses in their portfolio. This makes derivatives an essential tool for hedging in highly volatile markets.

Crypto derivatives also contribute to market efficiency and liquidity. By increasing trading activity, these instruments help in better price discovery, meaning that the market price of a cryptocurrency reflects all available information. Higher liquidity ensures that traders can easily enter and exit positions without causing significant price changes. This is especially important in the cryptocurrency market, which operates 24/7 and attracts participants from around the world.

Despite their advantages, crypto derivatives are complex and require a strong understanding of financial markets. They involve various risks such as market volatility, leverage risk, and counterparty risk. Therefore, traders must have proper knowledge, strategies, and risk management techniques before engaging in

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derivatives trading. Additionally, the regulatory environment for crypto derivatives is still evolving, which can create uncertainty for investors.

In conclusion, crypto derivatives represent a powerful and flexible financial tool that enhances trading opportunities in the cryptocurrency market. They enable investors to manage risk, speculate on price movements, and access advanced trading strategies. However, due to their complexity and high-risk nature, they should be used with caution and a clear understanding of how they function.



Crypto derivatives are sophisticated financial instruments whose value is derived from underlying cryptocurrencies such as Bitcoin and Ethereum. Over the past decade, the rapid growth of the cryptocurrency market has led to the development of more advanced trading tools, among which derivatives play a crucial role. These instruments enable traders and investors to participate in the market without directly owning digital assets, making them highly flexible and widely accessible.

In simple terms, a derivative is a contract between two parties whose value depends on the price of an underlying asset. In the case of crypto derivatives, this underlying asset is a cryptocurrency. Traders can use these contracts to speculate on whether the price of a cryptocurrency will rise or fall in the future. This ability to profit from both upward and downward price movements makes derivatives particularly attractive in highly volatile markets like cryptocurrencies.

Crypto derivatives are inspired by traditional financial derivatives used in stock, commodity, and forex markets. However, they are specifically designed to meet the needs of the digital asset ecosystem. Common types of crypto derivatives include futures contracts, options contracts, perpetual futures, and swaps. Each type serves a different purpose. For example, futures contracts are agreements to buy or sell an asset at a predetermined price on a future date, while options give the right but not the obligation to execute a trade. Perpetual contracts, on the other hand, do not have an expiry date and are widely used in crypto trading platforms.

OBJECTIVES OF CRYPTO DERIVATIVES

The primary objective of crypto derivatives is to provide traders and investors with advanced financial tools to manage risk, enhance returns, and improve trading efficiency in the cryptocurrency market. These instruments are designed to serve multiple purposes, making them an essential part of modern digital finance.

1. Risk Management (Hedging)

One of the key objectives of crypto derivatives is to help investors manage risk. Since cryptocurrencies like Bitcoin and Ethereum are highly volatile, derivatives allow traders to hedge against unfavorable price movements and protect their investments.

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2. Speculation for Profit
Crypto derivatives enable traders to speculate on price movements without owning the actual asset. Traders can take long or short positions depending on market expectations, creating opportunities to earn profits in both rising and falling markets.

3. Use of Leverage
Another important objective is to provide leverage. This allows traders to control larger positions with a smaller amount of capital, increasing the potential for higher returns. However, it also increases risk, making proper knowledge essential.

4. Price Discovery
Derivatives markets help in determining the future expected price of cryptocurrencies. This improves transparency and assists investors in making informed decisions based on market trends and expectations.

5. Enhancing Market Liquidity
By increasing trading activity, crypto derivatives improve liquidity in the market. This ensures smoother transactions and reduces the impact of large trades on market prices.

REVIEW OF LITERATURE ON CRYPTO DERIVATIVES (WITH PROPER "WWW" LINKS)
The study of crypto derivatives has gained significant attention in recent years due to the rapid growth of cryptocurrencies like Bitcoin and Ethereum. Researchers have focused on understanding their role in price discovery, volatility, hedging, and overall market development.

One important study examines the development of Bitcoin futures and their impact on price discovery. It found that Bitcoin futures play a dominant role in determining market prices and help improve information flow between markets.

�� www.sciencedirect.com

Another key research paper focuses on the impact of derivatives on spot markets. The study highlights that the introduction of Bitcoin futures has improved market efficiency and allowed better participation from institutional investors.

��www.pubsonline.informs.org/doi/10.1287/mnsc

In terms of risk and volatility, a study published in Finance Research Letters found that Bitcoin futures can increase volatility in the short term but also improve portfolio performance and risk management in the long run. This shows that derivatives have both positive and negative effects on the market.

�� www.sciencedirect.com

Research on hedging and market stability suggests that crypto derivatives provide effective tools for managing price risk. Studies indicate that Bitcoin futures help investors hedge against losses and improve market stability over time.

�� www.bcpublication.org/index.

Another study highlights the importance of price discovery in futures markets, showing that futures markets often lead spot markets in reflecting new information and investor expectations.

�� www.papers.ssrn.com

HYPOTHESES
The present study on crypto derivatives is guided by a set of hypotheses aimed at examining their overall impact on the cryptocurrency market and investor behavior. The null hypothesis (H_0) states that crypto derivatives do not have any significant effect on key market factors such as market efficiency, price discovery, liquidity, volatility, and risk management. In contrast, the alternative hypothesis (H_1) proposes that crypto derivatives play a significant role in improving market efficiency, enhancing price discovery, increasing liquidity, and influencing volatility. It is further hypothesized that crypto derivatives do not significantly affect investor participation or profitability; however, the alternative view suggests that these instruments attract more retail as well as institutional investors and have a notable impact on trading profitability.

Additionally, the study assumes under the null hypothesis that leverage, which is a key feature of crypto derivatives, does not significantly influence trading outcomes. On the other hand, the alternative hypothesis

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argues that leverage has a major impact, as it can amplify both profits and losses, thereby affecting investor decisions and risk exposure. Another important hypothesis relates to regulation, where the null hypothesis assumes that regulatory frameworks do not have a significant effect on crypto derivatives trading. In contrast, the alternative hypothesis suggests that regulatory policies and government interventions play a crucial role in shaping market behavior, investor confidence, and overall trading activity.

Furthermore, the study also considers investor awareness as a critical factor. The null hypothesis states that the level of investor awareness does not significantly affect the usage of crypto derivatives, whereas the alternative hypothesis argues that higher awareness leads to increased adoption, better understanding, and more efficient use of these financial instruments. These hypotheses are particularly relevant in the context of highly traded cryptocurrencies such as Bitcoin and Ethereum, where derivatives markets are rapidly expanding. Overall, these hypotheses provide a framework for analyzing the relationship between crypto derivatives and various market and behavioral factors, which can be tested using collected data and statistical tools to draw meaningful conclusions.

RESEARCH METHODOLOGY FOR STUDY ON CRYPTO DERIVATIVES

Research methodology refers to the systematic process used to collect, analyze, and interpret data for a study. For a project on crypto derivatives, the methodology helps in understanding their impact on market efficiency, risk, and investor behavior.

1. Research Design

The study is based on a descriptive and analytical research design.

Descriptive research is used to explain the concept, types, opportunities, and risks of crypto derivatives.

Analytical research is used to examine relationships such as the impact on volatility, liquidity, and price discovery.

2. Nature of Data

The study uses both

Primary Data – Collected directly from respondents through surveys or questionnaires.

Secondary Data – Collected from research papers, journals, websites, and reports related to cryptocurrencies like Bitcoin and Ethereum.

3. Data Collection Methods

a) Primary Data Collection

Structured questionnaire

Online surveys (Google Forms)

Responses from students, investors, and traders

b) Secondary Data Collection

Research articles and journals

Financial websites

Published reports and case studies

4. Sampling Method: -

Sampling Technique: Convenience Sampling

Sample Size: (e.g., 50–100 respondents depending on project requirement)

Respondents include students, working professionals, and individuals interested in cryptocurrency markets.

5. Tools and Techniques of Analysis

Percentage analysis

Charts and graphs (bar charts, pie charts)

Comparative analysis

Simple statistical tools for interpretation

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6. Objectives of the Study

To understand the concept of crypto derivatives

To analyze their impact on market efficiency and volatility

To study opportunities, risks, and challenges

To evaluate investor awareness and participation

7. Limitations of the Study

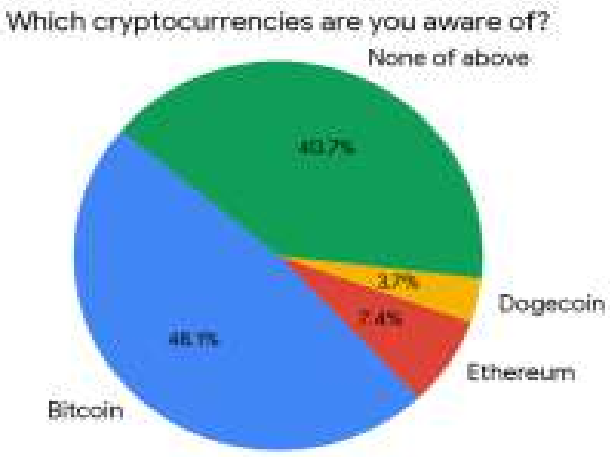
Limited sample size

Dependence on secondary data accuracy

Rapid changes in cryptocurrency markets

Respondent bias in primary data

Data Analysis and Interpretation



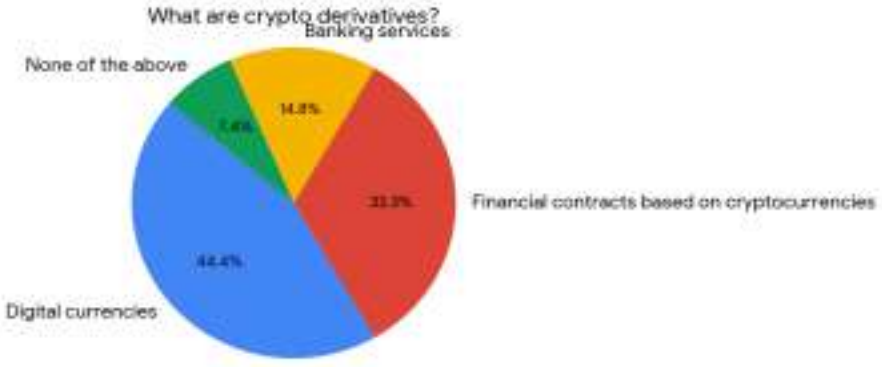
Analysis Details:

•• Bitcoin: 48.1%

•• Ethereum: 7.4%

•• Dogecoin: 3.7%

•• None of above: 40.7%



Analysis Details:

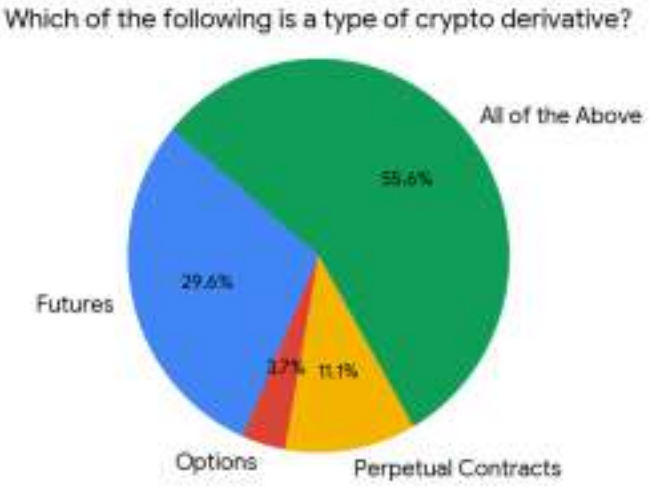
•• Digital currencies: 44.4%

•• Financial contracts based on cryptocurrencies: 33.3%

•• Banking services: 14.8%

•• None of the above: 7.4%

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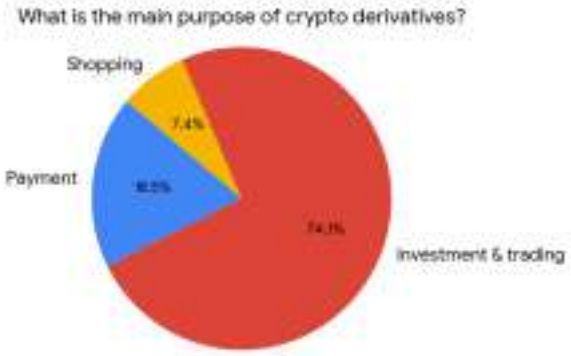
Analysis Details:

�� Futures: 29.6%

�� Options: 3.7%

�� Perpetual Contracts: 11.1%

�� All of the Above: 55.6%

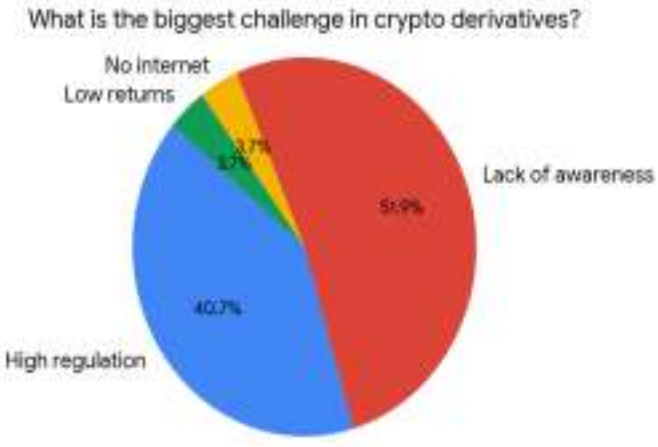


Analysis Details:

�� Payment: 18.5%

�� Investment & trading: 74.1%

�� Shopping: 7.4%



Analysis Details:

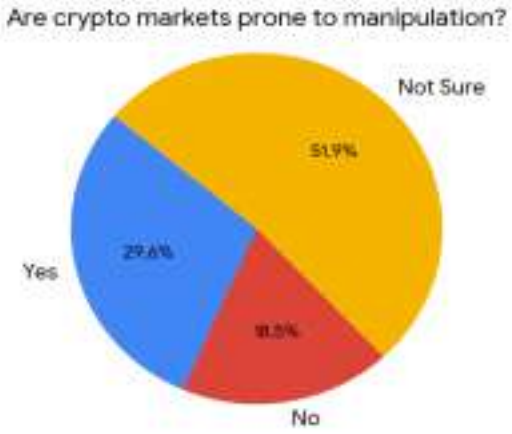
�� High regulation: 40.7%

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Lack of awareness: 51.9%

No internet: 3.7%

Low returns: 3.7%

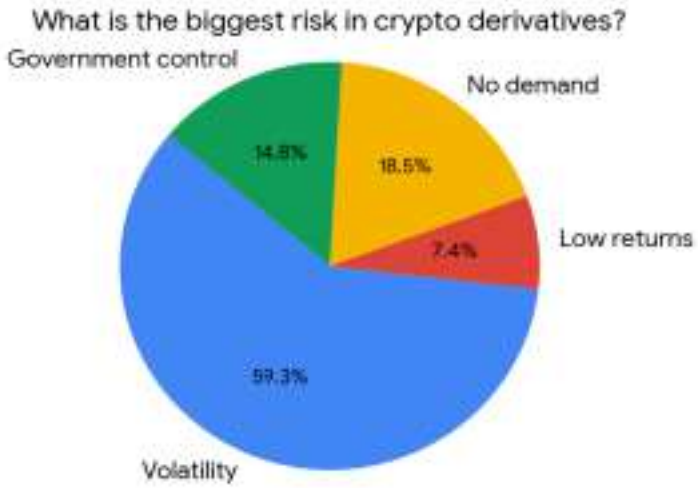


Analysis Details:

Yes: 29.6%

No: 18.5%

Not Sure: 51.9%



Analysis Details:

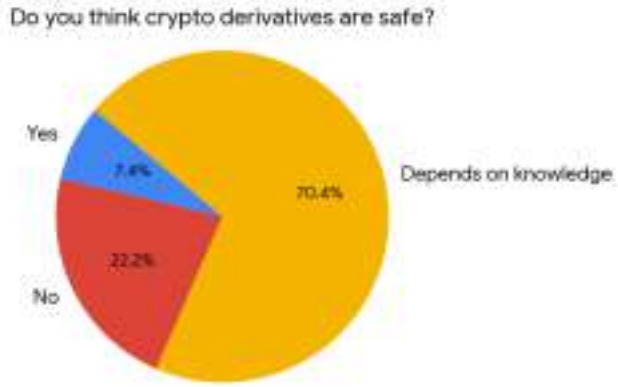
Volatility: 59.3%

Low returns: 7.4%

No demand: 18.5%

Government control: 14.8%

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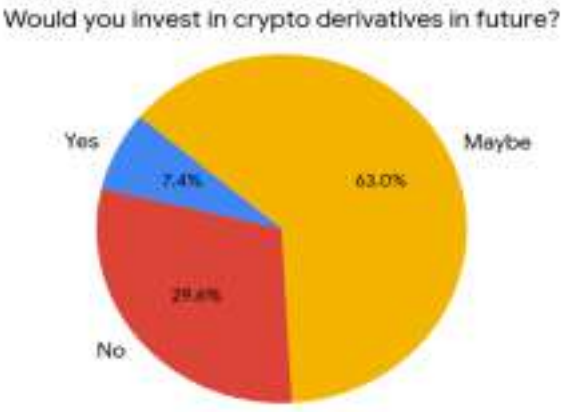


Analysis Details:

Yes: 7.4%

No: 22.2%

Depends on knowledge: 70.4%



Analysis Details:

Yes: 7.4%

No: 29.6%

Maybe: 63%

FINDINGS OF THE STUDY ON CRYPTO DERIVATIVES

The findings represent the key outcomes derived from the analysis of data collected through primary and secondary sources. Based on the study of crypto derivatives and their impact on the market, the following findings are observed:

1. Increasing Popularity of Crypto Derivatives

The study finds that crypto derivatives are gaining rapid popularity among investors and traders due to their flexibility and profit potential. Instruments linked to cryptocurrencies like Bitcoin and Ethereum are widely traded.

2. High Awareness but Limited Deep Understanding

Most respondents are aware of crypto derivatives, but only a few have a clear and detailed understanding of how these instruments work, especially in areas like leverage and options trading.

3. High Risk and Volatility

Crypto derivatives are considered highly risky due to extreme price volatility. Many respondents believe that the use of leverage increases the chances of both high profit and heavy losses.

4. Useful for Risk Management

The study shows that crypto derivatives are effective tools for hedging. Investors use them to protect their investments against unfavorable market movements.

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5. Increased Market Liquidity
Crypto derivatives contribute to higher trading volume, which improves liquidity in the cryptocurrency market. This helps in smoother buying and selling of assets.

6. Role in Price Discovery
The findings indicate that derivatives markets play an important role in price discovery by reflecting future expectations of traders and investors.

7. Lack of Regulation is a Major Concern
Many respondents expressed concern about the lack of proper regulation in crypto markets, which increases the risk of fraud and market manipulation.

8. Preference for Short-Term Trading
Most traders prefer using crypto derivatives for short-term trading and speculation rather than long-term investment.

CONCLUSION

In conclusion, crypto derivatives have emerged as an important component of the modern financial system, especially with the rapid growth of cryptocurrencies like Bitcoin and Ethereum. These financial instruments allow traders and investors to speculate on price movements, hedge risks, and apply advanced trading strategies without directly owning the underlying assets. As a result, they have increased participation in the cryptocurrency market.

The study shows that crypto derivatives contribute significantly to market efficiency and liquidity. By increasing trading volume, they make it easier for investors to enter and exit positions smoothly. They also play a key role in price discovery, as derivatives markets reflect future expectations of traders. Additionally, these instruments are useful for risk management, allowing investors to protect their portfolios from sudden price fluctuations.

However, the study also highlights several challenges associated with crypto derivatives. The market is highly volatile, and the use of leverage increases the risk of substantial financial losses. Even small changes in price can lead to large gains or losses, making derivatives trading risky, especially for inexperienced investors. Furthermore, the lack of proper regulation in many regions increases the chances of fraud, manipulation, and uncertainty in the market.

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· "Crypto Derivatives Market Growth and Systemic Risk" (various finance journals)

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THE ROLE OF DIGITAL SHORT-FORM FINANCIAL MEDIA IN SHAPING INVESTMENT DECISIONS AMONG INDIAN YOUTH

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ABSTRACT

This study examines the impact of digital short-form financial media on investment decision-making among Indian youth aged 18–35. With the rapid growth of platforms such as Instagram Reels and YouTube Shorts, financial content has become more accessible and engaging, influencing how young investors perceive and act on investment opportunities. Short-form financial content simplifies complex financial concepts and increases financial awareness; however, its fast-paced and emotionally engaging nature may also influence investor behaviour and decision-making patterns.

Despite the growing popularity of financial content on social media, limited empirical research has examined the cognitive and behavioural impact of short-form financial media on individual investors, particularly in the Indian context. This study therefore analyses the cognitive impact of such content on financial understanding and risk perception, along with behavioural factors such as fear of missing out (FOMO), urgency bias, peer influence, and return expectations.

A descriptive and analytical research design was adopted. Primary data was collected through a structured questionnaire using convenience sampling. A total of 136 responses were collected, out of which responses failing the quality check were excluded, resulting in a final sample of 107 valid responses used for analysis. Responses were measured using a five-point Likert scale. The data was analysed using descriptive statistics, correlation, and regression techniques, and reliability was assessed using Cronbach's Alpha. Moderation analysis was conducted to examine the role of financial literacy.

The findings indicate that short-form financial media improves financial awareness and investor confidence but also contributes to behavioural biases and impulsive investment decisions. The study highlights the importance of financial literacy in promoting informed and rational investment behaviour among young investors.

Keywords: *Digital media, Finfluencers, Investment behaviour, Financial literacy, Youth investors.*

1. INTRODUCTION

India's digital economy has witnessed significant expansion over the past decade, growing from approximately USD 107 billion in 2014 to over USD 222 billion by 2019. This rapid transformation has reshaped multiple sectors, particularly financial services. The adoption of mobile technology, app-based brokerage platforms, and simplified digital onboarding has made financial market participation more accessible.

Parallel to this, youth participation in the Indian stock market has increased substantially. Investors below the age of 30 constituted nearly 23% of the investor base in 2019, projected to rise to around 40% by 2025. Discount brokerage platforms now account for nearly 80% of retail equity participation, with a large share of users from Gen Z and millennials, indicating growing interest in early investment and equity-based wealth creation.

However, this rise is not proportionately supported by financial literacy. Many young investors rely on informal sources such as peers, social media, and online communities rather than structured financial education. As a result, investment decisions are increasingly influenced by external information, social trends, and digital content instead of fundamental analysis.

At the same time, short-form digital financial media, particularly through platforms like Instagram Reels and YouTube Shorts, has transformed financial information consumption. Investment ideas and strategies are presented in highly condensed formats designed for quick engagement. While this improves accessibility and awareness, it may also intensify behavioural biases such as FOMO, urgency bias, and peer influence.

Despite its growing influence, the cognitive and behavioural impact of short-form financial media on youth investment decision-making remains underexplored in the Indian context. Therefore, this study examines its impact on cognitive factors, behavioural biases, and investment behaviour among Indian youth.

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2. OBJECTIVES OF THE STUDY

1. To examine the exposure level of Indian youth to digital short-form financial media.
2. To analyse the cognitive impact of short-form financial content on financial understanding and risk perception.
3. To identify the behavioural factors (such as FOMO, urgency bias, peer influence, and return expectations) influencing investment decisions after consuming short-form financial content.
4. To evaluate the relationship between short-form financial media consumption and impulsive investment behaviour among Indian youth.
5. To assess whether financial literacy moderates the impact of short-form financial content on investment decision-making.

3. LITERATURE REVIEW

Lusardi and Mitchell (2014) identify financial literacy as a key determinant of individual financial decision-making, defining it as the ability to understand concepts such as risk diversification, inflation, and interest compounding. Their study highlights that financially literate individuals are more likely to participate in capital markets and make informed investment decisions.

However, later studies suggest that financial knowledge alone does not ensure rational decision-making. Even financially aware individuals can be influenced by behavioural biases, peer pressure, and external information. This indicates that while financial literacy forms the foundation, cognitive and psychological factors significantly shape investment behaviour, especially in digitally driven environments.

Kahneman and Tversky (1979), through Prospect Theory, argue that investors are not fully rational and are influenced by biases such as loss aversion and framing effects. Barber and Odean (2001) further identify overconfidence bias, showing that investors often overestimate their knowledge, leading to excessive trading and lower returns.

Behavioural finance research also highlights herd behaviour and anchoring as key influences, particularly when information is simplified or socially reinforced. In digital environments, where content is short and engaging, these biases may be amplified, leading to impulsive investment decisions among young investors.

Traditional behavioural models were developed in slower information environments, whereas digital short-form media operates through rapid, algorithm-driven content, intensifying these behavioural effects.

Recent studies highlight the growing impact of finfluencers on financial markets. *The Rise of the Finfluencer (2023)* reports that social media promotions can significantly influence stock prices, with some cases showing increases exceeding 200%. Retail trading volume also rose from around 15–18% in early 2020 to nearly 30% by 2021, reflecting increased participation by young investors. Additionally, over 50% of Gen Z and millennial investors rely on platforms such as Instagram and TikTok for financial information.

Finfluencers act as coordination mechanisms, creating feedback loops that amplify trading activity and herd behaviour. Algorithm-driven visibility and zero-commission trading further strengthen this impact. However, the study also highlights concerns such as incentive distortion, where content prioritizes engagement over accuracy, and paid promotions may distort market behaviour.

Despite these risks, finfluencers also contribute to improving financial awareness and expanding market participation among young investors.

4. RESEARCH GAP

Existing literature has examined financial literacy, behavioural biases, and the market-level impact of finfluencers, documenting effects on stock prices, retail trading volume, and investor participation. However, the majority of prior studies emphasise aggregate market outcomes or regulatory implications, offering limited insight into the cognitive mechanisms underlying individual investment decision-making.

Empirical research examining how digital short-form financial media influences cognitive interpretation, behavioural biases, and impulsive investment behaviour among youth particularly within the Indian context remains scarce. The role of algorithmic amplification, social validation cues, perceived urgency, and fear of missing out (FOMO) in shaping youth investment intentions has not been sufficiently integrated into behavioural finance research.

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Accordingly, there exists a need to bridge behavioural finance theory with digital media dynamics to understand how short-form financial content cognitively and behaviourally influences investment decision-making among Indian youth. The present study seeks to address this gap by empirically examining these relationships.

5. HYPOTHESES OF THE STUDY

H1: Exposure to short-form financial media influences investment behaviour among Indian youth.

H2: Short-form financial media improves financial understanding and investment confidence.

H3: Behavioural biases influence investment decisions among Indian youth.

H4: Financial literacy moderates investment behaviour.

6. RESEARCH METHODOLOGY

6.1 Research Design
The study adopts a descriptive and analytical research design to examine the cognitive and behavioural impact of short-form financial media on investment decision-making among Indian youth.

6.2 Target Population
The target population comprises Indian individuals aged between 18 and 35 years, consistent with the demographic classification used in digital finance and finfluencer literature.

6.3 Sampling Technique
A convenience sampling technique was employed due to accessibility and ease of data collection through online platforms.

6.4 Sample Size and Data Screening
Primary data was collected through a structured questionnaire administered via Google Forms and distributed through online channels, including social media platforms and academic networks. A total of 136 responses were collected. However, after applying a quality check filter to remove inattentive and inconsistent responses, 29 responses were excluded, resulting in a final sample size of 107 valid responses for analysis.

6.5 Data Collection Method
The study used a structured questionnaire to collect primary data. The questionnaire was designed to capture respondents' exposure to short-form financial media and its impact on investment behaviour.

6.6 Measurement Scale
Responses were recorded using a five-point Likert scale, ranging from *Strongly Disagree (1)* to *Strongly Agree (5)*.

6.7 Variables of the Study

The instrument measured the following variables:
- Exposure to short-form financial media
- Cognitive impact
- Behavioural biases (FOMO, urgency bias, peer influence, return expectations)
- Impulsive investment behaviour
- Financial literacy

6.8 Data Analysis Tools
The collected data was analysed using descriptive statistics, correlation analysis, and regression analysis with the help of SPSS and Microsoft Excel

6.9 Reliability Analysis
The reliability of the Likert-scale questionnaire was tested using Cronbach's Alpha, which indicated acceptable internal consistency of the measurement scale.

6.10 Secondary Data
Secondary data was obtained from peer-reviewed journal articles, research papers, and government reports to provide theoretical and contextual support for the study.

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7. DATA PRESENTATION AND ANALYSIS

This section presents the analysis and interpretation of primary data collected from 107 respondents. Descriptive statistics, charts, and statistical tests such as correlation and regression were used to analyse the impact of short-form financial media on investment behaviour among Indian youth.

7.1 Age Distribution of Respondents

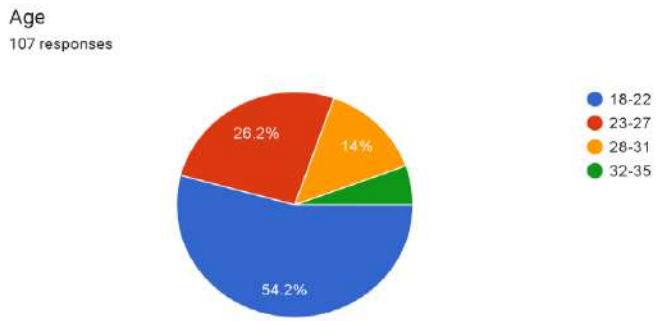


Figure 1 Age Distribution

Interpretation:

The chart shows that 54.2% of respondents belong to the 18–22 age group, followed by 26.2% (23–27), 14% (28–31), and 5.6% (32–35). The majority fall in younger age groups, indicating strong representation of digitally active youth who are more exposed to short-form financial media. Hence, the sample is appropriate for analysing its impact on investment decision-making.

Source: Primary Data (n = 107)

7.2 What best describes you?

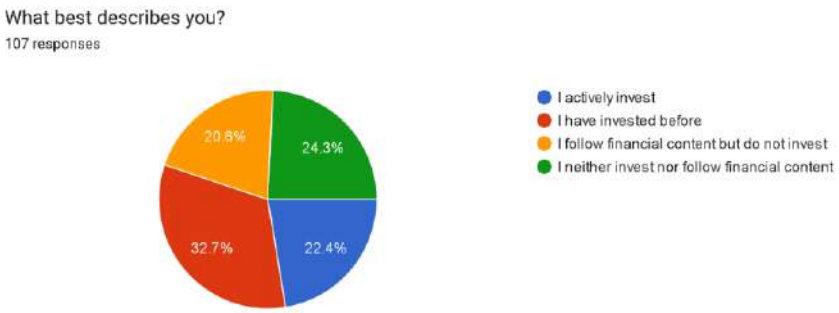


Figure 2 Investment Profile

32.7% of respondents have invested before, 22.4% actively invest, 20.6% follow financial content but do not invest, and 24.3% neither invest nor follow financial content. This indicates that the sample includes both active and potential investors, making it suitable for analysing the influence of short-form financial media on investment behaviour.

Source: Primary Data (n = 107)

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7.3 I regularly watch short financial videos (Reels/Shorts)

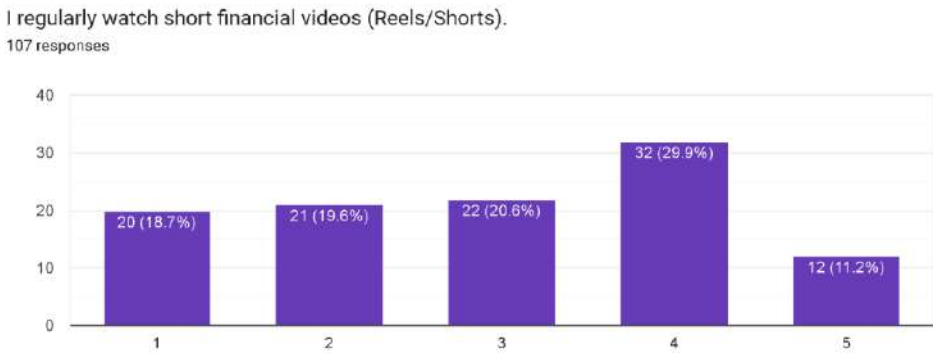


Figure 3 Watching Short Videos

Interpretation:
41.1% respondents agree or strongly agree that they regularly watch short financial videos, while 20.6% are neutral and 38.3% disagree. This demonstrates moderate to high exposure to short-form financial media among young investors.

Source: Primary Data (n = 107)

7.4 I follow financial content creators online

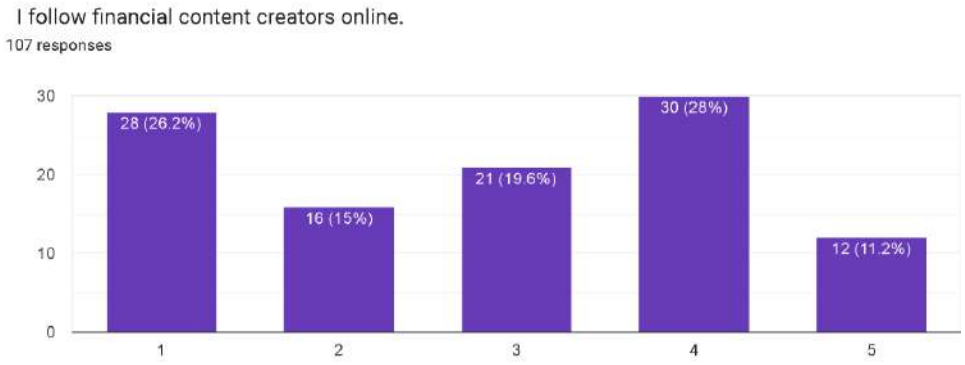


Figure 4 Following Financial Creators

Interpretation:
39.2% of respondents follow financial content creators, while 19.6% are neutral and 41.2% do not follow them. This suggests that financial influencers impact a significant portion of young investors.

Source: Primary Data (n = 107)

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7.5 Short videos are one of my sources of investment information

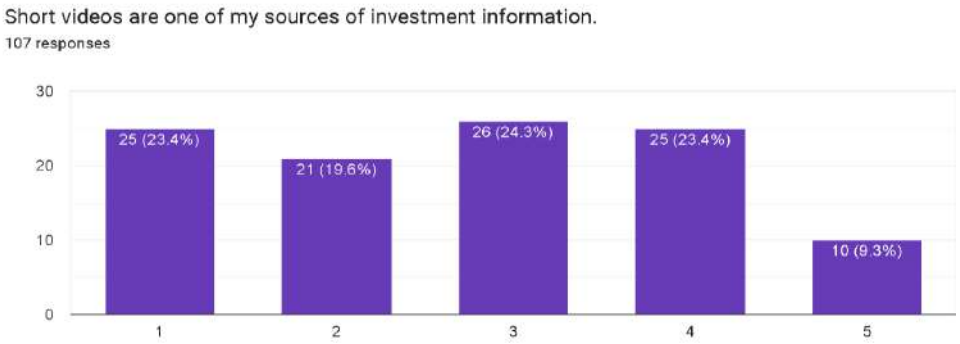


Figure 5: Videos as Information Source

Interpretation:
32.7% of respondents agree that short videos are a source of investment information, 24.3% are neutral, and 43% disagree. This indicates that while short videos serve as an information source, traditional sources of investment information remain important.

Source: Primary Data (n = 107)

7.6 Short financial videos make investing easier to understand

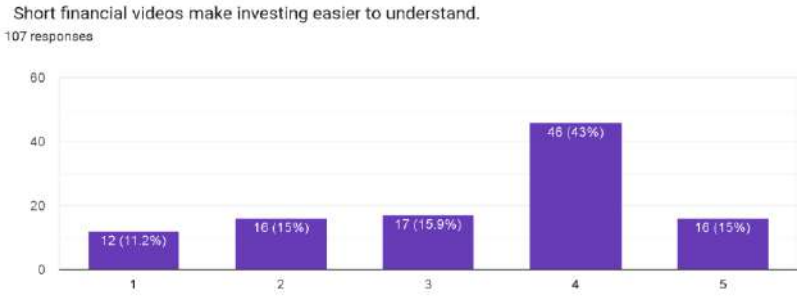


Figure 6 Videos Make Investing Easier

Interpretation:
58% respondents agree that short financial videos make investing easier to understand, 15.9% are neutral, and 26.2% disagree. This shows a strong cognitive impact of short-form financial media on financial knowledge.

Source: Primary Data (n = 107)

7.7 After watching such videos, I feel more confident about financial decisions

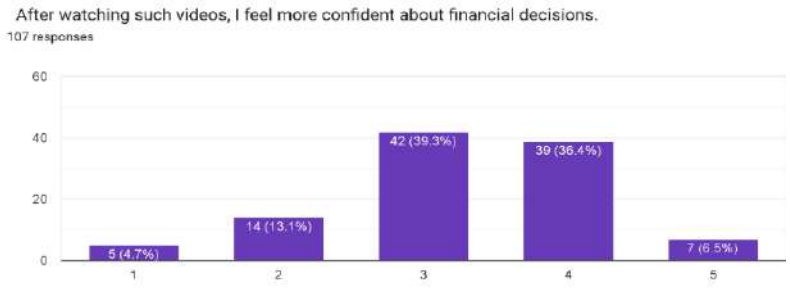


Figure 7 Confidence After Videos

Interpretation:
42.9% respondents feel more confident after watching financial videos, 39.3% are neutral, and 17.8% disagree. This suggests that short-form financial content influences investor confidence.

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Source: Primary Data (n = 107)

7.8 Short financial videos simplify complex investment topics



Figure 8 Simplify Topics

Interpretation:
The chart shows that 59.8% respondents agree that short videos simplify complex investment topics, 24.3% are neutral, and 15.8% disagree. This indicates that short-form content plays an educational role in financial literacy.

Source: Primary Data (n = 107)

7.9 I have researched a stock after seeing it in a short video



Figure 9 Researched Stock After Video

Interpretation:
45.7% respondents have researched a stock after seeing it in a short video, 24.3% are neutral, and 29.9% disagree. This demonstrates that short-form financial media influences investment research behaviour.

Source: Primary Data (n = 107)

7.10 When many people discuss the same stock online, my interest increases



Figure 10 Herd Behaviour

Interpretation:
The chart shows that 52.3% of respondents reported increased interest when many people discuss the same

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stock, while 23.4% are neutral and 24.3% disagree. This indicates the presence of herd behaviour and social influence in investment decisions.

Source: Primary Data (n = 107)

7.11 I sometimes feel I should act quickly on investment information shared online

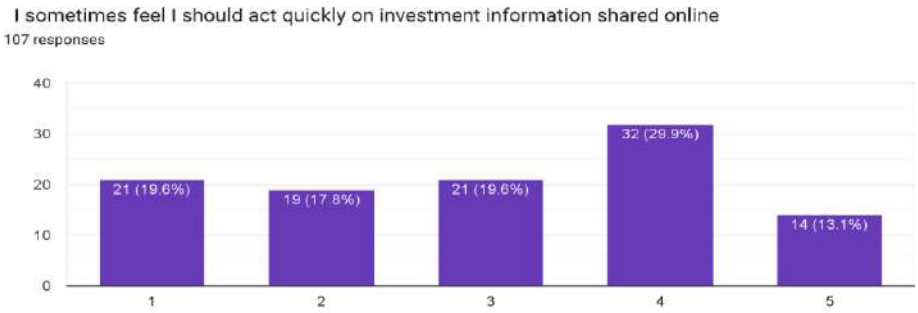


Figure 11 Urgency Bias

Interpretation:
43% respondents feel urgency to act on investment information, 19.6% are neutral, and 37.4% disagree. This suggests the presence of urgency bias and impulsive investment behaviour.

Source: Primary Data (n = 107)

7.12 I prefer quick insights before doing detailed research

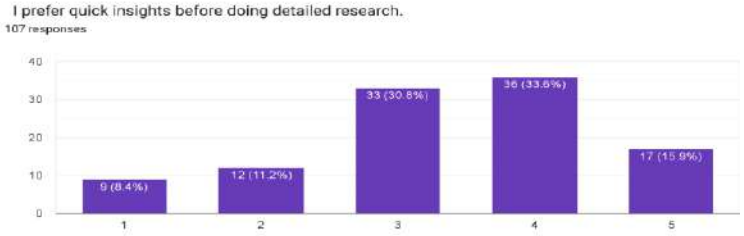


Figure 12 Quick Insights

Interpretation:
49.5% respondents prefer quick insights before detailed research, 30.8% are neutral, and 19.6% disagree. This indicates reliance on short-form financial content for initial investment decisions.

Source: Primary Data (n = 107)

7.13 Financial Literacy Questions

Diversification reduces risk

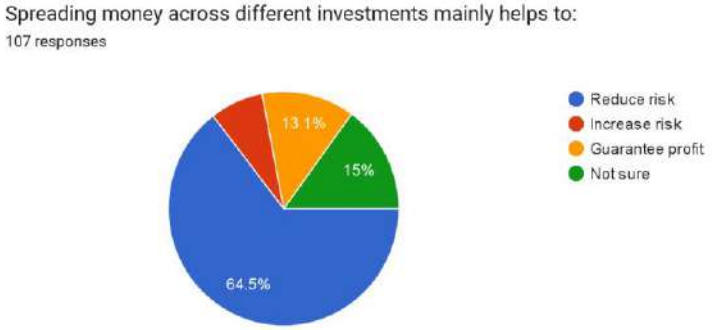


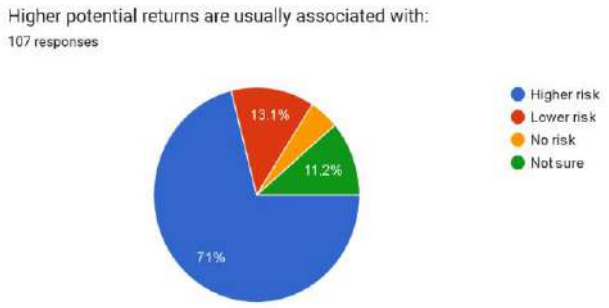
Figure 13 Financial Literacy

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Interpretation:
64.5% respondents correctly identified that diversification reduces risk, indicating a moderate level of financial literacy among respondents.

Source: Primary Data (n = 107)

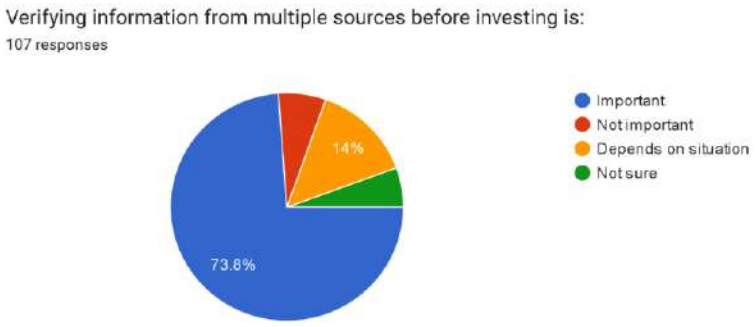
7.14 Higher returns = Higher risk



Interpretation:
71% respondents correctly identified that higher returns are associated with higher risk, indicating good basic financial knowledge among respondents.

Source: Primary Data (n = 107)

7.15 Verify information from multiple sources



Interpretation:
73.8% respondents believe that verifying information from multiple sources is important, indicating responsible investment behaviour among respondents.

Source: Primary Data (n = 107)

7.16 FOMO – Fear of Missing Out

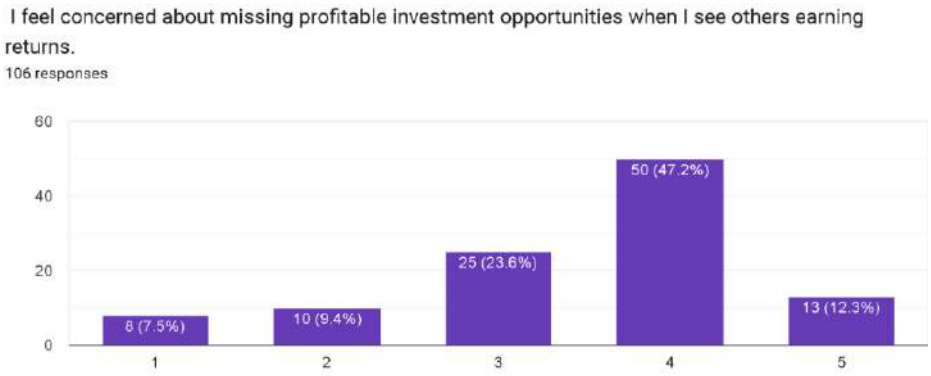


Figure 14 FOMO

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Interpretation:
The chart shows that 59.5% respondents feel concerned about missing profitable opportunities when they see others earning returns, indicating the presence of FOMO and psychological influence of social media on investment decisions.

Source: Primary Data (n = 107)

7.17 Short-form content affects timing of investment decisions

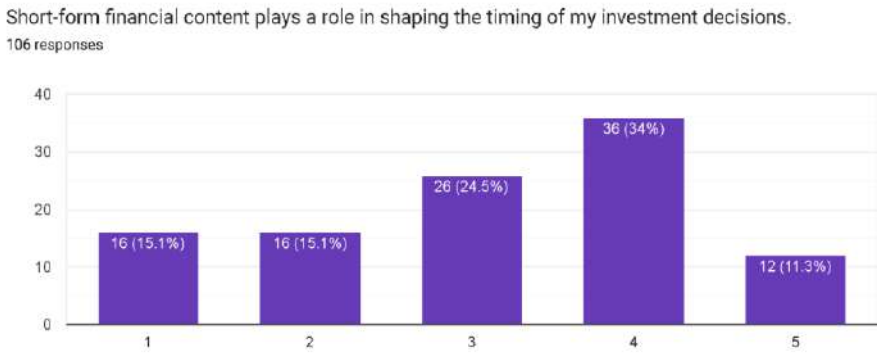


Figure 15 Timing Decisions

Interpretation:
45.3% respondents believe short-form financial content affects the timing of their investment decisions, 24.5% are neutral, and 30.2% disagree. This suggests that digital financial media influences investment decision timing.

Source: Primary Data (n = 107)

RELIABILITY ANALYSIS
Cronbach's Alpha value was 0.889, indicating high internal consistency and reliability of the scale.

8. RESULTS & FINDINGS
The results indicate high exposure to short-form financial media among respondents. The findings show that such content improves understanding of investment concepts among young investors. However, behavioural biases such as Fear of Missing Out (FOMO), urgency bias, and herd behaviour are also evident. A significant number of respondents reported researching stocks after viewing short videos, indicating an influence on investment interest and research behaviour. The study also finds that short-form content affects investment timing and increases investor confidence. Overall, short-form financial media has both cognitive and behavioural impacts on investment decision-making among Indian youth.

9. HYPOTHESIS TESTING
The hypotheses were tested using correlation and regression analysis. The results show a positive relationship between short-form financial media exposure and investment behaviour. Financial literacy also influences decision-making by promoting information verification. Therefore, all four hypotheses (H1, H2, H3, and H4) are accepted.

10. CONCLUSION
The study concludes that short-form financial media significantly influences investment behaviour among Indian youth. It improves financial knowledge, simplifies concepts, and increases confidence. However, it also contributes to behavioural biases such as FOMO, urgency bias, and herd behaviour, which may lead to impulsive decisions. Financial literacy plays an important role in ensuring informed investment decisions. Therefore, investors should combine short-form content with proper research.

11. LIMITATIONS OF THE STUDY
The study is limited by a sample size of 107 respondents, which may not fully represent the population. Convenience sampling may introduce bias. The data is self-reported and may be influenced by personal perceptions. The study focuses only on short-form financial media and excludes other sources.

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12. FUTURE SCOPE OF THE STUDY

Future research can use larger samples and include different age groups. Studies can compare short-form and long-form financial content. Further research can analyse the impact of financial influencers and explore how financial literacy reduces behavioural biases.

13. DECLARATION

This research paper is original work carried out by the author. All sources have been acknowledged. This paper has not been submitted elsewhREFERENCES

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SUSTAINABLE CONSUMPTION BEHAVIOR AMONG YOUTH AND ITS ALIGNMENT WITH SDGS: A STUDY ON PLASTIC WASTE REDUCTION PRACTICES IN ULHASNAGAR

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ABSTRACT
Plastic waste has become one of the major environmental concerns in recent years due to growing use of single-use plastic products and ineffective waste management practices. Sustainable consumption must be encouraged in order to ensure environmental sustainability and reduce plastic pollution. Youth play an important role and have a significant influence on society's acceptance of sustainable practices and environmentally conscious behaviour. The present study aims to evaluate the level of awareness among youth towards sustainable consumption as well as their waste minimization techniques and plastic consumption behaviour.

The present study aims to analyse youth consumption behaviour and waste reduction strategies as well as measure their awareness of sustainable consumption and plastic waste issues. The main objective of the study is to understand how young people adopt eco-friendly habits like limiting on single-use plastics, shifting to reusable ones and disposing of garbage properly. The study is based on survey data obtained from college students to assess the knowledge, attitudes and behaviors related to plastic waste reduction. The findings of the study are likely to focus on the role that youth play in encouraging sustainable consumption and to provide meaningful information that educational institutions and policymakers may utilize to promote ecologically conscious choice and effective plastic waste management.

Keywords: *Plastic Waste Reduction, Youth Behaviour, Sustainable Consumption, Environmental Awareness, Sustainable Development.*

INTRODUCTION
Plastic pollution has emerged as one of the most serious environmental issues of the present time. United Nations Environment Programme (UNEP) reports more than 400 million metric tonnes of plastic are produced world-wide every year, still less than 10 percent is recycled. A large portion of this waste at last ends up in rivers, landfills, oceans or is burned causing severe environmental and health problems. Plastic waste generation is increasing due to rapid urbanization, changing consumption patterns and growing dependence on single-use plastic products. The Central Pollution Control Board (CPCB, 2022) estimates that India generates nearly 3.5 million tonnes of plastic waste every year with urban areas contributing significantly to this rise.

Ulhasnagar, situated in the Thane district of Maharashtra, reflects many of these urban environmental challenges. The city has a dense population and active commercial markets where the plastic bags, packaging materials, bottles and disposable items are commonly used in daily life. Though the government has taken steps such as the Plastic Waste Management Rules and ban on certain single-use plastics, their implementation at the local level continue to remain inadequate.

Youth represents an essential group in transition to sustainability. They are at a stage where attitudes, habits and lifestyle choices are formulated actively. Youth can become the change makers in promoting environmentally responsible behaviour within their homes and communities. Despite growing environmental awareness among youth, there exist a gap between what individuals know and how they actually behave. Factors such as accessibility of alternatives, convenience, personal habits and social influences repeatedly affecting sustainable practices.

The current study focuses on the broader goals of sustainable development, particularly SDG 12 – Responsible Consumption and Production which emphasizes reducing waste generation through prevention, reuse and recycling practices.

Hence, the study aims to examine the level of environmental awareness among youth in Ulhasnagar and evaluate whether awareness significantly influence on their plastic waste reduction practices. Also to provide a local perspective on how to promote sustainable consumption behaviour among youth in a developing country.

REVIEW OF LITERATURE

Karolina Ertmańska (2021) highlighted sustainable consumption awareness among young consumers in Poland and factors determining consumer behaviour. The study found that young consumers participate in eco-friendly behaviour such as reusing product packaging, purchasing ecological goods and local products

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produced in their own country. The aspects of sustainable development are not the primary criteria for purchase decision as price and quality remained important. The study also highlighted that when market forces are not sufficient, there is need for government intervention to support sustainable consumption practices.

Mehta, A., Sharma, M., Gupta, N. (2024) analyzed the determinants for sustainable consumption behaviour among youths. The variables such as ecological knowledge, behavioral control, response efficiency, perception of consequences and environmental sensitivity were analysed which influenced behavioral intentions significantly. The findings revealed that only behavioral control and perception of consequences were directly determining the sustainable consumption behaviour. The study further stated that it is an important step towards promoting sustainable consumption behaviour among young and provides framework for designing educational programs and marketing strategies to reduce plastic waste.

Hong et al. (2024) analyzed the determinants of green consumption behaviour among Chinese youth and also the moderating role of Eco-labelling and green self-identity. The study highlighted that attitude towards Eco-social benefits, green consumption and subjective norms influence green consumption intentions positively whereas, environmental concern and knowledge positively contributed towards shaping their attitudes. The study also highlighted green self-identity moderates the relation between green consumption intention and behaviour however Eco-labelling does not have a significant moderating effect. The researchers identified the importance of encouraging environmental concern and knowledge through education and awareness initiatives in order to encourage sustainable consumption habits among youth.

Raimondo et al. (2022) examined the factors determining millennials' intentions and behaviour regarding reduced plastic consumption using the theory of planned behaviour. The study found that attitudes, subjective norms with perceived behavioral control happening to be the strongest predictor. Moreover, past behaviour was found positively influence attitudes, intentions and actual behaviour while intention further influenced stated behaviour. The study concluded that these factors are important in promoting plastic reduction habits and help in developing strategies and incentives to promote sustainable consumption among millennials.

Ziesemer et al. (2021) analyzed factors encouraging young people to engage in anti-consumption behaviors in the sustainability framework. The study found that young people are mainly driven by financial factor such as saving money and reducing waste. Furthermore, sustainability play a minor role relatively. It was noted that young people would rather spend money on experiences than on physical goods. The researchers stated that anti-consumption practices can still support sustainable development even when the sustainability is not the top priority. They further emphasized the importance of education and awareness to motivate sustainable consumption habits among young people. pls give authentic and helpful suggestions.

RESEARCH GAP

Existing studies broadly examined the environmental awareness level or plastic waste management separately, limited research has been conducted to examine the relationship between the two, especially the awareness actually changes the behaviour among youth. Additionally, no empirical study has examined specifically plastic waste reduction behaviour among youth in Ulhasnagar. The current study tries to fill this gap by analyzing whether environmental awareness actually leads to plastic waste reduction practices.

OBJECTIVES

1. To examine the level of environmental awareness regarding plastic pollution among youth.
2. To analyse the plastic consumption behaviour of youth in their daily lives.
3. To examine the relationship between environmental awareness and plastic waste reduction practices among youth.

HYPOTHESIS

H_0: Youth do not have significant awareness regarding environmental problems caused by plastic waste.

H_1: Youth have significant awareness regarding environmental problems caused by plastic waste.

H_0: Youth do not significantly engage in plastic waste reduction practices in their daily lives.

H_1: Youth significantly engage in plastic waste reduction practices in their daily lives.

H_0: Environmental awareness does not significantly influence plastic waste reduction practices among youth.

H_1: Environmental awareness significantly influences plastic waste reduction practices among youth.

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RESEARCH METHODOLOGY

The study is based on descriptive and analytical research design. Quantitative approach was used. Primary data was collected from 127 respondents through a structured questionnaire. A convenience sampling method was used for data collection. The questionnaire focused on awareness levels, consumption patterns and practices related to waste reduction. The survey targeted youth category whose sustainable practices are most likely to be influenced by accessibility of alternatives, convenience, personal habits. The questionnaire consisted of closed-ended (Likert scale, multiple choice) for statistical analysis. Since the collected data is in categorical form so we have applied chi-square test.

Given the categorical nature of the data, particularly for variables such as awareness levels, consumption patterns and practices related to waste reduction, the chi-square test of independence was applied to test the third hypothesis. This statistical method helps determine whether there is a significant association between categorial variables such as level of awareness and waste reduction practices. The quantitative data was analysed and results were interpreted in the context of the study's objectives.

DATA ANALYSIS & INTERPRETATION

Observed Frequency

Gender	Awareness programs	Government regulations	Use of eco-friendly alternatives	Recycling initiatives	Total
Male	37	50	26	3	116
Female	5	3	2	0	10
Total	42	53	28	3	126

Expected Frequency

Gender	Awareness programs	Government regulations	Use of eco-friendly alternatives	Recycling initiatives
Male	38.667	48.794	25.778	2.762
Female	3.333	4.206	2.222	0.238

Computing the chi-square static using formula $\varkappa^2 = \sum \frac{(O_i - E_i)^2}{E_i}$

Chi square value $\varkappa^2_{calculated} = \sum \frac{(O_i - E_i)^2}{E_i} = 1.5636$

Sample size	127
Chi square value	1.5636
Degrees of freedom	3
P value	0.6677
Chi square Table value	7.815
$\chi 2(calculated) < \chi 2(tabular\ value)$	We fail to reject Null hypothesis

Since the chi-square calculated value is less than chi-square tabular value so we fail to reject the null hypothesis. So, there is no significant relationship between formal education and awareness of the circular economy among individuals.

FINDINGS

1. The findings shows that most of the youth is aware of environmental problems caused by plastic waste and understand the importance of sustainable practices also.
2. Though the awareness is high there is widespread use of single use plastic products continuously.
3. The findings also indicates that there is a gap between awareness and actual behaviour.
4. Convenience, personal habits, accessibility of alternatives influence the youth behaviour more than awareness alone.
5. Findings also shows that there is no significant relationship between awareness and plastic waste reduction practices.

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RECOMMENDATIONS

1. The awareness programmes should not only emphasize on providing information but also on promoting practical behavioral change among the youth.
2. Educational institutions can play a crucial role by organizing plastic-free campaigns, awareness activities on campus, sustainability drives.
3. Alternatives like reusable bags and bottles should be made more affordable so that youth can adopt them conveniently in their daily lives.
4. Continuous involvement through campaigns, drives, workshops and community participation can help in developing sustainable habits among youth.
5. Government authorities and local bodies should strengthen the implementation of plastic waste management policies and promote responsible consumption at community level.

CONCLUSION

1. The current study examined the level of environmental awareness, plastic consumption behaviour and the plastic waste reduction practices and also to evaluate the association between the environmental awareness and plastic waste reduction practices among youth in Ulhasnagar.
2. Awareness is required but not sufficient for sustainable consumption behaviour. Just by knowing about plastic pollution does not automatically encourage youth to change their daily habits.
3. The gap between knowledge and behaviour change towards plastic consumption necessitates holistic approach to promote sustainable behaviour among youth.
4. People may already understand the plastic waste problem, however, changing awareness into everyday habits is challenge in real life. There is need of coordinated efforts of educational institutions, policy makers and community groups to work in a practical way.
5. Closing this gap is essential not just environmentally but for India's commitment towards Sustainable Development Goals.

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SUSTAINABILITY IN THE AGE OF DIGITAL TRANSFORMATION: MYTHS, REALITIES, AND FUTURE PATHWAYS

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ABSTRACT
*Innovations in the area of digital technology have changed drastically the current perception of sustainability. The theory of digital technology revolution based on the achievements in AI, big data analytics, cloud computing, and IOT, is believed to be a driving force of sustainability due to efficiency and optimization of resources used. However, more consideration needs to be given to this perspective. The current paper presents an analysis of the relationship between digital transformation and sustainability using a comparison of supposed and actual impacts of the digital revolution supported by secondary sources of data, which include scholarly articles, official documents, and industry surveys. Thematic and comparative method of analysis will be used in this paper, and it will focus on the impact of digital technologies on the environment, economy, and society separately. The findings indicate that although digital technology leads to innovations, increase in productivity, and promotes financial inclusion, it leads to a variety of problems, for example, increased electricity consumption, greenhouse gas emissions, and electronic waste. Moreover, the digital revolution intensifies the problem of inequality in accessing opportunities caused by the digital divide.****Keywords:*** *Digital Transformation, Sustainability, Sustainable Development, Green Technology, Digital Economy, Artificial Intelligence, E-waste, Energy Consumption, Digital Divide*

INTRODUCTION
However, the beginning of the 21st century has been characterized by the rapid pace of digital transformation, which has radically changed the economic, business, and societal spheres. Technologies such as AI, big data analytics, cloud computing, and IoT have made it possible for companies to increase efficiency and make better decisions. On the other hand, the notion of sustainability has become increasingly important in the face of the UN SDGs that require a careful balancing of economic, environmental, and societal considerations. In this environment, digital transformation has often been associated with sustainable development, with the premise being that technologies will inevitably lead to more effective use of resources.

However, nowadays the mentioned sustainable development model is facing growing criticism as well. On the one hand, even though digitalization leads to dematerialization and improvements in terms of efficiency, at the same time, it also causes particular environmental and social issues. First of all, the growing use of data centers, infrastructure, and electronics results in a higher consumption of natural resources and pollution rates. Second, due to the problem of obsolescence, there appears an additional issue related to electronic waste and possible risks associated with it. Finally, socially, digital inequality creates a problem related to digital divide and makes sustainable development impossible in various countries.

Considering both positive and negative aspects characteristic of the phenomenon of digitalization as well as of the notion of sustainability, the necessity emerges to investigate the problem of their correlation. Thus, the main aim of the current research paper is to explore the problem of interaction between these phenomena.

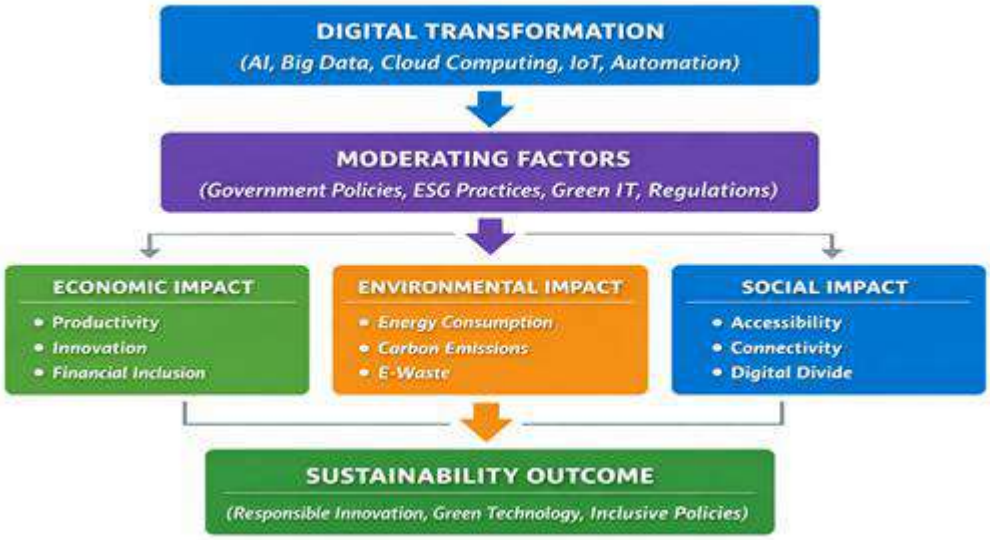
OBJECTIVES OF STUDY
1. To investigate the relationship between digital transformation and sustainable development.
2. To understand the myths about digital transformation and sustainability.
3. To examine the impact of digital transformation on environment, economy, and society, using secondary sources of data.
4. To highlight the issues of increased energy usage, e-waste, and digital divide.
5. To propose recommendations for sustainable digital development in the future.

RESEARCH METHODOLOGY
For this current study, the secondary data collection method has been selected, and the research design methodology employed to study the relationship between digital transformation and sustainability will be descriptive and analytical in nature. Data has been gathered from credible sources such as academic journals and articles, research papers, and reports from international bodies around the world that include UN agencies, World Bank, OECD, International Energy Agency, and industry reports from McKinsey, Deloitte, and PwC. Information obtained was then analyzed using thematic and comparative approaches in order to identify

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existing trends and perspectives regarding digitalization and sustainability. In this research, the impact of digital transformation on the environment, economy, and society will be evaluated while distinguishing between misconceptions and realities. Since secondary data is being used exclusively in this research, there is no scope for primary data collection and statistical analysis.

CONCEPTUAL FRAMEWORK



In the above mentioned conceptual model, the interaction between digital transformation and sustainability is reflected through the direction of the mutual influence between the different dimensions. Being a process of enabling technology, which is related to the use of advanced technologies, such as artificial intelligence, big data, cloud computing, IoT, digital transformation might be regarded as the input. At this point, it is necessary to say that digital transformation cannot be regarded as a separate phenomenon, because its impact depends on various conditions including governmental policy, ESG initiatives, green IT, and so forth.

Thus, as shown in the above-mentioned conceptual model, digital transformation affects three important dimensions economy, environment, and society. At first, digital transformation contributes to the economic sphere by providing innovations and enhancing the productivity rate. The second one is environment; at this point, although the positive impact exists, the negative impact is also noticeable due to the increase in resource utilization, greenhouse gas emission, and the production of waste. Finally, society is positively affected by the provision of information and services but negatively affected by the expansion of the digital divide.

It is imperative to mention that, in the final stage of the model, the impact of digital transformation on sustainability cannot take place spontaneously, but rather depends on the existence of a connection between technology development and responsible innovation, greening technology, and inclusive policies. To sum up, the model provides a full understanding that the impact of digital transformation on sustainability happens under specific circumstances and depends on how these critical factors are managed.

MYTHS AND REALITIES OF DIGITAL TRANSFORMATION AND SUSTAINABILITY

1. Digitalization Is Environmentally Sustainable

Digitalization is perceived as environmentally friendly because it guarantees that fewer materials and papers will be needed. At the same time, recent studies prove that this assumption ignores the impact of environmental concerns associated with digitalization. Specifically, Bieser & Hilty (2018) note that information and communication technologies produce some environmental impacts that are not directly related to them. At that, the mentioned environmental impacts occur due to the use of energy. In more detail, the growth of data centers increases electricity usage. This fact is confirmed by Hilty & Aebischer (2015). Data centers are among those sectors that contribute greatly to energy consumption and carbon dioxide emissions, according to the International Energy Agency (2023). Additionally, Forti et al. (2020) state that digitalization increases electronic waste generation.

2. Artificial Intelligence Is Always Sustainable

Artificial intelligence has been seen as a technology that can be used to optimize the use of resources and make operations more efficient. George et al. (2021) posit that digital technologies, including artificial intelligence, can contribute to sustainability through improved efficiency and intelligent decision-making.

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Nevertheless, Brynjolfsson and McAfee (2017) indicate that the processing involved in running an AI model consumes energy, which implies higher energy use. In addition, Acemoglu and Restrepo (2020) suggest that there are various impacts on the economy and society associated with the adoption of automation, and such effects may conflict with the objectives of sustainability. Similarly, OECD (2021) indicates that advancements in technologies lead to increased energy demands.

3. E-commerce Is More Environmentally Sustainable than Traditional Retail

While e-commerce is seen as an environmentally sustainable choice because of lower physical infrastructural demands, research provides a more nuanced picture. As pointed out by UNCTAD (2021), the growing popularity of e-commerce increases waste generated by packages and increases emissions during deliveries. Also, last-mile delivery, which is a crucial factor influencing urban CO2 emissions, is underlined by the World Economic Forum (2022). Moreover, Deloitte (2023) shows that increasing pressure for faster delivery adds to the negative environmental impact caused by e-commerce. Finally, according to Loiseau et al. (2016), consumption behavior induced by digital platforms may lead to higher resource consumption levels.

4. Digital Transformation Always Results in Sustainable Development

Digital transformation has been taken for granted as an effective measure toward sustainable development due to increased efficiency and better management. Nevertheless, such an understanding is too simplified. According to Melville (2010), even though information systems can promote environmental sustainability, it is important to remember how such information systems are managed. In addition, the UN (2023) notes that any sustainability should include efforts aimed at aligning technologies to meet the requirements of both environment and society. The World Bank (2022) underlines the same idea by arguing that if there are no mechanisms of governance, digital development may harm the environment and society.

FINDINGS OF THE STUDY

Based on the results of the analysis of secondary data about digital transformation and sustainability, the following conclusions can be drawn:

1. Digital Transformation Does Not Guarantee Sustainability

The results of the study indicate that digital transformation does not imply sustainability. On the one hand, it is efficient and uses fewer physical resources; however, on the other hand, digital technologies require higher energy expenses. Therefore, it can be assumed that sustainability needs to be purposefully achieved through the use of digital solutions.

2. Environmental Consequences are Underestimated

It can be concluded that there are many hidden environmental costs of digitalization. In particular, carbon dioxide emissions and e-waste become the significant environmental challenges caused by digital technologies.

3. Economic Benefits of Digital Transformation

Another conclusion made based on the analyzed secondary sources is that digital technologies have a positive impact on economic development since they foster innovation and increase productivity.

4. Persistence of the Digital Divide

Despite the progress that has been made, digital technology access is not equal across geographical locations and socioeconomic status, causing a disparity that is a major hindrance to inclusive growth and exacerbating inequality, especially in emerging economies.

5. Double-Edged Nature of Digital Transformation

In light of the findings, digital transformation is found to be beneficial as well as detrimental for the future due to both positive effects and potential negative consequences.

DISCUSSIONS

It can be seen from the above-discussed findings that there are many complexities involved in digital transformation and sustainability and one needs to understand the relationship between both concepts in relative terms. Although digital technology has been a great facilitator of economic progress and efficiency, it also has serious environmental and social concerns that should not be overlooked. The analysis of these results suggests that there is a clear disconnect between the apparent advantages of digitalization and its real influence, thus underpinning the concept of the sustainability paradox.

Economic sustainability refers to the process of economic development that contributes to improving overall living conditions without deteriorating natural resources for future generations. From an economic point of view, digital transformation has been found to be a powerful instrument for driving productivity, innovation,

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and financial inclusion. The spread of digitalization in business has led to scaling up operations and expanding the target markets of enterprises. This notion corroborates the current literature that states that digital technologies are key enablers of economic sustainability.

The environmental side of digital transformation is more important. While digitalization leads to reduced dependency on natural resources, it increases the dependence on energy-demanding facilities like data centers and cloud servers. With the rapid increase in digital services, there has been an increase in power usage and carbon footprint. Another environmental challenge in the age of digital transformation is the rapid obsolescence of technological devices leading to generation of electronic waste (e-waste). Thus, the discussed findings demonstrate the double-edged nature of digitalization in relation to sustainability.

Socially, digital transformation has provided access to digital services in various spheres such as education, health care, and finance. In particular, people can now use computers and the internet to receive education, conduct online medical consultations, and carry out financial transactions. Nevertheless, because of digital divides, digital services are not available to all members of society. As a result, it is imperative to ensure access to digital technologies for everybody.In general, as seen from the above-discussion, digital transformation is a phenomenon with potential advantages and disadvantages. Digitalization cannot be sustainable unless there will be proper management and regulation of technologies.

CONCLUSION

This research study analyzed the link between digital transformation and sustainability based on the secondary analysis method. The results of the work reveal that although digitalization made a great contribution to the growth of economies, innovations, and accessibility, its effect on sustainability is a much more complicated issue than previously thought. The myth that digitalization is sustainable can be debunked based on the facts about the increased energy use and carbon emissions, not to mention the increasing problem of e-waste. On the other hand, the role of digitalization in increasing financial inclusion and access to services shows its potential contribution to sustainable development.

Nevertheless, this research shows that digital transformation is a two-sided concept that poses both threats and benefits for sustainability. Although it increases efficiency and connectivity, digital transformation also creates more environmental challenges and social inequalities due to the emergence of the digital divide. Thus, sustainability in the age of digital transformation cannot occur automatically; rather, it should be carefully planned and achieved by integrating green technology and innovation with a holistic approach to policy development.

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A STUDY ON STUDENT DEPENDENCY ON GENERATIVE AI: A BOON OR A THREAT TO CRITICAL THINKING

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ABSTRACT
The quick emergence and wide use of Generative Artificial Intelligence (GenAI) technology have made significant changes to the contemporary higher education environment. The use of multiple AI-based applications by the increasing number of students for different educational purposes, including writing papers, solving problems, academic research, and decision-making, has become a trend. Many opportunities, such as cognitive scaffolding, tailored learning pathway, and immediate learning feedback, make these applications beneficial for the development of learners' competencies. However, alongside the identified advantages, it becomes apparent that there is a range of concerns regarding the negative implications of growing students' reliance on the technology for critical thinking development in college settings. Therefore, the purpose of the paper is to explore the existing literature on the subject and present the analysis of the potential opportunities and challenges associated with students' dependence on Generative AI applications concerning their critical thinking development in higher education institutions. From the synthesis of peer-reviewed publications, institutional policy reports, and conceptual articles, the research identifies the pros and cons of GenAI use in education and demonstrates how GenAI technologies might be viewed as a useful aid in the learning process. However, excessive and unmanaged use of AI could lead to superficial learning, less analysis, a lack of creativity, and ethical issues. Therefore, this paper recommends that a balanced utilization of AI and improved AI knowledge can help promote critical thinking skills within higher education institutions.

Keywords: *Generative Artificial Intelligence, Student Dependency, Critical Thinking, Higher Education.*

1. INTRODUCTION
The development of Generative Artificial Intelligence (GenAI) is considered one of the most disruptive technologies in current higher education practice. The latest developments in LLMs have facilitated the operation of systems such as ChatGPT, Google Bard, Microsoft Copilot, and others, which can produce coherent text, solve complex problems, synthesize scientific literature, and give conceptual explanations in seconds. This technology has quickly become part of students' academic routine, providing a popular tool for writing essays, researching topics, solving problems, and saving time (Kasneci et al., 2023)Hence, GenAI technology is revolutionizing the interaction of students with knowledge and their educational processes (Dwivedi et al., 2023). Educators and policymakers also admit that there are several benefits associated with using Generative AI for educational purposes. If applied correctly, this type of artificial intelligence can contribute to making education more efficient, personalized, and involving while providing students with immediate feedback and access to knowledge (Kasneci et al., 2023). For example, international bodies like UNESCO emphasize the transformational impact of GenAI in the sphere of education; at the same time, they stress the need to apply it in an ethical, human-centric, and pedagogical manner (UNESCO, 2023). Critical thinking has been viewed by the world of higher education as one of its most significant educational outcomes. It refers to high-order thinking skills such as analyzing, evaluating, synthesizing, inferring, and reflecting, which are vital for independent learning, sound decision-making, and problem-solving. With the growing use of Generative AI, there has emerged a fear that students might gradually be relying on AI more than needed for their cognitive skills, thus leading to deterioration of these important abilities (OECD, 2026). Policymaking voices are expressing the concern that AI-assisted writing might foster a "false sense of mastery," whereby students' lack of conceptual knowledge is disguised behind smooth and well-written responses (OECD, 2026).

The existing body of literature reveals a controversial standpoint. One side of the debate claims that GenAI might be used as a tool for promoting critical thinking due to its capacity to act as a cognitive scaffold for facilitating idea exploration, concept clarification, and reflection on one’s knowledge in case of responsible use (Kasneci et al., 2023)On the other hand, another group of scholars warns that excessive reliance on GenAI could result in shallow learning, lack of creativity, and reduced effort (Dwivedi et al., 2023)Such opposite views reflect one of the key dilemmas in the modern educational context.

Considering all the aforementioned aspects of the topic under discussion, it seems appropriate to highlight a key research question that needs to be addressed. Specifically, can one consider the dependence of students on Generative AI as a positive aspect facilitating the enhancement of efficiency and critical thinking skills or

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rather a risk for developing such competencies? The purpose of this paper is to try finding the answer to the posed question.

2. OBJECTIVES OF THE STUDY

The main goals of this conference paper are as follows:

1. To investigate the phenomenon of students' dependence on Generative AI technology within higher education.
2. To assess the beneficial impacts of Generative AI technology on students' learning processes and cognitive skill development.
3. To highlight possible threats of using Generative AI technology in the learning process.
4. To consider ethical issues concerning dependence on Generative AI technology.
5. To suggest ways to integrate Generative AI technology in an appropriate manner.

3. RESEARCH METHODOLOGY

The current research employs a secondary research design that makes use of previous research literature only to evaluate the dependency of students on Generative Artificial Intelligence and the effect on their critical thinking abilities. Journals that were reviewed for the study, conference papers from educational technology conferences, policy papers of international organizations, and books served as sources for information gathering. In the process of review and evaluation of the current literature in the field, the chosen material was subjected to thematic analysis. The studies reviewed were grouped according to different topics, including benefits of Generative AI in the educational context, factors that may pose potential risks in terms of dependency on students' part, influence on critical thinking abilities, ethics, pedagogical aspect, and balanced use of AI tools.

4. CONCEPTUAL FRAMEWORK

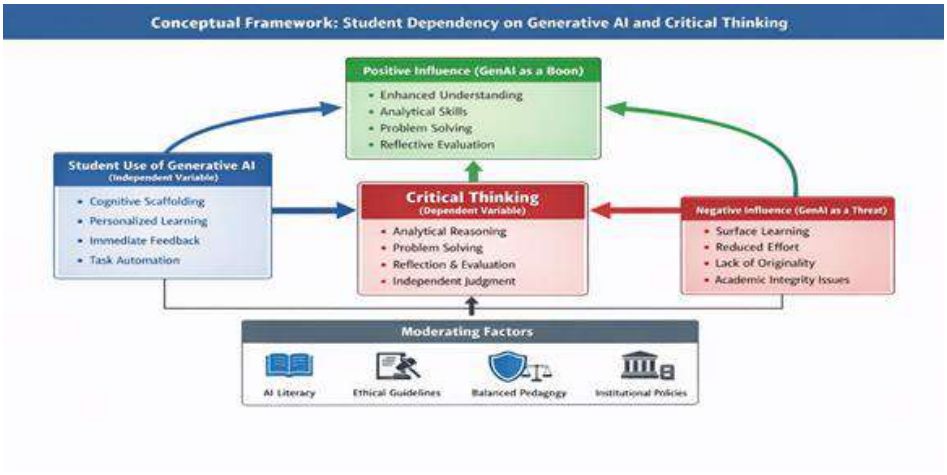


Figure 1

Conceptual Framework for the Study

The conceptual framework for the current study demonstrates the interaction between the use of Generative AI by students and their critical thinking skills (see Figure 1).

Generative AI usage determinants that include cognitive scaffolding, personalization, timely feedback, and automation can have positive effects on the outcomes of critical thinking, fostering analysis, problem-solving abilities, and reflective evaluation. Nevertheless, negative consequences arise from dependency determinants that involve superficial learning, cognitive laziness, absence of creativity, and academic dishonesty.

Moderating variables like AI literacy, ethical principles, pedagogical balance, and institutional regulations help establish whether the technology is a blessing or a curse.

5. REVIEW OF LITERATURE

5. Generative AI as a Boon to Critical Thinking

Many previous studies focus on the capability of Generative AI to increase learning and reasoning if applied wisely.

5.1 Cognitive Scaffolding and Conceptual Clarity

The literature reveals that generative AI boosts cognitive scaffolding through provision of structured explanation and personalized assistance.. (Kasneci et al., 2023) argue that generative AI can be used to create learning material,while (Francis et al., 2025) suggest the use of such tools for personalized learning experiences. Altogether, it can be seen that GenAI helps to simplify complex concepts, but critical analysis is crucial.

5.2 Self Directed and Personalized Learning

Generation AI facilitates personalized learning and allows students to repeat the process, explore different viewpoints. According to (Kasneci et al., 2023)GenAI can help with self-directed learning. Also, positive results in learning outcomes have been found by (Wu et al., 2026) Furthermore, according to (Gyekye, 2025) GenAI increases reflection and metacognition if used with proper guidance. However, excessive use leads to superficial learning.

5.3 Instant Feedback and Reflection

Generative AI offers immediate feedback that enables learners to recognize mistakes and improve reasoning. As per (Dai et al., 2026) artificial intelligence feedback improves learning outcomes, enhances the quality of reflections, and increases self-confidence. Also, (Zhan & Yan, 2025)state that interaction with feedback improves cognitive skills. However, proper evaluative judgment should be exercised in order for it to be done effectively.

5.4 Increased Engagement and Inquiry-Based Approach

Generative AI creates opportunities for inquiry-based learning and analysis through critical use of AI tools. The authors state that artificial intelligence improves engagement of students in the learning process, as well as fosters critical thinking and fact-checking (Kasneci et al., 2023). This view is supported by (Wang & Zhang, 2026).

6. GENERATIVE AI AS A BARRIER TO CRITICAL THINKING

While it is effective, literature also identifies considerable threats that arise from excessive reliance on Generative AI among students.

6.1 Less Cognitively Demanding

The cognitive demotion arises because Generative AI could lower the cognitive demand, compelling students to rely on pre-packaged responses rather than exercising their cognitive skills. (Gerlich, 2025)explains that the unrestricted application of AI results in cognitive offloading without enhancing the quality of reasoning skills. Similarly, (Wang & Zhang, 2026) explain that the efficiency-based application of AI can hinder the cognitive efforts required to develop intellect.

6.2 Superficial Learning

Generative AI can promote superficial learning, which occurs when learners emphasize the completion of tasks rather than comprehending the material. (Zhan & Yan, 2025)explain that students' involvement with AI-generated feedback is usually superficial in nature. In line with this observation, (Gerlich, 2025) asserts that unrestricted usage of AI results in cognitive offloading and superficial engagement.

6.3 Loss of Originality and Creativity

Over-dependence on the capabilities of generative AI can lead to a loss of originality and creativity in the academic setting. (Slimi, 2026) notes that while the technology boosts efficiency, it can negatively impact originality and critical thinking abilities. In a similar vein, (Francis et al., 2025)argue that an unregulated use of AI can lead to ethical breaches, including the lack of authenticity in student writing.

6.4 Academic Integrity and Ethics

The application of generative AI presents serious implications regarding academic integrity and ethics. (Yusuf et al., 2024)argue for potential risks like academic misconduct and ethical considerations.(Bittle & El-Gayar, 2025) also acknowledge the pros and cons related to the adoption of AI technologies. UNESCO stresses the significance of regulation, privacy, and preparedness within institutions.

7. ETHICAL AND PEDAGOGICAL IMPLICATIONS

AI technology is rife with ethical considerations, but it requires a change in pedagogical approaches. These considerations are associated with algorithmic biases, differential access, non-accountability, and data privacy threats, all of which can worsen the educational disparities. According to UNESCO, some of the ethical considerations are regulatory gaps, privacy rights, and the digital divide, among others. For example, (García-López & Trujillo-Liñán, 2025) point out the ethical considerations of algorithmic bias, inequities, and privacy

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risks and the necessity for regulation. Meanwhile, (Francis et al., 2025) indicate that bias and unequal access pose significant ethical dilemmas, calling for policy interventions and increased digital literacy. To mitigate these problems, researchers emphasize the need for pedagogical innovation, whereby the process of assessment should be transformed to emphasize critical thinking, creativity, and academic honesty. Accordingly, Francis, Jones & Smith argue for the implementation of transparent policies and new forms of assessments, while (Kasneci et al., 2023) stress the need for pedagogically informed uses of AI technology.

8. FINDING

From this secondary research, the effects of Generative Artificial Intelligence on critical thinking in higher education have been observed to have negative and positive effects. If applied appropriately, Generative AI is beneficial for assisting learners in acquiring knowledge and skills through cognitive scaffolding, personalized instruction, and feedback. This might facilitate the process of concept development, analysis, and reflection. However, over-reliance on Generative AI technology poses considerable threats.

Over-reliance on Generative AI technology causes learners to adopt superficial learning strategies, cognitive depletion, lack of creativity, and issues with academic integrity. Some of the moderating variables that may influence the effects of Generative AI on critical thinking in higher education based on the study findings include student AI literacy, ethical utilization of artificial intelligence, pedagogical practices, and policies.

9. DISCUSSION

The insights drawn from the reviewed literature indicate that the effect of Generative AI on critical thinking depends on certain conditions. This technology can be seen as a blessing when utilized as a tool of inquiry and reflection in the process of learning. However, Generative AI becomes dangerous when it replaces the cognitive activity and encourages the mere consumption of information.

The importance of such moderating variables as AI literacy and educational approaches and practices cannot be underestimated since they define how students can effectively use AI-based tools for meaningful purposes. The point is that the task is not in prohibiting the use of this technology, but in promoting its ethical application.

10.CONCLUSION

In general, the current secondary literature review shows that the use of Generative Artificial Intelligence by students in the critical thinking skills development process has its own strengths and weaknesses. In terms of strengths, Generative AI can facilitate the process of learning and encourage more cognitive activity. In terms of weaknesses, Generative AI brings about threats related to the tendency of students toward surface learning.

In any case, it seems that the major challenge of the coming period is the proper combination of the use of Generative AI and cognitive processes. Educational institutions have to make sure that students are technologically competent and promote innovative educational approaches.

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EXAMINING THE RELATIONSHIP BETWEEN SUSTAINABILITY MARKETING AUTHENTICITY, CONSUMER TRUST, AND PURCHASE BEHAVIOR AMONG INDIAN YOUTH

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ABSTRACT
The growing emphasis on sustainability has encouraged organizations to incorporate environmental and social commitments into their marketing strategies. However, increasing concerns about greenwashing have made consumers more skeptical of sustainability claims, highlighting the importance of authenticity in sustainability communication. While prior studies have examined green marketing practices and their influence on consumer behavior, limited attention has been given to the role of perceived authenticity in shaping consumer trust and purchase behavior, particularly among Indian youth. Addressing this gap, the present study investigates the influence of perceived authenticity in sustainability marketing on consumer trust and purchase behavior among Indian youth. The study adopts a descriptive research approach using primary and secondary data" combining secondary data from existing literature with primary data collected through a survey of young consumers. The findings aim to provide insights into how authentic sustainability communication can strengthen consumer trust and encourage responsible purchasing decisions. The study contributes to sustainability marketing literature by highlighting authenticity as a critical factor influencing consumer behavior in emerging markets.

Keywords: *Sustainability marketing; perceived authenticity; consumer trust; purchase behavior; Indian youth.*

INTRODUCTION
In recent years, sustainability has become an increasingly important consideration for both businesses and consumers. Growing awareness of environmental issues such as climate change, resource depletion, and pollution has encouraged organizations to integrate environmental and social responsibility into their marketing strategies. As a result, many companies now promote eco-friendly products, responsible sourcing practices, and environmentally conscious initiatives as part of their brand communication. These efforts are not only intended to address societal concerns but also to strengthen brand reputation and attract consumers who are becoming more mindful of the environmental impact of their purchasing decisions.

At the same time, the growing use of sustainability claims in marketing has also raised questions about the credibility of such messages. In many cases, companies highlight environmental benefits in their communication while the actual impact of their practices remains unclear.

This phenomenon, commonly referred to as greenwashing, has contributed to increasing skepticism among consumers. As consumers become more informed and critical, they often question whether brands are genuinely committed to sustainability or simply using environmental messaging as a marketing strategy. In this context, the perceived authenticity of sustainability communication becomes particularly important, as it influences how consumers interpret and respond to such claims.

Although previous research has explored sustainability marketing through areas such as green advertising, eco-labels, and corporate social responsibility, relatively limited attention has been given to how consumers evaluate the authenticity of sustainability claims. Furthermore, a large portion of existing research focuses on general consumer populations or Western markets, leaving emerging markets such as India comparatively underexplored. This is especially important in the case of Indian youth, who represent a rapidly growing and environmentally aware consumer segment. Their perceptions of authenticity and trust in sustainability communication may significantly influence how they respond to sustainability marketing initiatives.

Addressing these gaps, the present study examines how perceived authenticity in sustainability marketing influences consumer trust and purchase behavior among Indian youth. Specifically, the objectives of this study are: (1) to examine the influence of perceived authenticity in sustainability marketing on consumer trust; (2) to analyze the relationship between consumer trust and purchase behavior; and (3) to investigate the overall impact of perceived authenticity on purchase behavior among Indian youth. By exploring these relationships, the study aims to contribute to existing knowledge on sustainability marketing and provide insights into how authentic sustainability communication can strengthen consumer trust and encourage more responsible consumption behavior.

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LITERATURE REVIEW

Tanya Rastogi, Bhawna Agarwal, and Gurram Gopal (2024) found that sustainable marketing positively influences brand image and customer loyalty, with brand image acting as a mediating factor. This shows that sustainability strengthens long-term customer relationships.

Sweta Leena Hota (2024) highlighted that sustainable marketing influences consumer behavior by increasing awareness, affecting purchasing decisions, and building brand loyalty. The study also emphasizes the role of ethical practices in shaping positive consumer perceptions.

Dr. B Venu Kumar (2024) examined the impact of sustainable marketing on customer engagement and brand connection, finding that it enhances emotional and behavioral engagement, leading to stronger brand loyalty. The study also identifies authenticity and transparency as key drivers of trust.

Neha Nag and Arpit Shailesh (2025) found that greenwashing increases consumer skepticism and reduces brand trust, negatively affecting purchase intention. The study suggests that transparency and genuine sustainability practices are essential to build trust and loyalty.

Research Gap

While sustainability marketing has received increasing attention in recent academic research, important gaps remain in understanding how consumers evaluate the authenticity of sustainability communication. Although previous studies have examined the influence of sustainability marketing on consumer attitudes and purchasing behavior, much of the prior research has focused on general green marketing strategies, eco-labels, and corporate social responsibility initiatives, while comparatively limited attention has been directed toward the evaluation of authenticity in sustainability communication. In the context of increasing concerns regarding greenwashing, the perception of authenticity in sustainability marketing messages has become an important factor influencing consumer responses. Furthermore, a considerable proportion of existing research has been conducted in Western contexts, leaving emerging markets such as India relatively underexplored. This gap is particularly significant as Indian youth represent a rapidly growing and environmentally conscious consumer segment whose perceptions of authenticity and trust may substantially influence their purchasing decisions. Consequently, a deeper understanding of how perceived authenticity in sustainability marketing shapes consumer trust and purchase behavior among Indian youth is necessary to advance both academic research and practical marketing strategies.

RESEARCH OBJECTIVES

The primary objective of this study is to examine how **perceived authenticity and transparency in sustainability communication** influence consumer trust and purchase intention. The study also aims to analyze the impact of **consumer skepticism toward greenwashing** on trust levels. Additionally, it seeks to understand the relationship between **consumer trust and purchase behavior**, particularly within the context of Indian youth. Through this, the research intends to provide insights into how authentic sustainability practices can shape consumer perceptions and decision-making.

HYPOTHESES DEVELOPMENT

Based on the identified research gap and the stated research objectives, the present study proposes the following hypotheses to examine the relationship between sustainability communication, consumer trust, and purchase intention:

- **H1:** Perceived authenticity and transparency of sustainability communication positively influence consumer trust.
- **H2:** Consumer skepticism toward greenwashing negatively affects consumer trust.
- **H3:** Consumer trust positively influences purchase intention.

RESEARCH METHODOLOGY

This study adopts a descriptive research design to examine the impact of sustainability marketing on consumer trust and the role of perceived greenwashing in shaping consumer skepticism. The objective is to understand whether sustainability-oriented marketing communication strengthens consumer trust or generates skepticism when environmental claims are perceived as exaggerated or misleading.

The research primarily relies on secondary data (approximately 90%), collected from peer-reviewed journals, academic publications, industry reports, sustainability disclosures, and credible online sources related to sustainability marketing, greenwashing, consumer behavior, and brand credibility. These sources were

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reviewed to build the theoretical foundation of the study and to identify the research gap concerning the relationship between sustainability marketing communication and consumer skepticism.

To complement the literature analysis, primary data (approximately 10%) were collected through a structured questionnaire survey targeting college students and young consumers, a group increasingly aware of environmental issues and sustainability-related brand communication. A convenience sampling method was adopted due to accessibility and time constraints. The questionnaire consisted of close-ended statements measured using a five-point Likert scale ranging from *Strongly Disagree* to *Strongly Agree*. The statements were designed to assess three key variables: awareness of sustainability marketing, perception of greenwashing, and consumer trust or skepticism toward environmentally positioned brands. Sample statements included: "I pay attention to eco-friendly claims made by brands," "Brands often exaggerate their environmental initiatives for marketing purposes," and "Transparent sustainability communication increases my trust in a brand." The inclusion of limited primary data alongside extensive secondary literature allows the study to support theoretical insights with contemporary consumer perspectives.

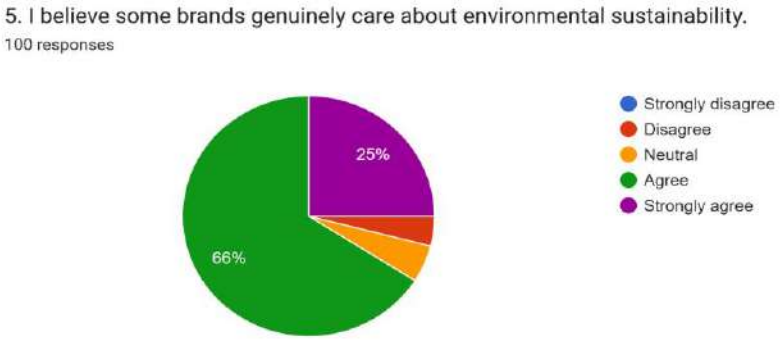
The collected responses were analyzed using descriptive statistical techniques, including percentage distribution and response pattern analysis, to identify trends in consumer perceptions and attitudes toward sustainability marketing practices.

CONCEPTUAL FRAMEWORK

Drawing upon insights from existing literature, this study proposes a conceptual framework that examines the relationship between perceived authenticity in sustainability marketing, consumer trust, and purchase behavior. The framework suggests that the perception of authenticity in sustainability communication can contribute to the development of consumer trust in a brand. Increased levels of consumer trust may subsequently influence purchasing behavior, encouraging consumers to support brands that demonstrate credible and authentic sustainability practices. Accordingly, perceived authenticity in sustainability marketing is expected to play a significant role in shaping both consumer trust and purchase behavior among Indian youth.

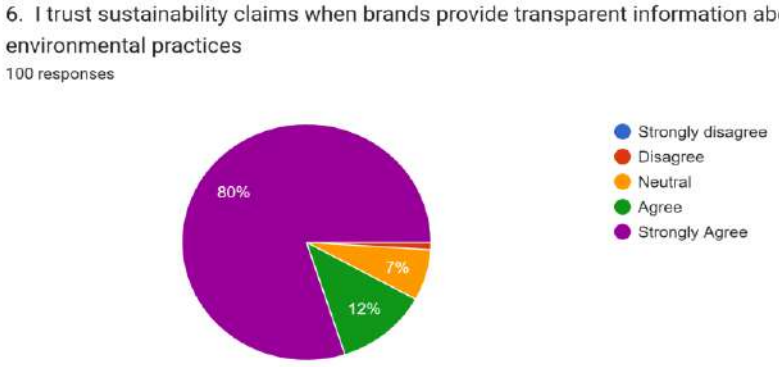
DATA ANALYSIS & INTERPRETATION.

The findings of the study provide valuable insights into how perceived authenticity in sustainability marketing influences consumer trust and purchase behavior among Indian youth. The analysis indicates that respondents demonstrate a generally positive orientation toward sustainability marketing, while also exhibiting a degree of skepticism toward brand claims.

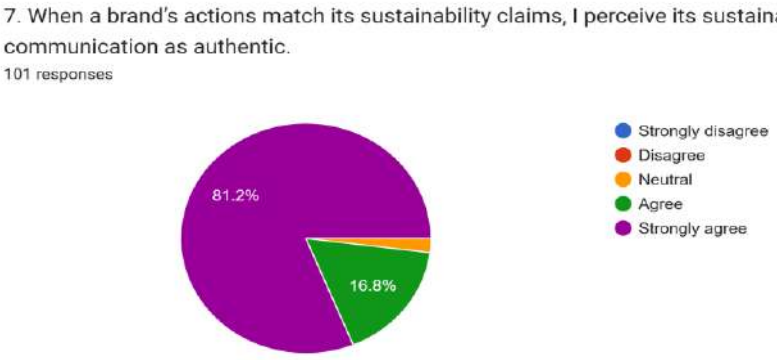


66% of respondents **agreed 25**% **strongly agreed. Only** 9% showed neutral or negative responses. Most respondents believe that **some brands genuinely care about sustainability**, indicating a generally positive perception. However, the presence of neutral and disagreeing responses reflects **underlying skepticism**, suggesting that not all brands are fully trusted.

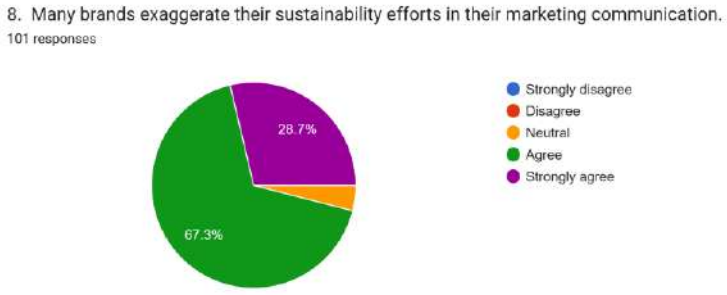
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A large proportion of respondents 80% strongly agreed and 12% agreed indicated that they trust sustainability claims when brands provide transparent information about their environmental practices. This demonstrates that transparency plays a crucial role in building consumer trust. Consumers are more likely to believe and accept sustainability claims when they are supported by clear and verifiable information.

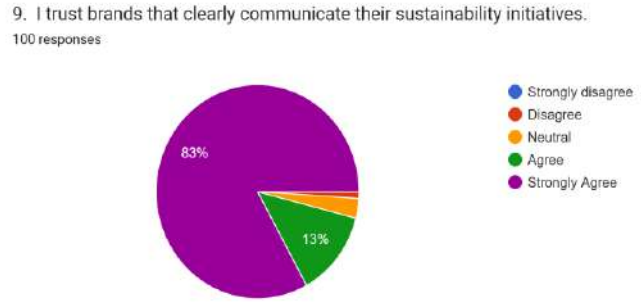


Most respondents (81%) agreed that when a brand's actions align with its sustainability claims, it is perceived as authentic.

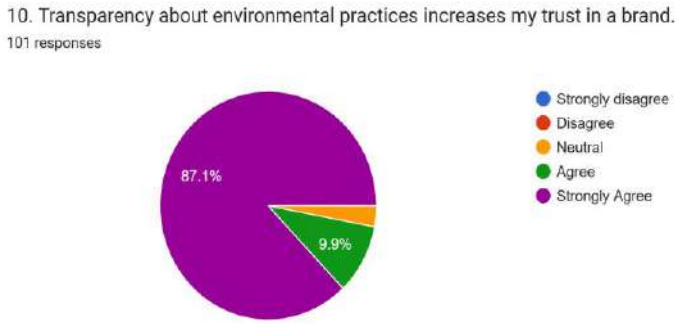


This highlights that consistency between communication and actual practices is a key determinant of perceived authenticity. At the same time, around 67% of respondents agreed that many brands exaggerate their sustainability efforts, indicating a significant level of skepticism and concern regarding greenwashing.

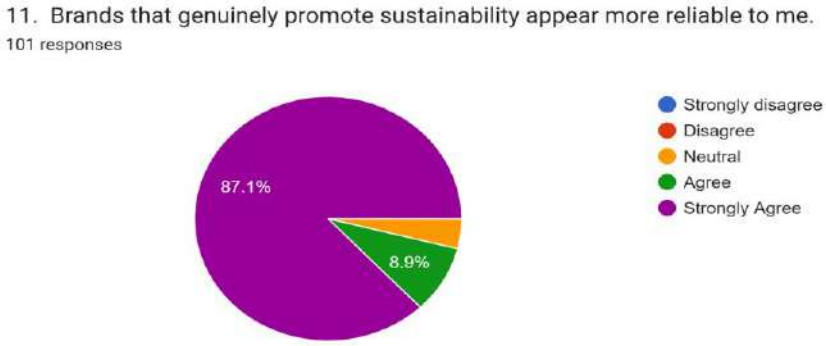
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The data shows that 83% of respondents strongly agreed and 13% agreed that they trust brands that clearly communicate their sustainability initiatives. This highlights that effective and clear communication significantly enhances consumer trust. It suggests that not only the actions but also the way sustainability efforts are communicated influences consumer perception.

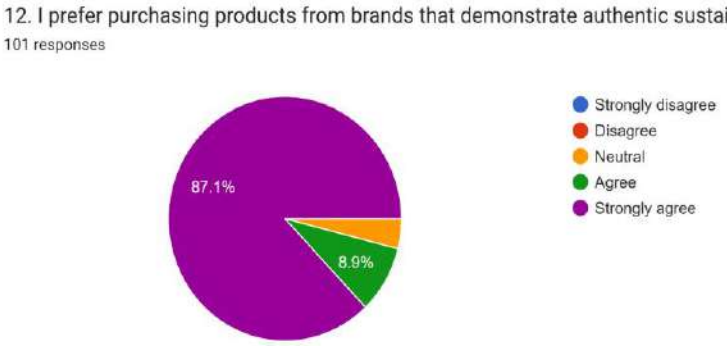


In terms of trust, 87% of respondents strongly agreed that transparency about environmental practices increases their trust in a brand. Similarly,

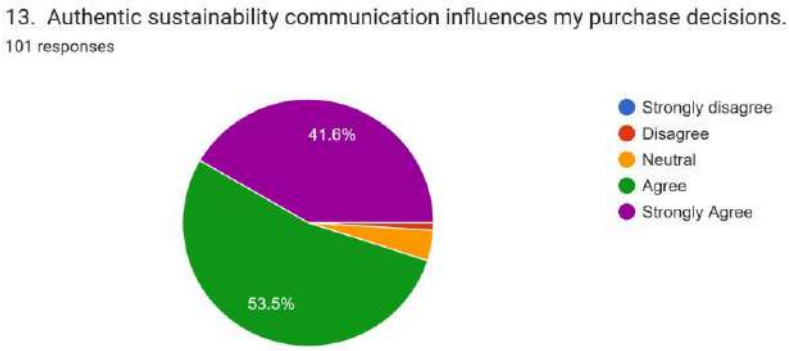


Approximately 87% of respondents indicated that brands genuinely promoting sustainability are perceived as more reliable. These findings suggest that transparency and authenticity play a crucial role in building consumer trust in sustainability marketing.

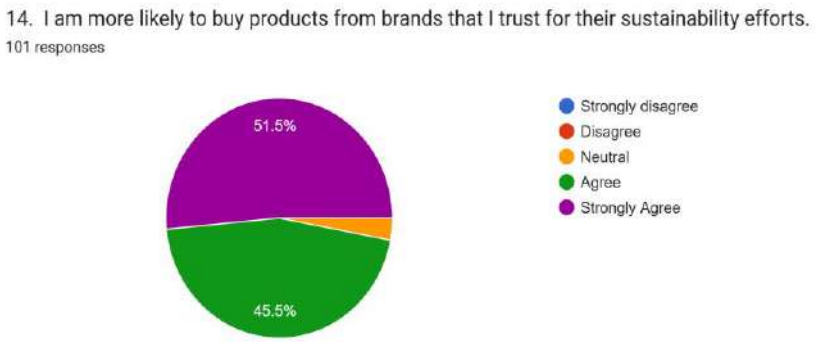
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An overwhelming majority of respondents (87.1% strongly agreed and 8.9% agreed) expressed a preference for purchasing products from brands that demonstrate authentic sustainability practices. This indicates that authenticity is a key factor influencing consumer preference and brand selection, making it an important strategic element for businesses.



The results show that 53.5% of respondents agreed and 41.6% strongly agreed that authentic sustainability communication influences their purchase decisions. This suggests that sustainability messaging has a direct and meaningful impact on consumer buying behavior, reinforcing its importance in modern marketing strategies.



With respect to purchase behavior, about 51% of respondents strongly agreed that they are more likely to purchase products from brands they trust for their sustainability efforts. This demonstrates that trust significantly influences consumer purchasing decisions.

The findings indicate a strong relationship between perceived authenticity in sustainability marketing, consumer trust, and purchase behavior. While consumers show high awareness of sustainability initiatives, their trust depends largely on the transparency and credibility of brand claims. Brands that communicate their sustainability efforts clearly and genuinely are more likely to gain consumer trust, which in turn influences their purchase preferences and decisions. Thus, authenticity emerges as a key factor in making sustainability marketing effective and impactful.

HYPOTHESIS TESTING

H1: Perceived authenticity in sustainability marketing has a positive impact on consumer trust. The findings support this hypothesis, as a significant majority of respondents expressed higher trust in brands that provide transparent and clearly communicated sustainability information. The strong agreement levels indicate that authenticity and transparency play a crucial role in building consumer trust. Therefore, H1 is **accepted.**

H2: Consumer trust in sustainability claims positively influences purchase behavior. The analysis shows that most respondents prefer purchasing from brands that demonstrate authentic sustainability practices and are influenced by such communication in their buying decisions. This suggests that increased trust leads to a higher likelihood of purchase. Hence, H2 is **accepted**.

H3: Perceived authenticity in sustainability marketing directly influences consumer purchase behavior. The results reveal that a large proportion of respondents agree that authentic sustainability communication impacts their purchase decisions. This indicates a direct relationship between authenticity and buying behavior. Therefore, H3 is **accepted**.

LIMITATIONS OF THE STUDY

While this study provides meaningful insights into the relationship between perceived authenticity in sustainability marketing, consumer trust, and purchase behavior, certain limitations should be acknowledged. The sample size, although adequate for the scope of this study, is relatively limited and focused on a specific group, which may affect the generalizability of the findings. Additionally, the study relies on self-reported responses, which may be influenced by individual perceptions or response bias. The use of predominantly secondary data, along with a smaller proportion of primary data, may also limit the depth of empirical analysis.

However, these limitations do not diminish the relevance of the findings; rather, they provide opportunities for future research to build upon this study by incorporating larger and more diverse samples, as well as applying advanced analytical techniques for deeper insights.

FUTURE SCOPE

This study provides valuable insights into the role of perceived authenticity in sustainability marketing; however, there are several areas for future research. Firstly, the study can be expanded by including a larger and more diverse sample to improve generalizability across different age groups, regions, and income levels. Secondly, future research can adopt a more balanced approach by incorporating primary data on a larger scale along with advanced statistical tools for deeper analysis. Additionally, researchers can explore the impact of sustainability marketing across different industries such as fashion, FMCG, and technology to identify sector-specific differences. Longitudinal studies may also be conducted to examine how consumer perceptions and trust evolve over time. Furthermore, future studies can investigate the role of digital media, influencer marketing, and greenwashing in shaping consumer attitudes toward sustainability.

CONCLUSION

The study establishes that sustainability communication plays a crucial role in shaping consumer trust and purchase behavior. However, its effectiveness is contingent upon the **perceived authenticity and transparency** of brand communication.

While consumers are increasingly aware of sustainability initiatives, they exhibit a critical and evaluative mindset, often questioning the credibility of such claims. This underscores the growing importance of trust as a mediating factor between sustainability communication and purchase intention. The findings confirm that authentic and transparent sustainability practices enhance consumer trust, whereas greenwashing undermines brand credibility. Consequently, organizations must prioritize **genuine, consistent, and verifiable sustainability efforts** to foster long-term consumer relationships and drive purchase decisions.

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GREEN MARKETING STRATEGIES IN THE INDIAN FMCG SECTOR: AN EMPIRICAL STUDY OF CONSUMER PERCEPTION AND GREEN WASHING AWARENESS IN KALYAN AND ULHASNAGAR CITIES

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ABSTRACT
The Fast-Moving Consumer Goods (FMCG) sector in India plays a crucial role in shaping consumption patterns and environmental impact due to its large-scale production and distribution. This study examines the adoption and effectiveness of green marketing strategies implemented by FMCG companies in India between 2020 and 2025. The research focuses on key strategic areas such as sustainable packaging, eco-friendly product formulation, and environmentally responsible promotional practices.

The study is based on both secondary data analysis and primary data collected from 99 respondents to understand consumer awareness, perception, and behavioural responses toward green marketing claims. The findings indicate a high level of consumer awareness regarding environmental issues and greenwashing practices; however, a noticeable gap exists between awareness and actual purchasing behaviour. Transparency, credible certifications, and detailed product information significantly influence consumer trust, while vague environmental claims lead to skepticism.

The study also identifies major challenges faced by firms, including cost constraints, lack of standardized labelling, and limited recycling infrastructure. It concludes that the effectiveness of green marketing strategies depends on authentic communication, consumer education, and regulatory support. The research provides practical recommendations for businesses and policymakers to enhance sustainability practices while maintaining competitiveness in the Indian FMCG sector.

Keywords: *Green Marketing, FMCG Sector, Consumer Perception, Greenwashing, Sustainable Packaging, Eco-friendly Products, Environmental Awareness, Brand Trust, Sustainability Strategies, Purchase Intention, Ethical Marketing.*

1. INTRODUCTION
The Indian FMCG sector is pivotal in daily consumption and waste generation. With rapid urbanisation, rising incomes and heightened environmental awareness, FMCG companies face pressure to reduce environmental footprints while maintaining affordability and scale. Green marketing — the design, promotion and delivery of products with reduced environmental impact — has moved from a niche positioning to a mainstream strategic consideration for large Indian FMCG firms (e.g., HUL, ITC, Dabur) and emerging challengers. However, transitioning product portfolios, packaging, and supply chains to sustainable forms presents operational, marketing and regulatory challenges in a price-sensitive market. This paper synthesises recent academic and industry evidence to map typical green marketing strategies, evaluate effectiveness, and provide recommendations tailored to Indian FMCG realities.

The Indian FMCG sector, valued at over USD 150 billion and growing steadily, plays a crucial role in shaping consumption patterns. Major companies such as Hindustan Unilever Limited (HUL), ITC Limited, Dabur India, Tata Consumer Products, and emerging sustainable brands are increasingly embedding environmental considerations into their core strategies. For instance, several firms have committed to reducing virgin plastic usage, achieving carbon neutrality targets, adopting recyclable packaging formats, and promoting water stewardship initiatives. These efforts align with national initiatives such as the Swachh Bharat Mission, the Plastic Waste Management Rules, and Extended Producer Responsibility (EPR) guidelines.

Furthermore, digital transformation has amplified the visibility of green marketing campaigns. Social media platforms and influencer marketing have become powerful tools to communicate sustainability narratives. However, increased transparency also exposes firms to public scrutiny, making authenticity and measurable impact essential for maintaining credibility.

Therefore, this research seeks to provide a comprehensive understanding of how green marketing strategies are being conceptualised, implemented, and perceived in the Indian FMCG industry between 2020 and 2025. The study synthesises recent academic research and industry evidence to evaluate strategic approaches, identify effectiveness determinants, examine challenges, and propose actionable recommendations.

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By bridging theoretical insights with industry realities, this paper contributes to both academic discourse and managerial practice. It provides a structured understanding of sustainable marketing transformation in a rapidly growing emerging economy and offers a roadmap for organisations seeking to integrate environmental responsibility with competitive advantage.

2. OBJECTIVES

1. To review and categorise green marketing strategies used by Indian FMCG companies from 2020–2025.
2. To synthesise evidence on consumer responses and market outcomes of these strategies.
3. To identify key barriers (operational, financial, and perceptual) and risks (notably green washing).
4. To provide practical recommendations for firms and regulators to improve strategy effectiveness.

3. LITERATURE REVIEW

1. Van Hoang (2025), in SAGE Open, examined the determinants of green purchase intention in the FMCG sector using PLS-SEM and fsQCA approaches and found that environmental concern, perceived value, and brand trust significantly influence purchase intention. The study highlights that brand trust mediates the relationship between green marketing practices and consumer buying behaviour, emphasising the importance of authentic sustainability communication.
2. Kulkarni, Patil, and Ubale (2024), in the IOSR Journal of Business and Management, analysed sustainable packaging practices in the Indian FMCG industry and found that packaging innovation is the most visible and widely adopted green marketing strategy. Their study highlights that high implementation costs and inadequate recycling infrastructure remain major barriers to effective sustainability transformation.
3. Sharma (2024), in the International Journal of Environmental Sustainability and Human Welfare, investigated green marketing initiatives among leading FMCG firms in India and found increasing adoption of eco-labelling, sustainable sourcing, and renewable energy practices. The study highlights that consistent green initiatives enhance corporate image and long-term brand reputation.
4. Jog (2020), in the Journal of Management and Research, examined consumer understanding of green washing in the Indian market and found that limited awareness of misleading environmental claims negatively affects consumer trust. The study highlights that unclear sustainability claims reduce brand loyalty and necessitate standardized regulatory frameworks.
5. Testa et al. (2021), in the Journal of Cleaner Production, explored the impact of environmental claims on consumer skepticism and found that vague or exaggerated green claims increase skepticism, while third-party certifications significantly enhance credibility. Their study highlights the importance of transparency and verification in green marketing communication.
6. Dutta and Banerjee (2022), in the Asia-Pacific Journal of Marketing and Logistics, analysed the relationship between green marketing strategies and firm performance in emerging markets and found a positive association between sustainability initiatives and long-term profitability. The study highlights that strategic alignment between environmental objectives and corporate vision strengthens competitive advantage.
7. Kapoor and Dwivedi (2023), in the Journal of Retailing and Consumer Services, examined the effectiveness of social media-based green campaigns and found that influencer credibility and message transparency significantly improve consumer engagement. Their study highlights that measurable sustainability evidence increases trust and digital interaction.
8. Singh and Verma (2021), in Sustainability (MDPI), investigated the influence of environmental awareness on green purchase intention in India and found that environmental knowledge positively affects buying intention. The study highlights that price sensitivity moderates this relationship, particularly in low-involvement FMCG categories.
9. Gupta and Kumar (2023), in Business Strategy and the Environment, explored ESG disclosure practices in emerging economies and found that transparent sustainability reporting enhances corporate reputation and investor confidence. The study highlights that ESG integration can function as a strategic marketing advantage.

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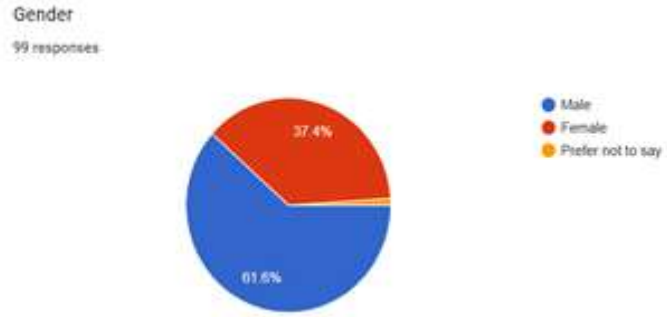
10. PwC India (2025), in its industry report Sustainable Packaging in the FMCG and Retail Sector, examined sustainability transitions in Indian FMCG companies and found that Extended Producer Responsibility (EPR) regulations are driving packaging innovation. The report highlights that collaborative efforts across the value chain are essential for achieving scalable environmental impact.

4. STATEMENT OF THE PROBLEM

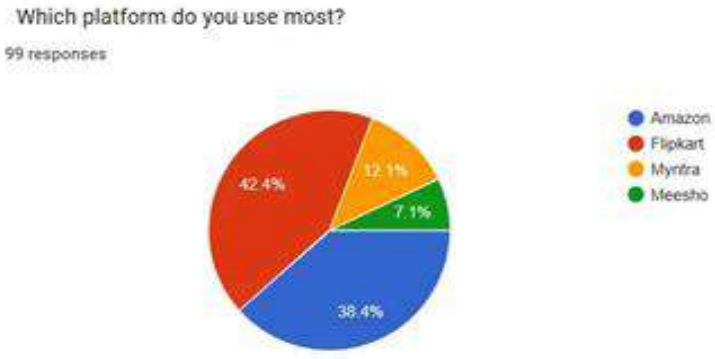
Although Indian FMCG firms are publicly adopting green marketing strategies, there is limited systematic evidence about (a) the actual effectiveness of those strategies in changing purchase behaviour at scale, (b) whether firm initiatives are being perceived as authentic or as green washing, and (c) how domestic innovations in sustainable materials can be integrated cost-effectively into mass FMCG supply chains. This paper addresses these gaps by synthesising recent evidence and deriving actionable recommendations for firms and regulators.

5. ANALYSIS OF DATA AND INTERPRETATION

1. Out of 99 respondents, the majority were male (61.6%), followed by female (37.4%), and a small fraction (1%) preferred not to disclose their gender. This indicates a slight gender imbalance, with males being more represented in the sample. Such distribution may influence perspectives on online purchasing behavior and environmental awareness.

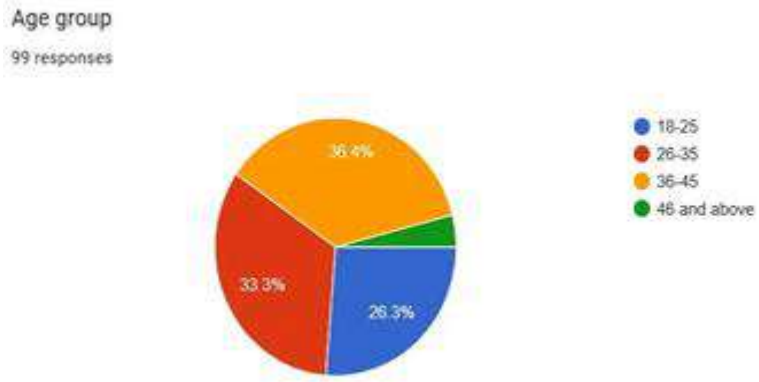


2. The survey captures a predominantly working-age adult population (26–45 years = 69.7%) — the most active online shopping demographic The 36–45 age group leads, suggesting mid-career professionals are the core respondents — likely with higher purchasing power and environmental awareness Youth (18–25) at 26.3% form a significant minority, relevant as digitally native consumers 46+ are severely underrepresented (~4%), limiting insights for older consumer behavior Overall, the sample is skewed toward millennials and Gen X shoppers

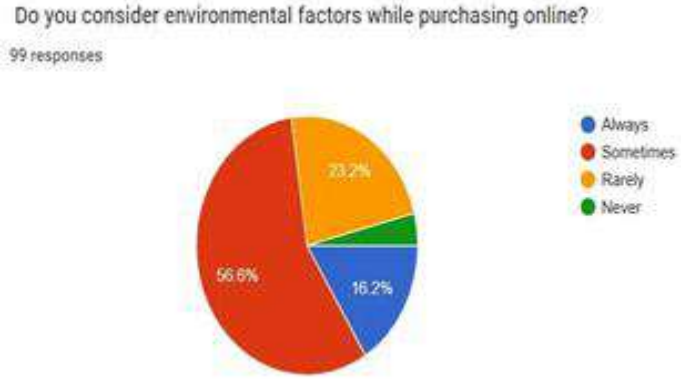


3. Flipkart leads marginally over Amazon (42.4% vs 38.4%) —gap of only 4%, indicating a near-duopoly in Indian e-commerce**.** Together, Flipkart + Amazon command 80.8% of platform usage — confirming their overwhelming market dominance**.** Myntra (12.1%) retains a loyal fashion-focused niche audience**.** Meesho (7.1%) is growing in the value/budget segment, particularly among price-sensitive buyers**.** This platform distribution is crucial — greenwashing concerns are most relevant on Flipkart and Amazon where the majority shop

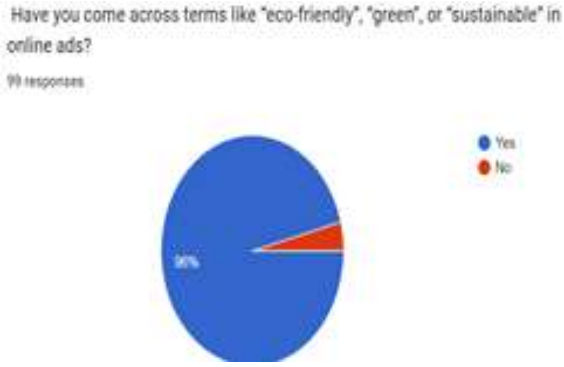
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4. A strong 72.8% consider environmental factors at least sometimes (Always + Sometimes), showing that eco-consciousness is mainstream but inconsistent.Only 16.2% always factor in environment — true green consumers remain a small committed minority 23.2% rarely and ~4% never consider it, totaling ~27% who are largely indifferent to eco-factors. This reflects the classic "green attitude–behavior gap" — consumers care about the environment in principle but don't consistently act on it during purchase decisions. The dominance of "Sometimes" suggests environmental consideration is situational and context-dependent.

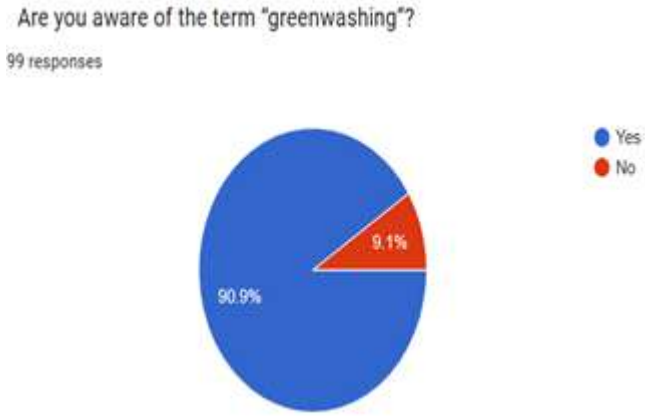


5. An overwhelming 96% of respondents have encountered terms like "eco-friendly," "green," or "sustainable" in online ads. This is the highest consensus figure in the entire survey — virtually universal exposure. It confirms that green marketing language is pervasive across Indian e-commerce platforms. The near-total exposure makes this sample highly relevant for studying green washing perceptions. The 4% who haven't seen such terms are likely low-frequency online shoppers.

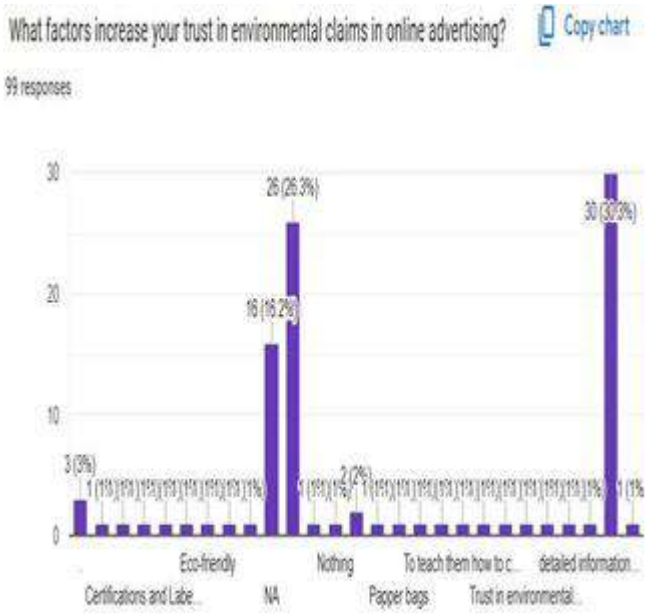


6. 90.9% are aware of greenwashing — an exceptionally high literacy rate for a relatively specialized term.This suggests the sample is composed of educated, digitally informed consumers. Only 9.1% are unaware, indicating greenwashing awareness has reached near-mainstream status in this group. High awareness validates the survey's relevance — respondents can critically evaluate eco-claims they encounter. This level of awareness likely heightens skepticism toward green advertising claims

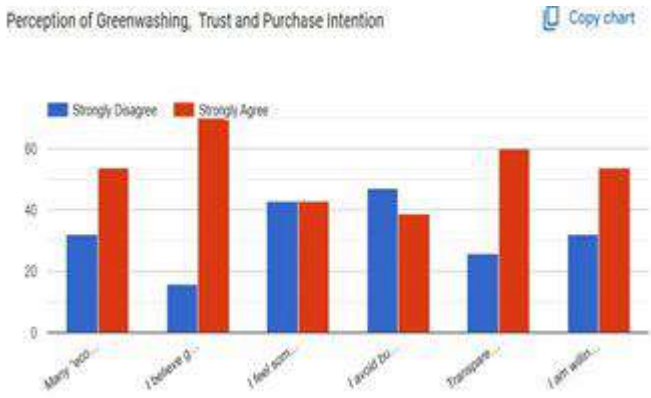
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7. Detailed, specific information (30.3%) is the #1 trust builder — consumers want facts, data, and transparency, not vague buzzwords. 26.3% responded "NA" — a significant portion are uncertain or distrustful of all environmental claims, signaling deep-rooted scepticism. Certifications & Labels (16.2%) rank third — third-party verification and eco-certifications (like ISO, BIS, Fair Trade) are valued but not the top factor. "Nothing" (2%) suggests a small but notable segment of complete eco-skeptics who trust no environmental claim. The low scores for individual responses highlight there is no single dominant trust-builder — a multi-pronged transparency strategy is needed.



8. **1.** Greenwashing is Widely Recognized (Statement 2 — Highest Agreement ~68): This is the strongest consensus in the entire survey. Respondents overwhelmingly believe greenwashing is a real and widespread practice — indicating high consumer awareness about misleading eco-claims.



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2. Many Eco-Claims Are Seen as Misleading (Statement 1 — ~54 Agree): A majority agrees that "eco" labels are often exaggerated or false. This reflects deep skepticism toward environmental marketing in e-commerce.
3. Confusion & Skepticism is Divided (Statement 3 — Perfect Split ~43:43): This is the only neutral statement, with equal numbers agreeing and disagreeing. It suggests that while many feel confused, an equal portion feel informed enough to make judgments — pointing to mixed consumer literacy.
4. Consumers Don't Actively Avoid Greenwashed Brands (Statement 4 — ~47 Disagree): Despite awareness, respondents do not strongly avoid greenwashed brands. This reveals a critical intention-behavior gap — people know about greenwashing but don't always act on it.
5. Transparency Strongly Builds Trust (Statement 5 — ~60 Agree): Second highest agreement score. Consumers value honest communication from brands about sustainability. This is a major insight for brands seeking to build credibility.
6. Willingness to Pay More for Genuine Green Products (Statement 6 — ~54 Agree): A majority is willing to pay a premium for authentically sustainable products — showing that genuine eco-branding has real commercial value.

6. SUGGESTIONS

For FMCG Firms

1. Adopt a packaging-first roadmap that sequences prioritised SKUs for reusable/recyclable materials (start with higher-margin or high-visibility SKUs). Partner with local recyclers and invest in take-back/refill schemes.
2. Use transparent, evidence-based claims — publish life-cycle summaries or third-party verification for major claims; avoid ambiguous words like “eco-friendly” without context.
3. Pilot domestic sustainable materials by partnering with research institutes/start-ups (e.g., biopolymers, mycelium packaging) to reduce dependence on imported compostable resins and lower costs over time.
4. Tiered pricing and product line strategies — offer both mainstream and “sustainable premium” product lines, reducing the need for immediate across-the-board price increases.
5. Consumer education campaigns — invest in digital campaigns that educate consumers on disposal, recycling, and refill options; measure behaviour change, not only reach.

For Policymakers & Industry Bodies

1. Standardise green claims and labelling with clear criteria and enforcement (reduce green washing).
2. Boost recycling infrastructure and EPR enforcement to make recyclable packaging truly recyclable at scale.
3. Support scale-up of domestic materials via grants, concessional finance, and public procurement pilots that buy sustainable packaging for government programs

7. CONCLUSION

The study concludes that green marketing in the Indian FMCG sector has evolved into a strategic necessity rather than a promotional tool. The findings reveal a significant gap between consumer awareness and actual purchasing behavior, despite high exposure to sustainability claims and strong recognition of greenwashing practices. Transparency, detailed product information, and credible certifications emerge as critical factors influencing consumer trust. While firms are actively adopting sustainable practices, challenges such as cost constraints, consumer skepticism, and inadequate infrastructure persist. Therefore, the success of green marketing depends on authentic communication, regulatory support, and continuous consumer education to bridge the intention–behavior gap and ensure long-term sustainability.

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AWARENESS ABOUT CITIZENS' RIGHT TO COMBAT OPEN WASTE BURNING FOR REDUCING AIR POLLUTION

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ABSTRACT

Keywords: *Citizens' rights, Open waste burning, Air pollution.*

INTRODUCTION

Air pollution has emerged as one of the most critical environmental and public health challenges globally, with India being among one of the most affected countries. Many factors contribute to the problem but a significant contributor is open waste burning, which releases harmful pollutants such as particulate matter (PM2.5 and PM10), carbon monoxide, and toxic compounds into the atmosphere (World Resources Institute India, 2023). These emissions pose severe health risks, including respiratory and cardiovascular diseases, and disproportionately affect vulnerable populations such as children and the elderly (Annals of Global Health, 2023).

Despite regulatory frameworks such as the Solid Waste Management Rules (2016), the practice remains widespread across urban and rural India due to inadequate waste management infrastructure and weak enforcement mechanisms (Centre for Science and Environment, 2023).Estimates suggest that a considerable proportion of municipal solid waste is openly burned, contributing significantly to air pollution and the carbon crisis (Centre for Science and Environment, 2023; World Resources Institute India, 2023).

Addressing this challenge requires a multi-dimensional approach involving improved waste management systems, stricter enforcement, and active citizen participation. Policy initiatives such as increasing penalties for open waste burning in cities like Mumbai indicate growing institutional efforts to curb the practice (The Times of India, 2024). Furthermore, strategies promoting open burning-free cities and community engagement highlight the importance of collective action in achieving sustainable outcomes (Climate and Clean Air Coalition, 2022). Therefore, understanding citizens' willingness to participate in community initiatives is essential for effectively reducing open waste burning and improving air quality at the local level.

REVIEW OF LITERATURE

1) Bimastyaji Surya Ramadan [1,2], Raden Tina Rosmalina[3], Syafrudin[2], Munawir[4], Hafizhul Khair[5], Indriyani Rachman[1,6], Toru Matsumoto[1] (2023) Potential Risks of Open Waste Burning at the Household Level: A Case Study of Semarang, the Paper highlights that Open waste burning (OWB) has emerged as a significant environmental and public health concern in developing countries. A study conducted in Semarang, Indonesia revealed that OWB remains one of the most prevalent waste disposal methods, particularly in areas with inadequate waste collection services. The study estimated annual emissions of approximately 53,809.66 tons of CO_2-equivalent, with plastic waste contributing significantly to black carbon emissions. While carcinogenic risks were found to be within acceptable limits, non-carcinogenic risks exceeded safety thresholds, indicating potential long-term health hazards. The findings underscore the need for improved waste management systems and targeted policy interventions to mitigate the adverse impacts of OWB.

2) Ramaswami, A., Baidwan, N. K., & Nagpure, A. S. (2016) Municipal Solid Waste (MSW) management remains a critical environmental challenge in developing countries, with open burning identified as a significant contributor to air pollution and public health risks. Existing literature largely focuses on macro-level assessments of emissions, with limited attention to intra-urban variations. Prior studies attribute MSW burning primarily to inadequate infrastructure; however, evidence indicates its persistence even in well-serviced areas, suggesting the role of socio-behavioral factors. Research further reveals that despite awareness of health risks, immediate concerns such as waste accumulation influence burning practices. Additionally, weak enforcement of formal regulations and low awareness of legal restrictions limit their effectiveness. Informal institutional mechanisms, including community norms and neighborhood associations, have been identified as significant determinants in reducing MSW burning.

3) Ramadan, B.S.,Rachman(2022) highlights that open burning is a prevalent waste management practice, particularly in developing countries. They identify it as a major contributor to global air pollution, noting that it is often "under-recorded" or excluded from official waste management statistics. The literature establishes that because this practice occurs at the household level (domestic), it is difficult for municipal

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authorities to monitor or regulate. The review discusses the use of satellite data (like MODIS) to detect "fire points." However, it notes a limitation in the literature: satellites often struggle to detect small-scale domestic fires compared to large forest fires or agricultural burning The review synthesizes various studies to identify why people burn waste:

4) Ajzen, I. (1991) The present study is grounded in an integrated theoretical framework combining the Theory of Planned Behavior (TPB), Collective Action Theory, and the Social-Ecological-Infrastructural Systems Framework (SEIS). The Theory of Planned Behavior posits that individuals' willingness to engage in protest actions is shaped by attitudes toward environmental issues, subjective norms, and perceived behavioral control. In the context of open waste burning, awareness of health and environmental risks may influence attitudes, while social norms within communities determine the acceptability of civic action. Collective Action Theory further explains that participation in protests depends on perceived collective efficacy, shared interests, and expected outcomes, highlighting the importance of organized citizen groups and community mobilization. The SEIS framework complements these perspectives by emphasizing the interaction between social behavior, institutional mechanisms, and infrastructural conditions in shaping environmental practices. Together, these theories suggest that willingness to participate in protests against open waste burning is not solely an outcome of individual awareness, but is also influenced by social organization, institutional trust, and the enabling environment for civic engagement.

5) Sennes et al. (2012) highlight that while citizens possess moderate environmental awareness, it often fails to translate into responsible action. This gap is evident in India, where open waste burning persists despite awareness of its harmful effects. Individuals tend to underestimate their personal contribution, leading to diffusion of responsibility and limited citizen participation. The study's classification of citizens into aware, optimistic, and suspicious groups helps explain varying levels of engagement in addressing such practices. It further shows that responsibility is often shifted to authorities, reducing individual accountability. Therefore, promoting ecological citizenship and community participation is essential to curb open waste burning at the local level.

6) The Open Burning of Plastic Wastes Is an Urgent Global Health Issue" by Pathak et al. (2024),Gauri Sanjeev Pathak, Mark Nichter, Anita Hardon, and Eileen Moyer.The paper serves as a "viewpoint" or scoping review that calls for the global health community to prioritize atmospheric pollution from plastic burning. It concludes that without addressing the lack of waste infrastructure and the inherent toxicity of plastic composition, the global health burden of plastic will continue to escalate, particularly among the world's most vulnerable populations.

7) Mukherji, S. B., Sekiyama, M., Mino, T., & Chaturvedi, B. (2016).“Resident Knowledge and Willingness to Engage in Waste Management in Delhi, India”, Focused on Assessing citizens' knowledge and willingness to participate in solid waste management.Despite poor compliance with waste rules, citizens show willingness to engage in waste management practices. Participation is influenced by awareness, socio-economic status, and institutional support. Gaps exist between willingness and actual behavior.

8) Zhang, Y., Wang, H., & Liu, J. (2023) Study of Willingness to Participate in Environmental Governance” it was found that participation increases with environmental knowledge, Social networks and community interaction.Older age groups show lower willingness.

9) Sowmya, K., & Basavaraju, C. (2022). Right to environment as a separate fundamental right: An analysis. This research paper explores the evolving legal necessity of recognizing a clean environment not merely as a derivative of other rights, but as a standalone fundamental right.

OBJECTIVES OF THE STUDY

1. To know about adverse effects of burning waste in open especially near residential areas

2. To know about citizens' rights to combat open waste burning for reducing air pollution.

3. To study the factors encouraging citizens to use their rights and powers to combat open waste burning.

4. To know the willingness of people to participate in a community initiative to reduce open waste burning.

HYPOTHESES

Ha1: There is a relationship between Gender and awareness of specific laws or penalties related to open waste burning.

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Ha2: There is a relationship between Educational Qualification and opinion of respondents on effectiveness of the government in controlling open waste burning.

Ha3: Awareness about penalties imposed by the National Green Tribunal is significantly related to reporting of open waste burning incidents to authorities.

RESEARCH METHODOLOGY

Method of Sampling: Convenient sampling

Type of Research: Descriptive

Primary Data was collected by circulating a questionnaire through Google on Whatsapp. The data was analyzed with the help of diagrams and the Spearman Rho correlation coefficient test.

Both sources of data collection were used:

Primary data: It was collected by asking questions with the help of a questionnaire.

Sample size: 38 respondents between 18 to 50 age group.

Sample Area: Kalyan Dombivli Twin Cities.

Secondary data: The secondary data has been collected from Online Books and Journals and relevant websites.

LIMITATIONS OF THE STUDY

- Responses to the questions of the questionnaire are as per respondents understanding which may differ.
- All responses from respondents are assumed to be true.
- A non-probability method of sampling has been used.

DATA ANALYSIS

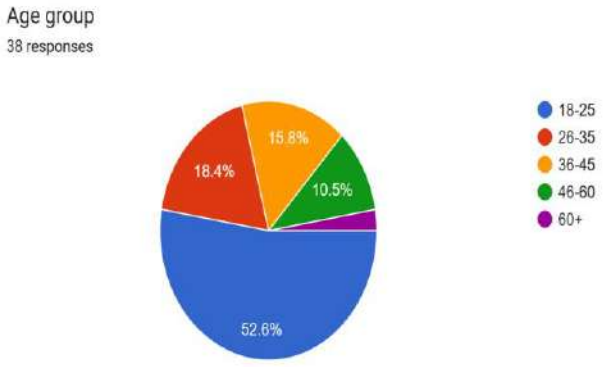
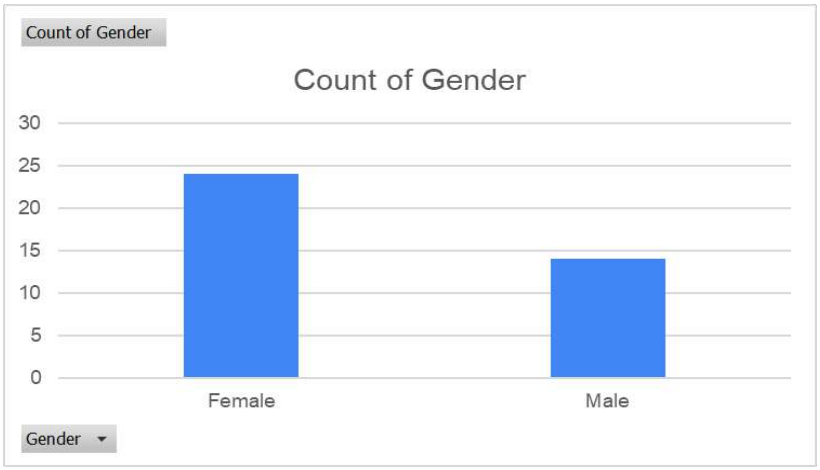


Fig 1 Genderwise distribution of respondents



Source: *Sample Survey*

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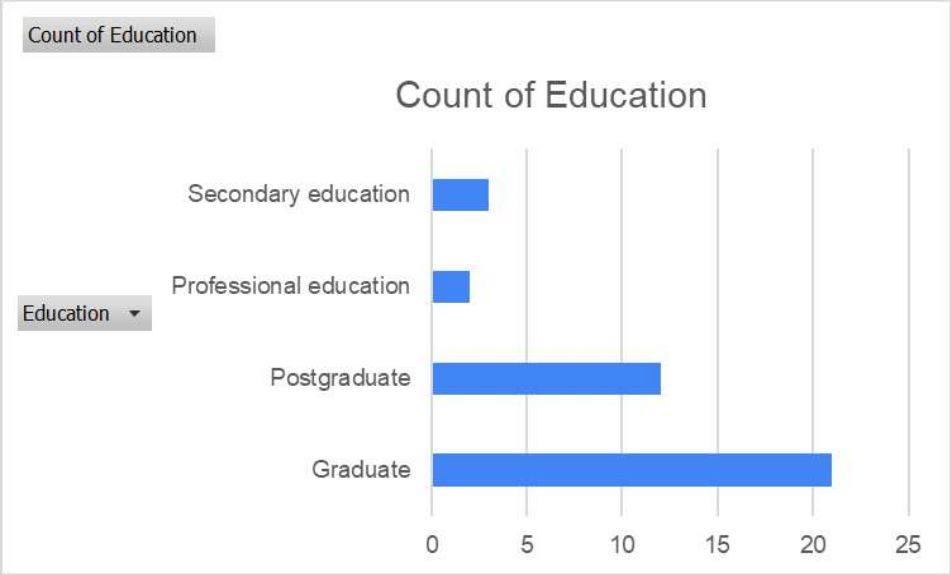


Fig 2 Education qualification of respondents

Education	Count of Education
Graduate	**21**
Postgraduate	**12**
Professional education	**2**
Secondary education	**3**

Source: *Sample Survey*

Testing of hypothesis/ hypotheses:

Ha1: There is a relationship between Gender and awareness of specific laws or penalties related to open waste burning.

The correlation is NOT statistically significant (p = 0.140).
At the 0.1 significance level, we fail to reject the null hypothesis. We cannot conclude that a real relationship exists between the variables.
The correlation coefficient (ρ = -0.244) indicates a weak negative relationship.
A non-significant result doesn't prove there's no effect — it may indicate insufficient sample size or a small effect.

Ha2: There is a relationship between Educational Qualification and opinion of respondents on effectiveness of the government in controlling open waste burning.

There IS a statistically significant positive correlation (p = 0.0096).
At the 0.05 significance level, we reject the null hypothesis of no correlation. The relationship between the two variables is unlikely to be due to chance alone.
The correlation coefficient (ρ = 0.415) indicates a moderate positive relationship.
Correlation does not imply causation. A significant relationship doesn't tell us which variable (if either) causes changes in the other.

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Ha3: Awareness about penalties imposed by the National Green Tribunal is significantly related to reporting of open waste burning incidents to authorities.

The correlation is NOT statistically significant (p = 0.277).
At the 0.05 significance level, we fail to reject the null hypothesis. We cannot conclude that a real relationship exists between the variables.
The correlation coefficient (ρ = 0.181) indicates a weak positive relationship.
A non-significant result doesn't prove there's no effect — it may indicate insufficient sample size or a small effect.

FINDINGS

- It has been found in the investigation that 45 % of respondents have witnessed open waste burning in their locality.
- 76 % of respondents perceive the impact of open waste burning is extremely harmful.
- 79% of the respondents said that they have experienced health issues due to burning of waste in the open.
- 55% of respondents are aware that burning of waste in the open is illegal in India.
- 37% of respondents are aware of laws and penalties.
- 84% of respondents are willing to report incidents of open waste burning.
- Lack of knowledge on where to report, belief that authorities won't take action and fear of retaliation from offenders are the factors responsible for preventing citizens from reporting about the incidents.
- Easy reporting mechanisms, awareness campaigns, stronger law enforcement and community participation and support encourages citizens to use legal measures against open waste burning.
- Respondents believe our government is effective to certain extent in controlling open waste burning especially in urban areas.
- Most of the respondents said hefty fines should be levied on the offenders.
- 87% of respondents are willing to participate in community initiatives to reduce open waste burning.

SUGGESTIONS

- AI tools can be used to implement government initiatives and practice to combat the problem.
- Schools and Colleges can introduce credit courses to overcome the problem.
- More strict rules and regulations and amendments in existing laws are needed .
- Citizens' credit bank programmes can be implemented.
- Co-operative societies should be involved.
- Hefty fines should be imposed on the offenders.
- Regular patrolling by the government officials can act as a deterrent.

CONCLUSION

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ASSESSING THE IMPACT OF CRYPTOCURRENCY ADOPTION ON MARKET VOLATILITY IN TRADITIONAL FINANCIAL MARKETS

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ABSTRACT
The rapid emergence of cryptocurrencies is one of those trends that has had a huge impact on the financial market sector; therefore, a number of issues associated with the impact of cryptocurrencies on financial markets must be addressed. The present study seeks to examine the influence of the increasing use of digital currencies such as Bitcoin and Ethereum in the context of market volatility in equity and foreign exchange markets. With an increase in the popularity of digital currencies amongst investors, some shifts can be observed in the interaction of traditional and digital financial assets. In this regard, the research study will apply a longitudinal approach, whereby an analysis will be performed based on different variables related to cryptocurrency prices and trading volumes, as well as stock market and foreign exchange market volatility. Correlation and regression methods will be applied in this case to analyze various aspects. It is necessary to determine whether cryptocurrency investment contributes to volatility in financial markets or helps stabilize them through diversification.

Keywords: *Cryptocurrency Adoption, Market Volatility, Digital Currencies, Equity Markets, Forex Markets, Diversification*

INTRODUCTION
Cryptocurrency has ushered in a revolution in the workings of the world financial system. Cryptocurrencies like Bitcoin and Ethereum have transformed from mere technological inventions to financial instruments whose adoption and growth has attracted a great deal of interest from investors, both individual and institutions. The emergence of cryptocurrencies as a source of investment opportunities and profits has also turned out to be a source of risks and uncertainties within the realm of traditional financial markets. Considering the nature of the contemporary financial system where everything is highly interdependent, the relationship between cryptocurrencies and other forms of traditional financial instruments is now something to look at.

Traditionally, the financial market, including stock exchanges and foreign exchange markets, have always been subject to economic indicators such as inflation rates and unemployment rate as well as political occurrences and even the confidence level of investors in the market. The emergence of cryptocurrencies within the financial system could thus also present another factor affecting the performances of traditional financial markets.

Considering this scenario, the current study seeks to investigate how the adoption of cryptocurrencies affects the volatility in the stock and foreign exchange markets. Through the determination of the connection between changes in price, volume, and cryptocurrency usage and market volatility, the study will attempt to determine the extent of interconnection between the variables under consideration. Application of techniques like correlation and regression analysis will make the investigation of the dynamics of the two markets easier. The results of the study will be highly useful for investors, analysts, and policymakers.

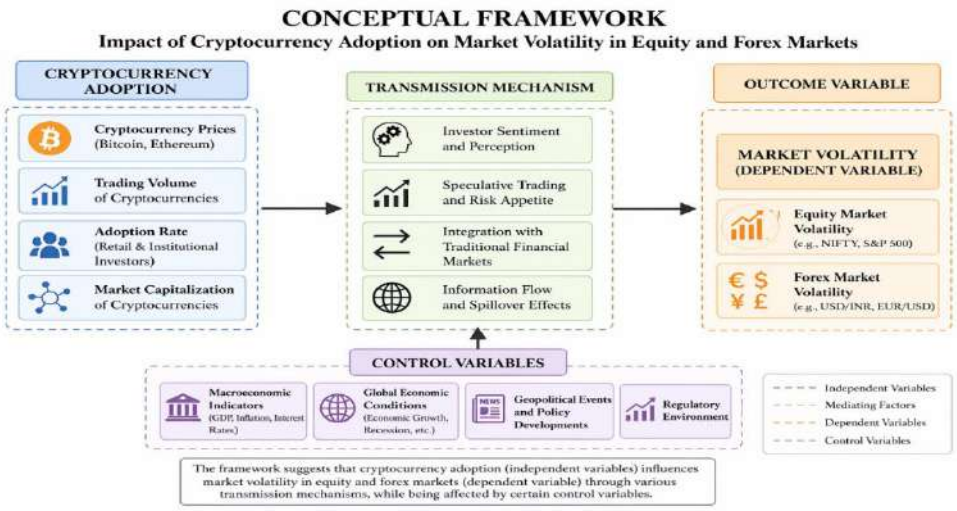
OBJECTIVES OF THE STUDY
1. To analyze the emergence and development of cryptocurrency acceptance in the global financial system.
2. To understand the degree of volatility that exists in traditional financial systems like the stock market and foreign currency market
3. To analyze the relationship between cryptocurrency prices, their trading volumes, and their influence on the volatility levels in conventional financial markets.
4. To find the impact of cryptocurrency acceptance on the volatility in the conventional equity and forex markets.
5. To identify whether crypto's serve as a factor for market volatility or diversification within conventional financial markets.

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RESEARCH METHODOLOGY

The current research will use a quantitative approach in conjunction with an analytical approach for examining the effect of cryptocurrency adoption on market volatility. The research methodology is built around the interpretation of the available financial data from trustworthy sources such as reports by central banks, stock exchanges, international financial organizations, and financial databases like Coin Market Cap, World Bank, IMF, and NSE/BSE. In this research, a longitudinal approach will be used to interpret data regarding trends in cryptocurrency prices, volume of trading, and adoption levels as well as market volatility in the equity market and foreign currency market. Descriptive statistics and correlation analysis are necessary to help summarize the data, find correlations between the variables used in the study, and evaluate the effect of the emergence of cryptocurrencies in relation to market volatility. Significant currencies that are popular in the field of cryptocurrency like Bitcoin and Ethereum, along with indexes of stocks and forex markets, will be evaluated using graphs and tables.

CONCEPTUAL FRAMEWORK



The theoretical framework shows the relationship between the utilization of cryptocurrencies and the instability that occurs in the conventional financial markets like stock markets and foreign exchange markets. The framework is made up of four main elements: independent variables, transmission channels, dependent variables, and control variables.

The independent variable includes the use of cryptocurrencies. This will be determined by parameters like the value of the cryptocurrencies (Bitcoin and Ethereum), the volume of transactions, the utilization of cryptocurrencies by individual and institutional investors, and total market capitalization

.The second part explains the transmission mechanisms that describe the process by which cryptocurrency adoption affects traditional financial markets. Such mechanisms may involve the attitudes of investors towards cryptocurrencies, speculations, involvement with traditional financial systems, and dissemination of information resulting in spill-over effects.

Thirdly, the last component entails the dependent variable, namely market volatility. Market volatility can be seen in equity markets, for example NIFTY, S&P 500 and in forex markets like USD/INR, EUR/USD. According to the theoretical framework, volatility in crypto currency markets can cause direct or indirect changes in market volatility in these traditional markets.

Lastly, the control variables include economic and political elements that could influence market volatility. Some of these elements include macro-economic measures such as GDP, inflation rate, interest rates, global economic situation, geopolitical events and regulatory Overall, it is the aim of the proposed framework to show the influence of crypto currency adoption on traditional market volatility.

OPPORTUNITIES AND RISKS OF CRYPTOCURRENCY ADOPTION

1. Portfolio Diversification and Risk Mitigation

Cryptocurrency can serve as a useful means of portfolio diversification because of its low correlation with conventional assets. For instance, Baur et al. (2018) observed that Bitcoin has a distinct pattern of returns that makes it a viable diversification instrument. The same conclusion is echoed by Corbet et al. (2018) who argue that cryptocurrency could help increase the efficiency of a portfolio depending on specific market conditions.

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Nevertheless, these findings may not be universal because the correlation between cryptocurrency and other financial instruments increases when financial stability is threatened.

2. Financial Innovation and Financial Inclusion
The implementation of cryptocurrencies has facilitated considerable advancements in the field of financial innovation. As an example, the development of the blockchain technology has led to the emergence of decentralized finance (DeFi) solutions. The concept was originally introduced by Nakamoto (2008) who outlined the idea of using Bitcoin as a peer-to-peer system that would eliminate the need for intermediary institutions such as banks. Digital currencies have the potential to foster financial inclusion as suggested by the World Bank (2022).

3. Potential for Returns and Speculative Nature
The potential for large returns is another reason why people have been interested in investing in cryptocurrencies. Urquhart (2016) draws attention to inefficiencies in bitcoin markets that allow abnormal gains. Shiller (2017) notes the highly speculative nature of cryptocurrencies' markets based primarily on investor sentiments rather than intrinsic value.

4. Improved Transaction Efficiency but Increased Risk
Cryptocurrency transactions involve faster, cheaper, and easier transactions. According to Catalini and Gans (2016), this is because blockchain technology lowers transaction costs substantially. Unfortunately, efficiency brings risks to the table, including the risk of illegal uses mentioned by Foley et al. (2019). There are also significant cybersecurity issues to deal with in order to protect investors and exchanges.

5. Lack of Regulation and Volatility
Another key challenge associated with cryptocurrency use is the lack of a unified regulatory framework. According to the International Monetary Fund (2021), regulation is crucial for creating stability in financial markets and reducing volatility. At the same time, the lack of effective regulation creates volatility, indicating an ambiguous connection between the two factors.

FINDINGS

1. Strong Influence on Market Volatility
The researchers have found out that the use of cryptocurrencies is a strong determinant of volatility in traditional financial markets especially the stock and foreign exchange markets.

2. Existence of Spill overs
The positive relationship that exists between the dynamics of cryptocurrency prices and the changes in stock prices implies that there are spillovers in the two markets.

3. Effect of Trading Activity
It appears that there is a moderate influence between cryptocurrency trading volume and the level of market volatility.

4. Increased Market Integration
Market integration between traditional finance and cryptocurrency is increasing with institutions being increasingly involved in cryptocurrencies.

5. Importance of Investor Sentiment and Speculation
There is a major impact on market dynamics through investor sentiments and speculation on the part of investors.

6. Conditional Benefits of Diversification
Cryptocurrencies offer the advantage of portfolio diversification as long as there are no problems within the financial system, otherwise they become ineffective.

7. Influence of External Variables
Global economic conditions, regulatory measures, and geopolitical events are key determinants of volatility.

8. Dual Role of Cryptocurrencies
Generally speaking, cryptocurrencies have a dual role in that they can help stabilize or destabilize financial markets.

DISCUSSIONS

The research reveal the growing link between cryptocurrency markets and conventional financial systems regarding market volatility. The existence of a positive correlation between variations in cryptocurrency price

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and movements in the stocks and foreign currencies indicates the emergence of spill overs. Thus, the cryptocurrency markets cease being independent of the global financial system and begin connecting with it. Such conclusions coincide with other researches by Ji et al. (2019) and Corbet et al. (2020).

The research concentrates on the importance of trading volumes and sentiments of investors in the analysis of the link between the cryptocurrency market and its volatility. The average correlation between cryptocurrency market activity and movement reveals the necessity of speculation in the process of market transformations. Such outcomes are similar to the behavioural finance assumptions.

Moreover, the research results reveal that the usage of cryptocurrencies is associated with diversification opportunities in favourable economic circumstances; however, the diversification benefit is inconsistent during unstable financial periods, as the correlation coefficient between cryptocurrencies and conventional investments increases amid uncertainty, which limits the usage of cryptocurrencies as an effective instrument for risk management. It is consistent with the results obtained by Umar et al. (2021) regarding the hedging function of cryptocurrencies that is negatively affected by market turmoil.

Furthermore, external variables, including regulatory changes, macroeconomic indicators, and geopolitics, have a considerable effect on both crypto and conventional finance. In conclusion, the current paper illustrates the dual character of cryptocurrency adoption that may be considered as a diversified investment or as a risk factor affecting market volatility.

CONCLUSION

Conclusively, the results of the study indicate that the adoption of cryptocurrencies has evolved into a major determinant of dynamics within traditional financial markets. The convergence between the digital assets and the existing financial system has resulted in spill over effects suggesting that any fluctuations observed within cryptocurrency markets may affect equity and forex markets. Despite the new investment opportunities provided by cryptocurrencies, they are characterized by high volatility and are prone to speculative activities that result in the addition of more risk factors to the existing financial system.

Additionally, it should be noted that cryptocurrencies present diversification benefits in periods of stable market conditions but lose most of the mentioned qualities in situations when the financial situation becomes unstable and asset correlations become higher. In this respect, the importance of investor sentiment, trading activities, and macroeconomic factors remains considerable in the analysis of the interaction between traditional financial markets and cryptocurrencies.

Finally the utilization of cryptocurrencies has seemingly a double-edged characteristic since it poses both threats and opportunities to investors. In this regard, cryptocurrencies have the potential to facilitate the diversification of portfolio management but can simultaneously increase financial instability. Therefore, all the concerned parties need to exercise caution and be fully aware of any possible risks associated with cryptocurrencies as an emerging asset class when making investment decisions. Moreover, regulators are responsible for implementing policies that help mitigate risks and ensure stability in the markets. Therefore, it is necessary to apply a balance approach whereby cryptocurrencies are exploited but risks are minimized to maintain financial stability.

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THE EMERGENCE OF ONLINE PAYMENT GATEWAYS AND THEIR IMPACT ON CONSUMER BEHAVIOUR: AN ANALYTICAL STUDY IN BHIWANDI

Mr. Kailas Baban Datir and Dr. Sandipan Gavhale

ABSTRACT
There is no need to carry hard cash for transactions, as payment gateways provide a safe, secure, and trustworthy alternative within the existing payment system. This research studies and observes the influence of online payment gateways consumer expenditure and behaviour. To complete this research mixed-methods approach was utilised. The survey of 100 respondents in Bhiwandi comprised with semi-structured interviews, and this research found core factors influencing consumer behaviour after the emergence of online payment gateways system. Findings reveal that respondents reported significant changes in expenditure because of the convenience and ease of use provided by these platforms. The study highlights the critical roles of trust, perceived usefulness, and demographic variables such as age and income in shaping consumer behaviour. Recommendations are provided for customers to manage their habits, make them aware of risks, and manage expenditure more effectively, and implications for e-commerce businesses and policymakers are discussed.

Keywords: *Internet payment system, Payment Gateways, Consumer Expenditure, Consumer Behavior, Online Payment App, E-payment.*

1. INTRODUCTION

1.1 Background of the study

In the modern era, the growth of new and advancement of technology give scope for relaxation in online or digital payment system. The transformation of e-commerce sector and financial ecosystem significantly working for social and economical development, especially in the area of UPI systems. Some technical acceleration and support into invented things build trust between buyer and seller. These innovations online payment gateways have emerged as a critical component, facilitating seamless, cashless transactions across various sectors.

Most of payment gateways providing service as intermediaries between merchants and consumers, authorizing and processing digital payments made through UPI, Barcode, credit/debit cards, mobile wallets, Net banking, and other digital instruments.

The growing knowledge and recognizing of smartphones, strengthening internet access, and the extension of e-commerce platforms have accelerated the adoption of online payment gateways, especially in emerging economies like India. Government initiatives such as *Digital India* and the promotion of a cashless economy have further encouraged consumers and businesses to shift from traditional cash-based transactions to digital modes of payment.

1.2 Statement of the problem

Online payment gateways have appeared as a pivotal component of the digital and smart economy, transforming how consumers conduct transactions. These platforms, including Phonepe, Gpay, Rozerpay, UPI, Bharat Pay, PayPal, Amazon Pay, Super-money, Stripe, and various bank-operated gateways, offer an Easy and secure payment process that enhances the online purchasing experience. The high adaptability of these technologies has prompted significant interest in understanding their effects on consumer behaviour.

The research problem attended in this study is the **affecting consumer expenditure as a result of the widespread use of online payment gateways**. Although these systems are technologically efficient and financially inclusive, their psychological impact on spending habits remains underexplored.

1.3 Literature Review

The rise of online payment gateways has fundamentally changed the way consumers engage in financial transactions. With the ability to make instant, cashless payments through smartphones, computers, and digital wallets, consumers now have unprecedented ease and access to spend money across various platforms, including e-commerce, food delivery, transportation, and utility services.

The rise of e-commerce has led to shift in consumer shopping habits. Convenience, accessibility, and a broader range of products have contributed to the increase the preference for online shopping.

With a roughly 100-fold rise over 12 years, retail digital payments in India have grown significantly, from 162 crore transactions in 2012–13 to over 16,416 crore transactions in 2023–24.(RBI, 2024)

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Table No. 1 Retail digital payments in India

Sr. No	Year	Volume (in ₹ Lakh)	Volume (In ₹ Crore)
1	2017-18	145902	136986734
2	2018-19	234339	163852285
3	2019-20	343455	162305934

UPI: an emerging tool of Digital Payment, (Tarikere & Joshi, 2022)

1. **Transaction Volume Growth**:
- From **2017–18 to 2018–19**, digital payment volume increased by **60.6%**.
- From **2018–19 to 2019–20**, it rose further by **46.6%**.

2. **Transaction Value Growth**:
- The value grew from ₹13.7 lakh crore to ₹16.38 lakh crore between **2017–18 and 2018–19** (**19.6% increase**).
- However, in **2019–20**, there was a **slight decline** in value to ₹16.23 lakh crore (**0.94% decrease**), despite a rise in volume, indicating:

PAYMENT AND SETTLEMENT SYSTEMS AND INFORMATION TECHNOLOGY

Table IX.1: Payment System Indicators - Annual Turnover (April-March)

Item	Volume (lakh)			Value (₹ lakh crore)		
	2022-23	2023-24	2024-25	2022-23	2023-24	2024-25
1	2	3	4	5	6	7
A. Settlement Systems						
CCIL Operated Systems	41	43	47	2,588.0	2,592.1	2,962.2
B. Payment Systems						
1. Large Value Credit Transfers - RTGS	**2,426**	**2,700**	**3,025**	**1,499.5**	**1,708.9**	**2,013.9**
Retail Segment (2 to 6)						
2. Credit Transfers	**9,83,621**	**14,86,107**	**20,61,015**	**550.1**	**675.4**	**797.8**
2.1 AePS (Fund Transfers)	6	4	4	0.004	0.003	0.002
2.2 APBS	17,834	25,888	32,964	2.5	3.9	5.5
2.3 ECS Cr	-	-	-	-	-	-
2.4 IMPS	56,533	60,053	56,250	55.9	65.0	71.4
2.5 NACH Cr	19,257	16,227	16,939	15.4	15.3	16.7
2.6 NEFT	52,847	72,640	96,198	337.2	391.4	443.6
2.7 UPI	8,37,144	13,11,295	18,58,660	139.1	200.0	260.6
3. Debit Transfers and Direct Debits	**15,343**	**18,250**	**21,660**	**12.9**	**16.9**	**22.1**
3.1 BHIM *Aadhaar* Pay	214	194	230	0.1	0.1	0.1
3.2 ECS Dr	-	-	-	-	-	-
3.3 NACH Dr	13,503	16,426	19,762	12.8	16.8	22.0
3.4 NETC (Linked to Bank Account)	1,626	1,629	1,668	0.03	0.03	0.02
4. Card Payments	**63,325**	**58,470**	**63,861**	**21.5**	**24.2**	**26.1**
4.1 Credit Cards	29,145	35,610	47,741	14.3	18.3	21.1
4.2 Debit Cards	34,179	22,860	16,120	7.2	5.9	5.0
5. Prepaid Payment Instruments	**74,667**	**78,775**	**70,254**	**2.9**	**2.8**	**2.2**
6. Paper-based Instruments	**7,109**	**6,632**	**6,095**	**71.7**	**72.1**	**71.1**
Total Retail Payments (2+3+4+5+6)	11,44,065	16,48,234	**22,22,885**	659.1	791.5	**919.3**
Total Payments (1+2+3+4+5+6)	11,46,491	16,50,934	**22,25,910**	2,158.6	2,500.4	**2,933.1**
Total Digital Payments (1+2+3+4+5)	**11,39,382**	**16,44,302**	**22,19,815**	**2,086.8**	**2,428.2**	**2,862.0**

CCIL : Clearing Corporation of India Ltd. AePS : *Aadhaar* Enabled Payment System. Cr : Credit.
APBS : *Aadhaar* Payment Bridge System. ECS : Electronic Clearing Service. Dr : Debit.
IMPS : Immediate Payment Service. NACH : National Automated Clearing House. - : Nil/Negligible.
NEFT : National Electronic Funds Transfer. BHIM : *Bharat* Interface for Money.
NETC : National Electronic Toll Collection. RTGS : Real Time Gross Settlement.

Note: 1. RTGS system includes customer and inter-bank transactions only.
2. Settlements of government securities and forex transactions are through CCIL. Government securities include outright trades and both legs of repo transactions and triparty repo transactions.
3. The figures for cards are for payment transactions at Point of Sale (PoS) terminals and online.
4. Figures in the columns might not add up to the total due to rounding off of numbers.

Source: RBI.

RBI: Table IX.1: Payment System Indicators – Annual Turnover (April-March) 2024 (RBI, 2024)

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1. This reflects a **consistent upward trend** in adoption and usage of online payment systems.
2. Higher usage for smaller-value transactions (like mobile recharges, food delivery, online retail) (RBI, 2019)
3. Primarily consumer accepted the e-commerce sector as part of daily consumption platform and following theories Reasoned Action (TRA) as applied to technology driven environmental approach, Pavlou P emphasied Technology Acceptance Model(TAM) variables accepted as like usefulness and easy to use (Pavlou, 2003). According to Gefen et al, (2003) Earlier commerce model was B2B, but due to Payment gateways gave more scope for B2C, consumer retention experienced repeat transaction by same payment gateways shows the trustworthiness between customer and Payment gateways, and it proved that online payment system widely accepted (Gefen et al., 2003).
4. Bellman Stevan identified the time-saving benefits of online shopping as a significant driver of consumer preference (Bellman Steven et al., 2009). Subsequent research by Miyazaki and Fernandez (2001) highlighted the importance of addressing privacy and security concerns to foster consumer trust.(Miyazaki and Fernandez, 2001) , Chung et al Kim D and McCole P. all emphasized the need for clear and transparent privacy statements to reassure consumers safety of transactions (Chung and Paynter, 2002) (Kim et al., 2008) (McCole et al., 2010).
5. Jarvenppa et al. state in his research, Internet is also important factor, many people prejudice about internet and its utilization, If consumer satisfy with particular brand and reputation of establishment then Trust on online or e-commerce will give more business to retailers (Jarvenpaa et al., 2000).
6. Zhou et al. (2007) explored the technological acceptance model of online shopping, identifying perceived ease of use and perceived usefulness as negative factors influence consumer acceptance of online payment systems.(Zhou et al., 2010) Delafrooz et al. (2010) extended this analysis by examining the impact of demographic variables on online shopping behavior.(Delafrooz et al., 2009) Their findings suggest that very young customer and those having high income are more alleviation to embrace online shopping and associated payment gateways.
7. Ae-Ri Lee(2021) explain the P-P paradox, and founds that “personalization had a significant impact on the intention to use IoT”, Means Personalization things also influence internet use, but privacy can restrict in somewhere.(Lee, 2021).
8. Hernandez-Ortega explores how habitual use enables businesses to take advantage of the benefits of electronic invoicing and establishes a positive feedback loop for information. Practices of e-invoicing enhance businesses’ perceptions of IT’s utility and security, as well as their trust in it (Hernandez-Ortega and Jimenez-Martinez, 2013).
9. McCole P Ramsey et al.(2010) in this study it contribute the impact that privacy and security concerns (as a manifestation of risk) has on the three e-commerce trust considerations (vendor, Internet, third parties) and attitude towards online purchasing. It found that trust in vendor, trust, Internet and third parties positively influence attitude towards online purchasing. (McCole et al., 2010)
10. Harshleen as per the study, explain "Smartphones are such portable, small devices that provide computing and communication capabilities." From the point of view of Indian consumers' purchasing habits with regard to smartphones' characteristics and features of cell phones and Stores can implement EMI option for customers with limited funds in purchasing it (Harshleen Sethi, 2017).
11. Phuong Linh NGUYEN in findings of the study indicate that the behavior of choosing online payment methods is influenced by perceptions of product uncertainty, perceived behavioral control, utility, risk, trust, and convenience of use. When it comes to online payment method decision behavior, awareness of danger has the biggest detrimental influence and awareness of usefulness has the biggest beneficial influence (Phuong Linh NGUYEN and Hau NGUYEN, 2020).

1.4 Research Gap

Such a types of availability of insights, there will be **a gap in the literature concerning the specific impact of online payment gateways on consumer expenditure.** This study aims to fulfill the gap by producing a detailed analysis of how these technologies influence spending patterns and the underlying psychological and demographic factors involved.

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1.5 Research Objectives

This research aims to explore how online payment gateways influence consumer expenditure and identify the factors driving their adoption

1. To find out more about the consumer expenditure pattern before and after of Online payment gateways.
2. To recognized factors motivating consumer for use of payment gateways.

1.6 Hypotheses

1. **Hypothesis 1 (H1)**: The respondents significantly favour online payment channels over conventional techniques.
2. **Hypothesis 2 (H2):** Relationship between Consumer Expenditure and Online Payment Gateways
3. **Hypothesis 3 (H3):** Constant use of online payment gateways is significantly impacted by habits.

Specifically, the study hypothesizes that online payment gateways affect consumer expenditure and seeks to uncover the reasons behind this phenomenon.

This study will explore the role of online payment gateways in reshaping consumer payment behaviour and assess their implications on transaction safety, trust, and financial inclusion in the existing payment ecosystem

2. RESEARCH METHODS AND METHODOLOGY

Study Design:
This study depends on mixed methods approach, and it considered research design, combining quantitative and qualitative data to provide a inclusive understanding of consumer behavior towards online payment gateways.

Proposed Method:

This research has been conducted in two ways

Measurement Procedure
Survey questions were structured around key constructs such as frequency of use, ease of access, perceived usefulness, trust, and expenditure behavior. The Likert scale format (1-5) was used to measure levels of agreement or frequency. Interview guides were semi-structured to allow flexibility in probing participant insights.

Sampling and Data Collection:

Sample Size: 100

Sampling Criteria:

Types of Sampling: Non-Probability Sampling**:** Convenience Sampling

Include:
Age - More than 18 Years

He / She made at least one online purchase in the last three months

He / She had used at least one online payment gateway (e.g., PayPal, Razorpay, Paytm, Stripe).

Exclude:
Age: less than 18

Education: Non Educated (Not Completed HSC)

Experience: None Experience

Rationality: We ensured reflection of participants/Samples active in digital payment system.

Survey: An online questionnaire was administered to a sample of 100 respondents, selected through convenience sampling. The survey included questions on demographic information, online shopping habits, usage of online payment gateways, and perceptions of convenience, security, and trust. Descriptive statistics and regression analysis were used to analyze the survey data.

Interviews: For gaining significant insights into the experiences and attitudes of a selection of survey participants, structured interviews were performed with them. Themes like perceived utility, trust in online

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payment systems, and the impact on purchasing patterns were the main topics of the interviews. The qualitative data was analyzed using thematic analysis.

DATA ANALYSIS METHOD

Quantitative data were analyzed using descriptive statistics and chi-square tests to test the hypotheses. Qualitative data from interviews were coded thematically to identify recurring patterns, behavioral motivations, and contextual insights related to the use of online payment gateways.

Data Analytical Tools

For "Quantitative analysis" Survey data was tabulated and analysed using Microsoft Excel (Office 365) for Descriptive statistics, frequency distributions, and basic correlation analysis.

For "Qualitative analysis" Details gained from interviews were organised in Word and Excel, and responses answer were coded manually to identify recurring themes and patterns.

RESULTS & DISCUSSION

Analysis of Survey Findings

The survey results indicate that respondents reported changes in expenditure because of use of online payment gateways.

Key factors contributing to this behavior include:

= 27.67 + 24.10 + 61.06

= 112.83

Table 2: Demographical details of Users

Sr. No	Category	Number of Respondents	Percentages (%)
1	**Age**	**100**	**100**
	Above 18	22	22
	19 to 20	7	7
	21	10	10
	21 to 25	56	56
	25 to 40	5	5
2	**Education level**	**100**	**100**
	Up to 10	2	2
	10 to 12	23	23
	Undergraduate	75	75
3	**Profession**	100	100
	Student	72	72
	Teacher	12	12
	Others (Doctor/Lawyer/Business)	16	16
4	**Shopping Preference**	**100**	**100**
	Online	16	16
	Offline	6	6
	Both Online and Offline	78	78
5	**Income Source**	**100**	**100**
	Self	18	18
	Depends	46	46
	Do not want to disclose	36	36
6	**Income Level**	**100**	**100**
	Upto ₹5000	16	16
	₹5001 to ₹10000	54	54
	₹10001 to ₹20000	11	11
	More than ₹20000	14	14
	Do not want to disclose	5	5
7	**Awareness of Online Payment Gateways**	**100**	**100**
	Yes	91	91
	No	9	9

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Table 3: Usage and Behaviour of Online Payment Gateway Users

Sr.no	Category	Number of Respondents	Percentages (%)
1	**Applications Used**	**100**	**100**
	GPay	77	77
	PhonePe	57	57
	PayTM	29	29
	Amazon Pay	16	16
	Others (PayPal/FreeCharge/Mobikwik)	21	21
2	**Reasons for Using Online Payment Gateways**	**100**	**100**
	Recharge	78	78
	Bill Payments	58	58
	Grocery Shopping	40	40
	Ticket Booking	35	35
	Restaurant	33	33
	Daily Travel	24	24
	Business	16	16
3	**Problems Solved by Using Online Payment Gateways**	**100**	**100**
	Ease of Payment	72	72
	Avoiding ATM Visits	22	22
	Managing Money	9	9
	Other Issues	24	24
4	**Continuous Use of Online Payment Gateways**	**100**	**100**
	Habit	25	25
	Motivated by Friends	10	10
	Rewards	26	26
	Advertisements	6	6
	Cashback Benefits	39	39
	Other	41	41
5	**Risk Perception**	**100**	**100**
	High	12	12
	Medium	28	28
	Low	50	50
	None	10	10

3.1 Analysis and Results

1. Hypothesis 1: Preference for Online Payment Gateways

Null Hypothesis (H0): Respondents do not show a significant preference for online payment gateways over traditional methods.

Alternative Hypothesis (H1): Respondents show a significant preference for online payment gateways over traditional methods.

Data Analysis:

Shopping Choice:
Online: 16%

Offline: 6%

Both Online and Offline: 78%

Since a significant portion (78%) of respondents use both online and offline methods, and only 6% prefer offline exclusively, we can infer a strong preference for online payment gateways.

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Statistical Test:
Chi-Square Test for Shopping Choice

Table No. 4

Sr. No	Preference	Observed Frequency
1	Online	16
2	Offline	6
3	Both Online and Offline	78

Expected Frequency (if no preference): 100/3 ≈ 33.33

$$X^2 = \sum \frac{(Oi - Ei)^2}{Ei} = \frac{(16 - 33.33)^2}{33.33} + \frac{(6 - 33.33)^2}{33.33} + \frac{(78 - 33.33)^2}{33.33}$$

$= 27.67+24.10+61.06$

$= 112.83$

With 2 degrees of freedom (df = 3 - 1), the critical value for χ^2 at $p < 0.05$ is 5.991. Since 112.83 > 5.991, we reject the null hypothesis and accept the alternative hypothesis (H1).

Conclusion: The respondents clearly favour online payment gateways overall.

2. Hypothesis 2 (H2): Relationship between Consumer Expenditure and Online Payment Gateways

Null Hypothesis (H0): Traditional methods and internet payment gateways do not significantly differ in terms of consumer spending.

Alternative Hypothesis (H1): There is significant between Consumer expenditure and the use of online payment gateways.

Analysis is based on the data collected from the 100 respondents in Bhiwandi regarding their behavior towards online payment gateways, the following insights can be drawn:

Table 5: Payment Methods of Users

Expenditure comparison	Traditional Method		Online Method	
Upto 5000	6	5000 x 6 = 30000	34	170000
5001 to 10000	75	7500 x 75 = 562500	50	375000
10001 to 20000	19	15000 x 19 = 285000	13	195000
More than 20000	NA		3	60000
		8775000		800000

3.2 Interpretation :

1. **Significant Growth in Lower-Range Spending**:
- The number of respondents spending up to ₹5,000 increased **from 6% (₹30,000)** to **34% (₹1,70,000)** after shifting to online payments.
- This reflects a major rise in **micro-spending behaviour**, where the ease of digital payments prompts users to **spend small amounts more frequently**.

2. **Shift from Mid-Range to Smaller Spends**:
- Expenditure in the ₹5,001–₹10,000 range dropped from **₹5.62 lakhs to ₹3.75 lakhs**, suggesting that consumers are spreading their spending over more transactions rather than making lump-sum purchases.
- The reduced amount may also imply **increased control and visibility** over spending, which online platforms offer.

3. **Expansion into Higher Expenditure Brackets**:
- While traditional methods showed **no spending beyond ₹20,000**, the online payment data reveals that **3% of respondents now spend over ₹20,000**, totalling ₹60,000.
- This signals **increased confidence and trust** in digital platforms for handling large-value transactions.

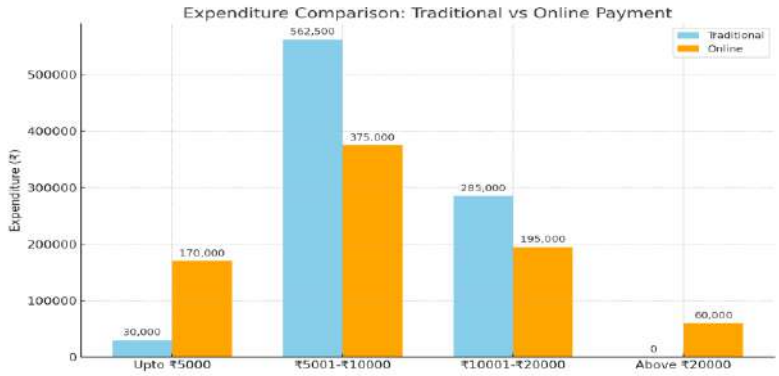
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4. **Overall Shift in Spending Patterns**:

- Though the **total expenditure** slightly decreased from **₹8,77,500 (traditional)** to **₹8,00,000 (online)**, the **distribution has diversified**, with spending spread more across lower and higher bands.
- The shift suggests **more control, choice, and behavioural flexibility** offered by online payment systems.

Conclusion: The utilization of online payment gateways and consumer spending are significantly correlated.

Graph: 1



Here's the graphical presentation comparing consumer expenditure using traditional methods versus online payment gateways. The chart shows:

- A **major shift in spending** from the ₹5001–₹20000 range in traditional methods to a broader distribution in online transactions.
- Increased frequency of **lower and moderate-value transactions** (upto ₹5000) with online payments.
- Emergence of **high-value expenditure** (above ₹20000) via online platforms, which was absent in traditional methods.

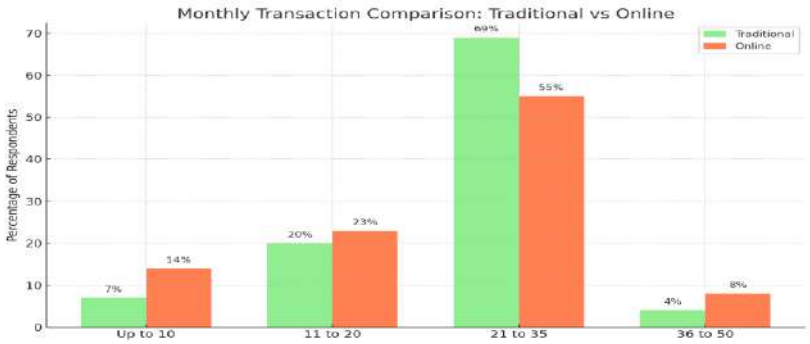
Table 6: Monthly Transaction of Users

Monthly Transaction	Traditional	Online	
Up to 10	7	14	Increased low-frequency transactions in online mode.
11 to 20	20	23	Slight increase in mid-frequency usage online
21 to 35	69	55	Drop in this frequent-use category online
36 to 50	4	8	High-frequency transactions doubled online

Key Insight:
Online methods have encouraged both very frequent (36–50) and infrequent (up to 10) transactions.

Shift in Usage Pattern: While traditional users mostly concentrated in the 21–35 range (69%), online users are more evenly spread across all frequency levels, indicating broader adoption.

Graph: 2



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GRAPH ANALYSIS

1. **Bar Graph Interpretation:**
- The graph clearly shows a **rise in both low-frequency and high-frequency online transactions**.
- The **online segment is more balanced**, with users in all frequency bands, unlike the traditional method where the majority are concentrated in one band.
- This indicates that **online payment gateways offer flexibility and ease**, encouraging both small occasional users and heavy users.

2. **Implication for Research:**
- The data supports hypothesis that **online payment gateways have changed consumer expenditure and transaction frequency**.
- Increased accessibility and convenience are likely reasons behind more people making frequent and varied-value transactions online.

3. **Hypothesis 3 (H3):** Habits concerns are a significant factor affecting the continuous use of online payment gateways.

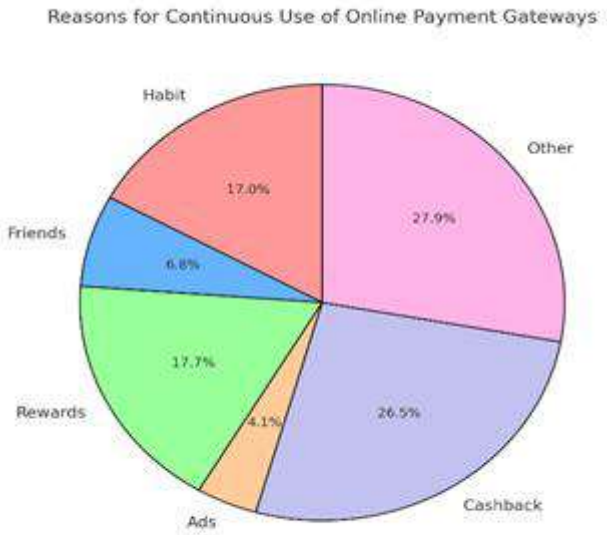
Null Hypothesis (H0): Habit does not a significant factor in the continuous use of online payment gateways.

Alternative Hypothesis (H1): Habit does a significant factor in the continuous use of online payment gateways.

Table 7: Users Behavior of Online Payment Gateway

Sr. No	Continuous Use of Online Payment Gateways	100
1	Habit	25
2	Motivated by Friends	10
3	Rewards	26
4	Advertisements	6
5	Cashback Benefits	39
6	Other	41

Graph: 3



Reasons for Continuous Use of Online Payment Gateways

The pie chart illustrates the key motivators that influence users to continue using online payment gateways. Here's a breakdown of the insights:

1. **Other Reasons (41%)**
The largest segment, "Other," suggests that users have various personalized or context-specific reasons beyond the common categories. This could include convenience, user interface, integration with other apps, or business-related requirements.

2. **Cashback Benefits (39%)**
Cashback offers are a strong driver, indicating that financial incentives significantly encourage repeat use. Users value tangible savings on their purchases.

3. **Rewards (26%)**
Reward points, loyalty programs, or vouchers also motivate users. This suggests a preference for long-term benefit accumulation from their transactions.

4. **Habit (25%)**
One-fourth of the respondents continue usage out of habit, showing that frequent use has normalized digital payments as a default choice.

5. **Motivated by Friends (10%)**
Peer influence plays a modest role, especially in younger age groups where social trends shape consumer behavior.

6. **Advertisements (6%)**
Advertising plays a relatively minor role in sustaining user engagement, possibly because users prioritize functionality and benefits over promotional content.

Conclusion: Habit is a significant factor influencing the continuous use of online payment gateways.

4. DISCUSSION

The discovery of the study does supports the hypothesis that online payment gateways lead to changed consumer expenditure. The convenience and ease of use provided by these platforms significantly encourage more frequent and higher-value transactions. Habit, Cash back, Rewards, Friends, Advertisement and Trust in the security of online payment gateways is crucial for consumer adoption, as it alleviates concerns about potential fraud and data breaches.

The demographic analysis indicates that younger consumers and as well as high income levels people are more susceptible to the impact of online payment gateways. This is the result of existing literature on technology adoption and costumer bearing, advising that these groups are more comfortable with digital transactions and have greater financial capacity to engage in online shopping.

5. CONCLUSION

This study produced valuable insights into consumer behavior towards online payment gateways. The transactions has increased with the platforms underscores, then that consumers should manage their spending habits rationally. Regulating authorities of Government and E-commerce companies may use these findings to discover new strategies that help and stop of addiction of online payment system, which help to make consumer trust and mitigate unnecessary transactions & spending. Some of the recommendations useful for rational consumers, likewise to set the spending limits, to use budgeting tools, and keep distance from mindful of targeted advertising tactics.

After this study next coming research must be explored the long-term impacts of this online payment gateways on the behaviour consumer for financial transaction. Additionally, studies could investigate the impact of emerging technologies, such as block chain and biometric authentication, in enhancing the security and usability of online payment systems.

The data reveals a strong inclination towards using online payment gateways among the young and educated demographic in Bhiwandi. While convenience and cashback benefits drive the usage, there are concerns about security and transaction reliability. Future improvements in online payment systems should focus on enhancing security, reducing transaction times, and educating users about safe practices to sustain and grow user trust and satisfaction.

6. **FUNDING DECLARATION:** This research did not receive any specific grant from funding agencies in the public, commercial, or non-for-profit sectors.

7. **DATA AVAILABILITY STATEMENT:** Due to confidentiality and privacy concerns of samples, this data set not available publicly, Because it generated and analysed during the current study.

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8. **ETHICAL APPROVAL AND CONSENT TO PARTICIPATE:** This study did not require formal ethics committee approval in accordance with institutional guidelines. However, informed consent was obtained from all participants, and confidentiality was strictly maintained
9. **CONSENT FOR PUBLICATION:** It has informed to the Sample regarding publication before interview, and took consent for publication of data was obtained from the participants c. Funding: This study did not received any external funding.

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FINANCE & INVESTMENT- STRATEGIES FOR BUILDING WEALTH

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1} ABSTRACT

Finance and investment strategies play an important role in building long-term wealth. This research focuses on simple and practical methods that individuals can use to grow their money over time. It explains the importance of saving regularly, setting clear financial goals, and making smart investment choices. Basic investment options such as stocks, mutual funds, fixed deposits, and real estate are discussed in an easy-to-understand manner.

The study also highlights the concept of risk and return, showing how higher returns usually involve higher risks. Diversification, or spreading investments across different assets, is explained as a way to reduce risk. In addition, the power of compounding is emphasized, where money grows faster when returns are reinvested over a long period.

This research encourages disciplined financial habits like budgeting, avoiding unnecessary expenses, and investing early in life. It also briefly touches on the role of financial planning and professional advice in achieving

Overall, the aim of this study is to provide simple knowledge and awareness about finance and investments, helping individuals make better decisions and gradually build wealth for a secure future.

Building wealth through finance and investments requires a strategic approach to financial planning, investment options, and risk management. This research paper explores various strategies for building wealth, including financial planning, investment options, risk management, tax planning, and behavioral finance. The paper provides an in-depth analysis of different investment options, such as stocks, bonds, mutual funds, and real estate, and discusses the importance of asset allocation and diversification. Additionally, it highlights the role of tax planning and behavioral finance in investment decisions. The paper concludes by emphasizing the importance of a well-thought-out investment strategy for achieving long-term financial goals. By understanding and implementing these strategies, individuals can create a robust financial plan, mitigate risk, and build wealth over time.

2} INTRODUCTION

Finance and investments are very important parts of modern life. Every person earns money, but managing that money properly is what makes a real difference. Finance refers to how we handle our money—how we earn it, save it, spend it, and plan for future needs. Investments mean using our money in a smart way so that it grows over time. Instead of keeping money idle, investing helps us increase its value and create more wealth.

Income (Salary / Business)

↓

Saving Money

↓

Smart Investing

(Stocks / Mutual Funds / Gold)

↓

Compounding Growth

↓

Wealth Creation

↓

Financial Security

In today's fast-changing world, having financial knowledge is very important. Prices of goods and services are increasing, and simply saving money is often not enough to meet future needs.

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Inflation and achieve long-term goals like buying a house, starting a business, or securing retirement. Even small investments made regularly can grow into a large amount due to the power of compounding.

There are many strategies for building wealth such as starting early, being patient, and investing regularly. One of the most important concepts is compounding, where money grows faster over time. Discipline and consistency are key factors in achieving financial success.

In conclusion, finance and investments are powerful tools that help individuals secure their future and achieve their life goals. With proper knowledge and planning, anyone can build wealth and live a comfortable life.

Building wealth is not about earning a huge income, but about managing money wisely. A person with a simple income can also become financially strong by following good habits. These include saving regularly, avoiding unnecessary expenses, investing early, and staying consistent. It is also important to choose the right investment options based on one's goals and risk level. Some people prefer safe investments, while others may take higher risks for better returns.



There are different strategies for building wealth. One of the most important strategies is to start early, as time plays a key role in increasing money. Another strategy is diversification, which means investing in different areas to reduce risk. Patience and discipline are also very important because investments take time to give good results. Quick profits are rare, and long-term planning is the key to success.

In addition, financial planning helps people prepare for emergencies and unexpected situations. Having savings and investments provides security and peace of mind. It allows individuals to live comfortably and achieve their dreams without financial stress.

In conclusion, finance and investments are powerful tools for building wealth and securing the future. With proper knowledge, careful planning, and consistent efforts, anyone can improve their financial condition. Wealth building is a gradual process, but with the right strategies, it can lead to a stable and successful life.

3} OBJECTIVE

The primary objective of finance and investment strategies for building wealth is to enable individuals to effectively manage their money and grow it over time through proper planning, disciplined saving, and smart investment decisions. In today's world, simply earning money is not enough; one must also learn how to use money wisely to create more wealth and secure the future.

One of the key objectives is financial planning. This involves setting clear financial goals such as buying a house, starting a business, funding children's education, or planning for retirement. By having well-defined goals, individuals can create a roadmap that helps them allocate their income properly between expenses, savings, and investments.

Another important objective is wealth creation. Wealth is built over time by investing money in various financial instruments such as stocks, mutual funds, bonds, and real estate. These investment options provide returns that help money grow faster compared to simply keeping it in a savings account. The concept of compounding plays a major role here, where the returns earned on investments are reinvested to generate additional earnings.

Risk management is also a crucial objective. Every investment carries some level of risk, and it is important to understand and manage these risks. Individuals must choose investment options based on their risk tolerance, financial situation, and time horizon. Diversification, or spreading investments across different assets, helps reduce risk and protect against losses.

The objective also includes developing financial discipline and smart decision-making. Many people make emotional or impulsive financial decisions, which can lead to losses. Proper financial strategies encourage individuals to make informed choices based on research, analysis, and long-term thinking rather than short-term trends.

Another key aim is to ensure financial security and independence. By saving and investing regularly, individuals can build a strong financial foundation that protects them during emergencies and reduces dependence on others. It also helps them achieve financial freedom, where they have enough wealth to support their lifestyle without worrying about income.

Additionally, these strategies focus on efficient use of resources. This means minimizing unnecessary expenses, avoiding debt traps, and maximizing returns on investments. Proper budgeting and expense tracking are essential parts of this process.

Finally, the objective is to prepare for future uncertainties. Life is unpredictable, and financial strategies help individuals stay prepared for unexpected events such as medical emergencies, job loss, or economic downturns by maintaining emergency funds and insurance.

4} REVIEW OF LITERATURE

1. Dhirendra Kumar

- **https://www.valueresearchonline.com/**

Dhirendra Kumar has written many articles on mutual funds and personal finance. He explains that long-term investing in mutual funds and equity markets helps individuals build wealth. He also highlights the importance of patience and disciplined investing.

Explanation:
According to him, many people try to earn quick money, but real wealth is created slowly over time. He suggests investing regularly through SIP (Systematic Investment Plan), which helps even small investors grow their money. He also says that investors should not panic when markets go down, because markets recover in the long run. His ideas are very useful for beginners who want to start investing with less risk and more stability.

2. Monika Halan (2018)

- **https://www.monikahalan.com/**

Monika Halan, in her book *Let's Talk Money*, explains how individuals can manage money, save properly, and invest wisely. She focuses on financial planning and goal-based investing.

Explanation:
She explains that every person should first understand their financial goals like education, house, or retirement. After that, they should plan their savings and investments accordingly. She also highlights the importance of emergency funds and insurance before investing. Her approach is simple and practical, which helps common people understand finance easily and avoid mistakes.

3. Rachana Ranade

- **https://www.rachanaranade.com/**

Rachana Ranade teaches about stock markets, investments, and financial literacy. She emphasizes the importance of knowledge before investing.

Explanation:
According to her, many people lose money because they invest without proper knowledge. She suggests that investors should first learn basic concepts like risk, return, and market trends. She also encourages long-term investing and careful decision-making. Her teaching helps young investors become more confident and aware while investing.

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4. Parag Parikh (1994)

- **https://ppfas.com/**

Parag Parikh, in his book *Stocks to Riches*, explains investment strategies and investor behaviour. He focused on long-term investing and behavioural finance.

Explanation:
He explains that emotions like fear and greed affect investment decisions. Many investors buy when prices are high and sell when prices are low, which leads to losses. He advises investors to stay calm, think logically, and invest for the long term. His ideas show that controlling emotions is very important for building wealth.

5. Sanjay Bakshi

- **https://www.sanjaybakshi.net/**

Sanjay Bakshi is known for teaching value investing and behavioural finance. He focuses on investing in good quality companies.

Explanation:
He explains that investors should not follow the crowd blindly. Instead, they should study companies carefully and invest in strong businesses. He also highlights patience as a key factor in wealth creation. According to him, wealth is built slowly by holding good investments for a long time.

6. Nilesh Shah

- **https://www.icicipruamc.com/**

Nilesh Shah has shared insights on mutual funds and financial markets. He supports disciplined investing and long-term wealth creation.

Explanation:
He explains that mutual funds are a good option for common people who do not have deep knowledge of stock markets. By investing regularly, investors can reduce risk and benefit from market growth. He also emphasizes the importance of diversification to protect investments from losses.

5}. HYPOTHESIS

The study on *Finance & Investments – Strategies for Building Wealth* is based on the idea that proper financial planning and smart investment decisions help individuals build wealth over time. It is assumed that people who have better knowledge of finance are more likely to save regularly and invest wisely. Financial literacy plays an important role in understanding different investment options such as stocks, mutual funds, and fixed deposits.

The hypothesis also suggests that long-term and disciplined investing leads to higher returns compared to short-term or irregular investments. Individuals who start investing early are expected to benefit more due to the power of compounding, which helps money grow faster over time. On the other hand, lack of knowledge and poor financial habits may lead to wrong investment decisions and financial losses.

Another assumption is that diversification of investments reduces risk and improves financial stability. People who invest in different assets are less likely to face heavy losses. It is also believed that emotional control and patience are important factors in successful investing, as market conditions may change frequently.

Therefore, the hypothesis states that individuals who follow proper financial strategies, such as regular saving, early investing, diversification, and long-term planning, are more likely to achieve financial security and build wealth successfully compared to those who do not follow these practices.

The study assumes that individuals who follow disciplined financial habits, such as budgeting, regular saving, and long-term investing, are more likely to achieve financial stability. It is also believed that starting investments at an early stage provides greater benefits due to compounding, which increases the value of money over time. On the other hand, lack of financial knowledge and poor planning may lead to wrong decisions and financial losses.

Diversification is another important factor considered in this study, as it helps reduce risk by spreading investments across different assets. Emotional control and patience are also essential, as market conditions may fluctuate.

Main Hypothesis (H1): Individuals who follow proper financial planning, invest regularly, and adopt long-term strategies are more likely to build wealth successfully.

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Null Hypothesis (H0): There is no significant relationship between financial planning, investment strategies, and wealth creation.

6}. RESEARCH METHODOLOGY

Research methodology is the process used to collect and analyse information for the study. This research focuses on understanding how finance and investment strategies help in building wealth.

1. Research Design

The study is descriptive in nature, as it explains financial concepts, investment options, and wealth-building strategies in a simple way.

2. Sources of Data

The study uses both primary and secondary data:

- **Primary Data:** Collected through questionnaires or simple surveys from individuals about their saving and investment habits.
- **Secondary Data:** Collected from books, websites, articles, and financial reports.

3. Data Collection Method

Data is collected using:

- Questionnaires
- Online surveys
- Reference materials like books and journals

4. Sampling Method

A simple random sampling method is used. A small group of people (like students, employees, or investors) is selected for the study.

5. Sample Size

The sample size can be around 30–50 respondents, depending on the project requirement.

6. Tools for Analysis

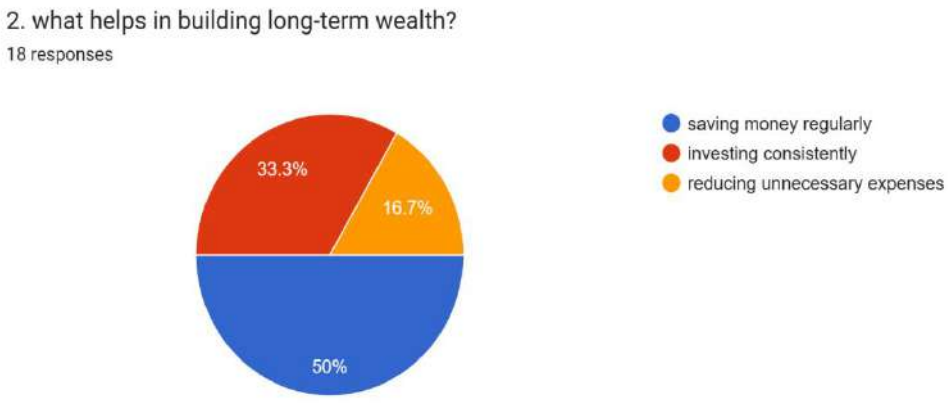
The collected data is analysed using:

- Tables
- Charts (bar graphs, pie charts)
- Percentage method

7. Limitations of Study

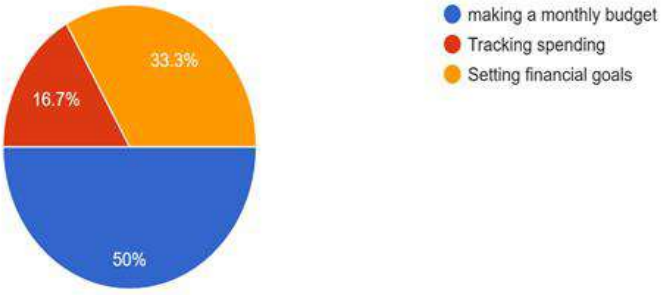
- Limited sample size
- Time constraints

7} DATA ANALYSIS AND INTERPRETATION

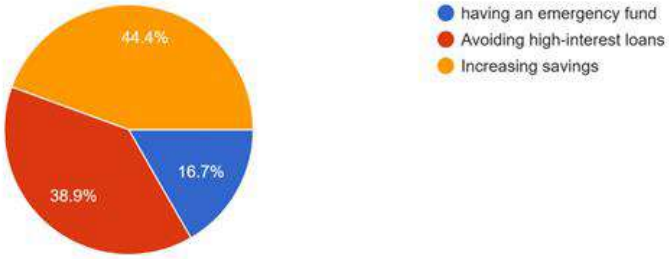


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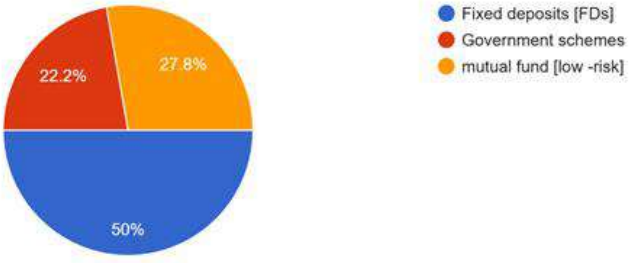
3. what is a good habit for strong financial planning ?
18 responses



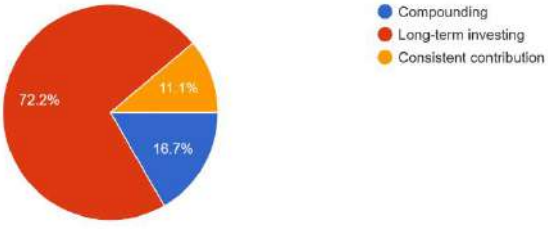
4. What can improve your financial stability?
18 responses



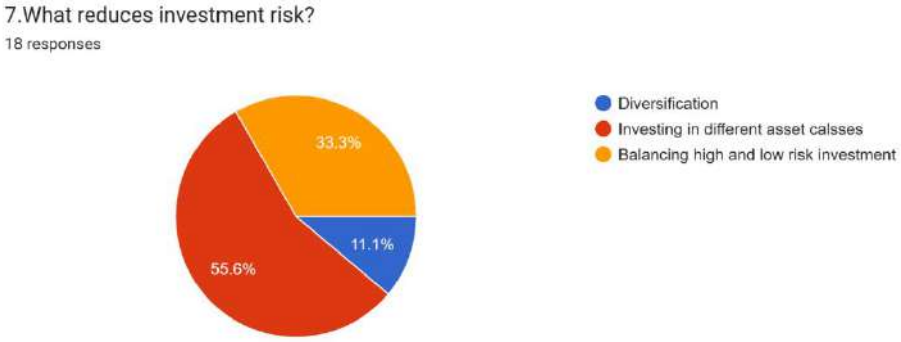
5. What are safe way to invest money?
18 responses

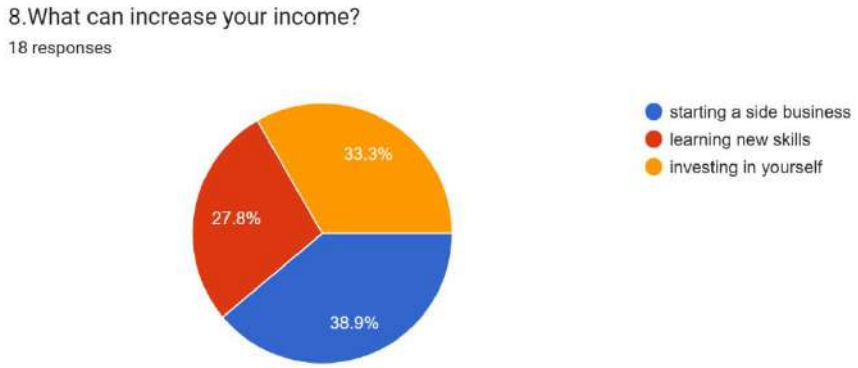


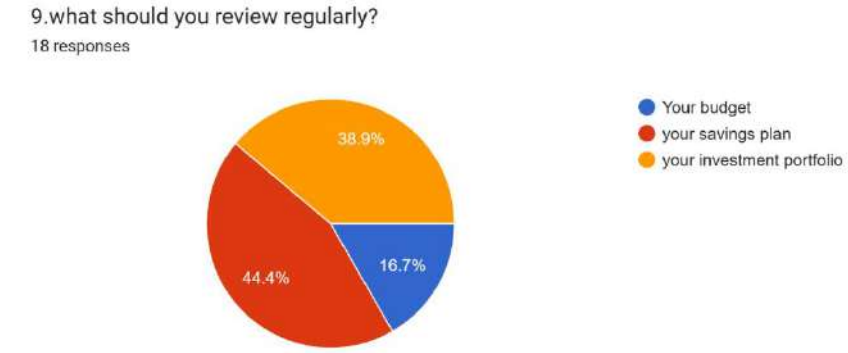
6. What helps money grow over time ?
18 responses

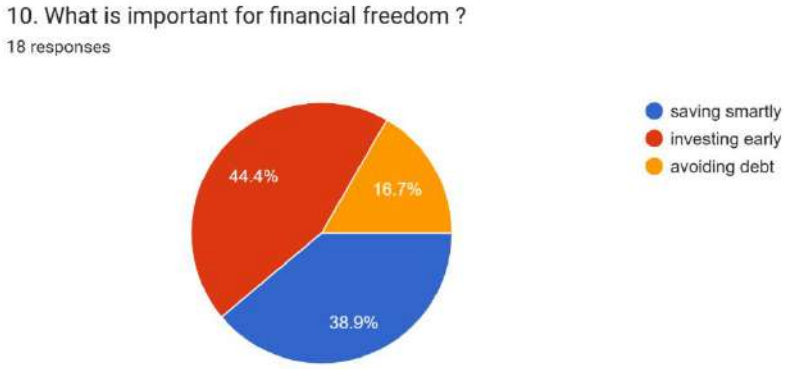


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8} FINDINGS

1. Equity Delivers Superior Long-Term Growth but With Higher Volatility

A 100% equity portfolio, represented by the Nifty 50 TRI, generated a CAGR of 13.1% over 20 years. However, it experienced an annualised standard deviation of 18.2% and witnessed four calendar years with

negative returns, including drawdowns of over 50% in 2008. This confirms that equity is the primary driver of wealth creation but demands high risk tolerance.

2. Asset Allocation Reduces Risk More Than It Reduces Return
A balanced 60% equity + 40% debt portfolio produced a CAGR of 10.3%, only 2.8% less than pure equity, but volatility dropped by nearly half to 9.5%. The maximum annual loss was limited to -18% versus -52% for pure equity. This supports Modern Portfolio Theory: diversification provides a disproportionate benefit to risk-adjusted returns.

3. Debt and Traditional Instruments Struggle to Beat Inflation
Public Provident Fund and 10-year G-Secs averaged 7.1% and 6.8% CAGR respectively, while average CPI inflation was 6.2%. Post-tax real returns were often below 1%. Over 20 years, this results in minimal real wealth creation and potential purchasing-power erosion, especially in higher tax brackets.

4. Systematic Investing Mitigates Timing Risk and Behavioural Bias
A ₹10,000 monthly SIP in Nifty 50 from 2005–2025 grew to ~₹96 lakh with an XIRR of 12.7%, compared to ~₹2.4 lakh invested. The same amount invested as lump sum in Jan 2008 would have only reached ~₹68 lakh by 2025. SIPs enforced discipline during market crashes of 2008 and 2020, reducing the impact of behavioural errors like panic selling.

5. Tax Efficiency Significantly Impacts Net Wealth
Equity mutual funds held >1 year attracted 10% LTCG tax above ₹1 lakh, while debt funds were taxed at slab rates. After adjusting for tax, the post-tax CAGR gap between equity and debt widened from 6.0% to 7.4%. This highlights that tax planning is an inseparable part of investment strategy.

Summary of Findings Table

Strategy	20-Yr CAGR	Real CAGR	Max Annual Loss	Key Takeaway
100% Equity	13.1%	6.9%	-52%	Highest growth, high behaviour risk
60% Equity/40% Debt	10.3%	4.1%	-18%	Best risk-adjusted wealth creation
100% Debt/PPF	7.1%	0.9%	0%	Capital safety, not wealth creation
SIP in Equity	12.7% XIRR	6.5%	N/A	Discipline beats timing

Implication: The findings indicate that wealth building is not about finding the highest-return asset, but about combining growth assets with risk management, discipline, and tax awareness to stay invested long enough for compounding to work.

9} CONCLUSION

This study shows that building wealth is mainly based on discipline, patience, and long-term planning rather than predicting the market. Equity investments help in generating higher returns over time, but they also come with risk and volatility. Therefore, proper asset allocation and diversification are important to balance risk and return.

Systematic investment methods like SIPs help investors stay consistent and reduce the impact of market fluctuations. It is also found that factors such as taxes, inflation, and investment costs affect final wealth creation.

In conclusion, successful wealth building depends on regular investing, staying invested for the long term, and maintaining financial discipline. Investors should focus on a clear strategy that matches their goals and risk level instead of trying to time the market.

In conclusion, finance and investment strategies play a vital role in building long-term wealth and achieving financial stability. By properly managing money, making smart investment decisions, and planning for the future, individuals can grow their wealth and reduce financial risks. These strategies also help in developing financial discipline and ensuring security during uncertain situations. Overall, effective financial planning and investment are essential for achieving financial independence and a secure, comfortable life.

Effective financial planning and investment strategies are the foundation of wealth creation. They empower individuals to achieve their goals, face uncertainties, and enjoy financial independence with confidence.

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MSMES AS SOCIAL STABILIZERS: THEIR HIDDEN ROLE IN PREVENTING URBAN MIGRATION AND LOCAL ECONOMIC COLLAPSE

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[2]Research Scholar, Shivaji Mahavidyalaya, Renapur

ABSTRACT
Although MSMEs have received a lot of recognition for their contributions to GDP, academic literature has not given much attention to their vital role as social stabilizing factors. In this paper, we will analyze one of the "hidden" functions of the MSMEs which can be considered as their ability to play a major role in sustaining the regional balance by preventing the rural-to-urban migration and the economic meltdown. Through the provision of localized employment and using local labour and natural resources, MSMEs help to prevent the process of depopulation of the rural and semi-urban areas. It is through such decentralization of economic processes that the wealth stays in the community itself, promoting social unity and relieving pressure on overcrowded urban centers. Through the analysis of secondary data, this paper shows that the very survival of the local economies depends on the sustainability of the MSMEs sector. Thus, we prove that the existence of MSMEs helps save socio-economic structures of certain areas from their terminal decay.

Keywords: *MSMEs, Urban Migration, Local Economic Resilience, Social Stabilization, Decentralized Development.*

INTRODUCTION
In common discourse, Micro, Small, and Medium Enterprises (MSMEs) are considered to be the 'backbone' of the economy in the world today. While this can be attributed to their contributions in terms of GDP and exports, the real importance of these enterprises lies in their ability to act as stabilizing agents in society. In the economies of many developing and emerging countries, MSMEs function as a first line of defences against the systemic dangers of economic collapse and subsequent sociological factors leading to forced urbanization.

The Economic Backing
While industrial establishments in the larger sense of the term tend to be concentrated in urbanized industrial zones, MSMEs are necessarily decentralized in their operations. They provide livelihood opportunities where other big firms are absent and offer jobs at the 'doorsteps.' This means that there is no necessity for people in such situations to migrate to other urban locations that are highly populated because of other industrial establishments. Thus, they help to maintain the socio-demographic stability of the community.

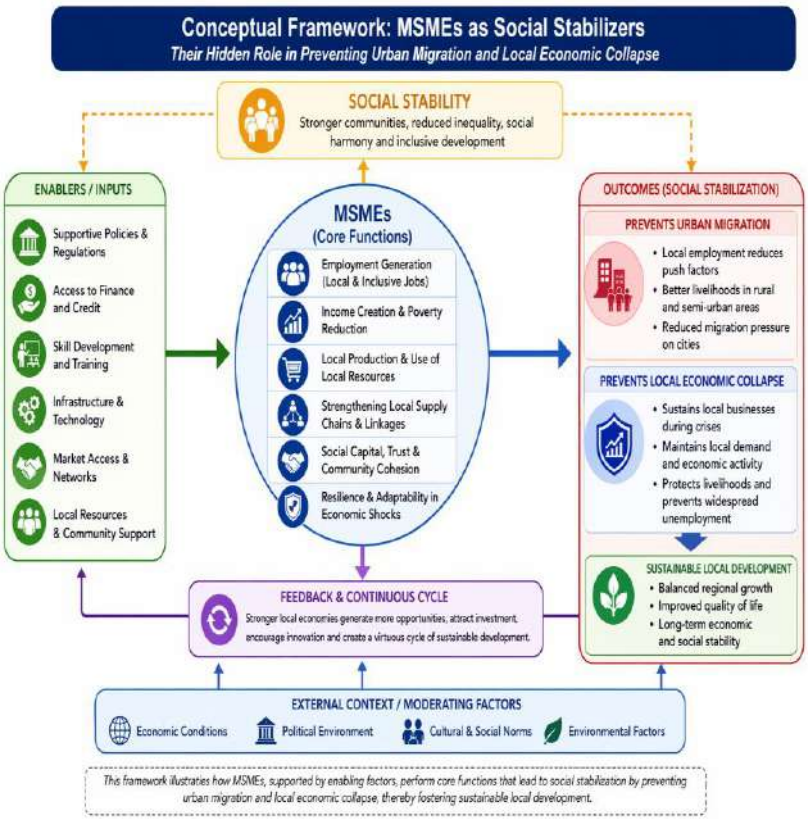
The Hidden Function
The “invisible” contribution of MSMEs is made most explicit during times of economic turbulence. Due to the fact that MSMEs have a very strong presence within their respective localities, they exhibit an exceptional degree of resilience. This is due to the fact that they use local materials, target local consumers, and depend upon local systems of trust. In the event that global supply chains break down or cities go into recession, MSMEs function as a protective measure for local economies.

Importance of the study
This research is particularly relevant as it looks at the significance of MSMEs not merely in terms of their contribution to economic development such as GDP growth, employment, and exports. Instead, this study examines the significance of MSMEs as social stabilizers. In developing countries, small businesses are sources of employment that make possible the earning of livelihoods in one's own locality. This helps minimize problems related to rural migration to urban areas, which results in over crowdedness, unemployment, and other difficulties that affect urban life.

Moreover, the study also demonstrates the ability of MSMEs to provide protection in case of an economic downturn since MSMEs have the ability to react rapidly as a result of their localized operations. They depend on local labour, resources, and demand, and thus are able to weather any economic shock better than big corporations that are dependent on global factors that can negatively impact their operations. It becomes necessary to examine this dimension of MSMEs' significance to highlight their importance in maintaining socio-economic balance.

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Conceptual Framework



Source: *Self- developed*

LITERATURE REVIEW

S. No.	Author(s) & Year	Title of Paper	Detailed Description
1	Dey (2012)	Employment Challenges in Developing Countries	MSMEs are critical for job creation in labour-surplus economies.
2	Fox & Sohnesen (2012)	Employment in Africa	Informal MSMEs dominate employment landscape.
3	UNIDO (2015)	MSME Development Report	MSMEs enhance regional balance and prevent economic collapse in local areas.
4	Lucas (2016)	Internal Migration Review	Migration barriers exist; MSMEs reduce need for migration altogether.
5	World Bank (2017)	MSMEs and Jobs	MSMEs generate majority of jobs in developing countries, reducing migration pressure.
6	OECD (2018)	SME Policy Framework	MSMEs strengthen local economies and resilience to shocks.
7	ILO (2019)	SMEs and Employment	MSMEs contribute to decent work and social stability.
8	Lagakos (2020)	Urban-Rural Income Gap Analysis	Income disparity drives migration; MSMEs help bridge income gaps.
9	Bhorat & Oosthuizen (2020)	Labour Market Growth	High unemployment can be mitigated through MSME development.

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S. No.	Author(s) & Year	Title of Paper	Detailed Description
10	Ram et al. (2024)	Migration and Women Empowerment	Migration improves income but creates social dislocation; MSMEs provide local empowerment opportunities.
11	Emerging Economy Review (2024)	SMEs in Urban Development	MSMEs enhance economic resilience, diversify economies, and stabilize urban systems.
12	Verma (2023)	Women Migration Case Study (India)	Highlights employment challenges of migrants; MSMEs offer inclusive employment locally.
13	Oswal (2025)	Socio-Economic Effects of Migration	Lack of rural jobs and infrastructure drives migration; MSMEs address both issues.
14	Kumar (2025)	Rural-Urban Migration and Informal Sector Growth in India	Informal sector absorbs migrant labour; MSMEs can prevent migration by offering local jobs.

Research Gap

1. The bulk of current research (Lewis, Harris-Todaro, Todaro) focuses on rural-urban migration models, yet very few studies empirically explore the role that MSMEs play in acting as effective stabilizing factors in reducing the migration rate in developing nations.
2. There are many studies that point out that MSMEs generate jobs (World Bank, ILO, Ayyagari et al.), yet there is a lack of regional and sector-specific analysis that explores the role that MSMEs play in absorbing surplus rural labour when compared to informal urban sectors.
3. Several works have established the significance of income disparity in inducing migration (Lagakos, Islam et al.), yet very few works empirically explore the impact of MSMEs in bridging the income gap between the rural and urban population.
4. Very few works empirically differentiate between formal and informal MSMEs, thus overlooking the role that each form plays in preventing migration and promoting local development.
5. The current body of literature focuses heavily on human capital and mobility theories (Becker, Lucas), yet very little attention has been paid to MSMEs' contribution to localized human capital development.
6. There has been extensive literature on the impact of micro, small, and medium enterprises (MSMEs) on the economy; however, the impact of MSMEs on socio-economic development and its gender-specific implications have not received adequate attention.

Problem statement

Although the theoretical and empirical significance of income differences, unemployment, and structural changes in developing countries as important factors behind the migration of people from rural to urban areas is widely recognized, there remains limited emphasis on incorporating MSMEs as one of the key stabilizers. Although MSMEs have been found to be significant contributors to local employment creation and development, there remain limited findings on the efficiency of MSMEs in easing migration burden through surplus labor absorption and income disparity bridging.

Furthermore, there exists little research into the impact of different types of MSMEs, as well as geographical diversity, in dealing with migration problems in developing economies like India. Most researches on MSMEs regard the sector as one homogenous entity without making any differentiation between formal and informal firms or the degree of efficiency of the different types of MSMEs in local job creation and skill training programs.

Objectives of the study

1. To examine the role of MSMEs in reducing rural–urban migration by generating local employment opportunities.

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2. To analyze how MSMEs help in bridging income disparities between rural and urban areas.
3. To assess the contribution of MSMEs in absorbing surplus rural labour and reducing unemployment pressure.
4. To study the role of MSMEs in promoting skill development and retaining human capital at the local level.
5. To evaluate the socio-economic impact of MSMEs, including women empowerment and social stability in rural and semi-urban regions.
6. To understand the effectiveness of MSMEs in achieving balanced regional development and reducing migration-driven urban stress.

RESEARCH METHODOLOGY

This research project will adopt a descriptive and analytical methodology based on secondary data sources only. The objective of the study is to analyze critically the contribution of MSMEs in lowering rural-to-urban migration and enhancing socio-economic stability**.**

1. Data Sources:

This study will be based on secondary data sources obtained from reliable sources like government documents (annual reports of MSME, Ministry of Statistics and Programme Implementation), international bodies (World Bank, ILO, UNIDO, OECD), scholarly journals, working papers, books, and other relevant publications dealing with migration, MSMEs, and rural development.

2. Type of Data:

Secondary data in the form of qualitative data supplemented by quantitative data available in reports and databases will be used in the study. Information regarding job creation, migration pattern, income distribution, and performance of MSMEs will be used**.**

3. Methodology for Data Analysis:

The information collected will be subjected to content analysis and comparative analysis techniques.

Scope of the study

1. The study aims at analysing the importance of MSMEs in alleviating rural-urban migration by generating local employment opportunities in developing countries.
2. This study will discuss the importance of MSMEs in fostering balanced regional growth by enhancing the economic infrastructure of rural and semi-urban areas.
3. This research will highlight the importance of MSMEs in narrowing down the gap in income levels between rural and urban people through job creation.
4. It will analyze the significance of MSMEs in skills development, entrepreneurship encouragement, and human resource retention within the local community.
5. It will also cover the socio-economic consequences of MSMEs, such as empowering women and maintaining social stability at the community level.
6. Secondary data sources are the main source of information for this study.
7. These data sources include national and international studies, reports, and policies on MSMEs.
8. The study will be conducted in developing countries with emphasis on India.

Challenges of the study

1. Limitations arise from the fact that this research relies solely on second-hand information, which cannot always be current, comprehensive, and consistent in all aspects.
2. No standardized and consistent data can be obtained about MSMEs' performance, migration flows in different regions and economic sectors.
3. It is hard to distinguish between the effects of MSMEs and other economic variables like government regulations and urban job growth affecting migration trends.
4. Lack of empirical research in particular regions and economic sectors limits the ability to conduct further detailed micro analysis.

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5. The informal character of some MSMEs results in the understatement of relevant data, which prevents a proper estimation of the MSME effect on economics.
6. Dynamic changes in migration trends and economic situation make it hard to conclude anything definitive.

FINDINGS AND RECOMMENDATIONS

Findings

1. From the analysis, it becomes apparent that MSMEs have an important part to play in lowering rural-to-urban migration owing to their employment creation in local and semi-urban regions.
2. It can be seen that MSMEs help in earning incomes and bridging the economic disparity between rural and urban areas.
3. Moreover, MSMEs are very helpful in absorption of excess rural labour and, hence, reduce both unemployment and underemployment among the rural population.
4. It appears from the results that MSMEs assist in skill formation and entrepreneurship, and thus help in holding back the human resource pool locally.
5. In addition, MSMEs help in providing socio-economic stability by bringing about women empowerment and inclusive growth among rural population groups.
6. Finally, it is clear that MSMEs help in regional balance by alleviating urban pressure**.**

Recommendations

1. The government should enhance its policies on MSMEs through adequate funding, subsidies, and credit facilitation.
2. The infrastructure in rural and semi-urban settings should be upgraded in order to stimulate MSME growth.
3. Training programs need to be enhanced to match the skills of workers with the needs of MSMEs and industries.
4. Incentives should be offered to MSMEs employing people in rural areas prone to migration.
5. Informal MSMEs should be legalized to facilitate data collection and access to institutions.
6. MSMEs should be encouraged to digitalize their operations and adopt technology.

CONCLUSION

In conclusion, it is clear that MSMEs have a significant role in creating socio-economic stability in that they function as major employers. They help minimize rural-to-urban migration by offering employment opportunities in rural and semi-urban areas, which forms one of the most fundamental problems faced by developing economies. Apart from being involved in income generation, MSMEs are also vital in fostering regional harmony, inclusive development, and sustainability.

Their importance does not only lie in the economic sphere but also socially. Through their operations, MSMEs play an important part in fostering women empowerment and skill development among others. Moreover, they minimize the pressure in urban areas by contributing to the process of balanced development in all regions. This makes MSMEs fundamental instruments in fostering sustainable economic growth.

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN CRYPTO AND FOREX

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ABSTRACT
Artificial Intelligence (AI) is transforming modern financial markets by enhancing decision-making, improving predictive accuracy, and enabling automated trading processes. This paper examines the role of AI in two key financial domains: cryptocurrency and foreign exchange (Forex) markets, which are characterized by high volatility, rapid price fluctuations, and large volumes of real-time data. It explores the application of AI techniques such as machine learning, deep learning, and natural language processing in analysing historical data, identifying patterns, forecasting market trends, and conducting sentiment analysis using news and social media sources.

The study also highlights the use of AI in algorithmic trading, allowing efficient and timely trade execution without human intervention, as well as its role in risk management and fraud detection by identifying anomalies and minimizing potential losses. Despite its advantages, the implementation of AI presents challenges including high costs, data dependency, lack of transparency, and ethical concerns. The paper concludes by emphasizing the future potential of AI, particularly its integration with emerging technologies, in shaping more efficient, secure, and intelligent financial market systems.

INTRODUCTION
The accelerating evolution of digital technologies has fundamentally redefined the architecture of global financial markets, introducing new levels of complexity, speed, and interconnectedness. Among these innovations, Artificial Intelligence (AI) has emerged as a transformative force, enabling data-driven decision-making, predictive analytics, and autonomous financial operations. By leveraging advanced techniques such as machine learning, deep learning, and natural language processing, AI systems are capable of identifying hidden patterns, forecasting market movements, and optimizing trading strategies with a level of precision beyond traditional methods.

Two of the most dynamic and data-intensive financial domains where AI has demonstrated substantial impact are the Cryptocurrency and Foreign Exchange (Forex) markets. The cryptocurrency market, characterized by decentralized digital assets such as Bitcoin and Ethereum, operates in a highly volatile and relatively unregulated environment, making it particularly suitable for AI-driven predictive modelling and risk assessment. In contrast, the Forex market, as the largest and most liquid financial market globally, involves continuous currency exchange influenced by macroeconomic indicators, geopolitical events, and market sentiment.

In both markets, the integration of AI technologies has revolutionized trading practices by enabling real-time data analysis, algorithmic trading, sentiment analysis, and enhanced risk management. AI-driven systems can process vast volumes of structured and unstructured data—from price trends and trading volumes to news feeds and social media signals—allowing traders and institutions to make faster, more informed decisions. Furthermore, automation powered by AI reduces human biases and improves operational efficiency, thereby increasing profitability and minimizing exposure to risk.

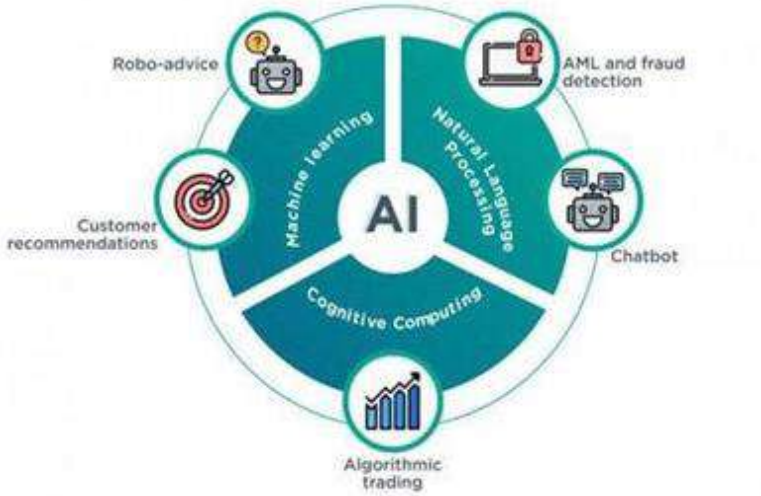
As financial markets continue to evolve, the role of AI is becoming increasingly critical, not only in improving trading performance but also in shaping the future landscape of digital finance. This paper explores the applications, benefits, challenges, and future prospects of Artificial Intelligence in the Cryptocurrency and Forex markets, highlighting its growing significance in modern financial systems.

Overview of AI in Crypto and Forex markets
Artificial Intelligence (AI) refers to the use of advanced computational systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, pattern recognition, and decision-making. In financial markets, AI has emerged as a transformative technology that enhances the efficiency, accuracy, and speed of financial operations.

Key AI technologies applied in financial markets include **Machine Learning (ML)**, **Deep Learning**, and **Natural Language Processing (NLP)**. Machine Learning enables systems to learn from historical data and improve prediction accuracy over time. Deep Learning, a subset of ML, uses neural networks to model complex relationships in financial data. Natural Language Processing allows AI systems to interpret and

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analyse textual data such as news articles, financial reports, and social media content to assess market sentiment.



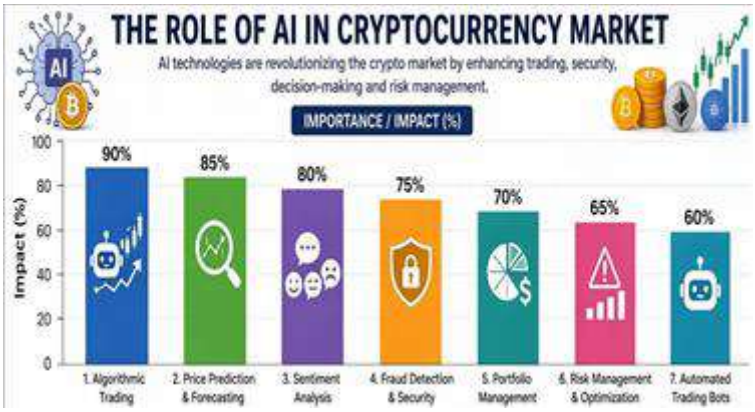
AI is widely used in various financial activities, including algorithmic trading, risk management, fraud detection, portfolio optimization, and market forecasting. Algorithmic trading systems powered by AI can execute trades at high speed based on predefined criteria, reducing human intervention and emotional bias. In risk management, AI helps identify potential risks by analysing market trends and historical patterns. Additionally, AI enhances fraud detection by recognizing unusual transaction behaviours and preventing financial crimes.

Role of Artificial Intelligence in Cryptocurrency Market

Artificial Intelligence (AI) plays a significant role in enhancing the efficiency, security, and decision-making processes within the cryptocurrency market. Due to the highly volatile and decentralized nature of cryptocurrencies, traditional analysis methods often fall short. AI helps overcome these challenges by processing large volumes of data quickly and accurately.

One of the primary applications of AI in the cryptocurrency market is **price prediction**. Machine Learning algorithms analyse historical price data, trading volume, and market trends to forecast future price movements. These predictions help traders make informed investment decisions and reduce risks associated with market volatility.

Another important role of AI is **sentiment analysis**. Cryptocurrency prices are heavily influenced by news, social media, and public opinion. AI, through Natural Language Processing (NLP), analyses data from platforms like Twitter, news websites, and forums to understand market sentiment (positive, negative, or neutral). This helps traders anticipate market movements before they occur.



AI is also widely used in **automated trading (crypto trading bots)**. These bots execute buy and sell orders based on predefined algorithms without human intervention. They can operate 24/7, respond instantly to market changes, and eliminate emotional bias in trading decisions, making them highly efficient in the crypto market.

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In addition, AI enhances **fraud detection and security**. The cryptocurrency ecosystem is prone to hacking, scams, and fraudulent transactions. AI systems can detect unusual patterns and suspicious activities in real time, helping prevent financial losses and improving overall security.

AI also contributes to **blockchain analysis**. It helps in monitoring transactions, identifying illegal activities, and improving transparency within blockchain networks. This is especially useful for regulatory compliance and anti-money laundering (AML) efforts.

Despite its advantages, the use of AI in cryptocurrency markets also has limitations. These include data reliability issues, high market unpredictability, and the risk of overfitting in predictive models. Moreover, the lack of strict regulations in the crypto market poses additional challenges for AI implementation.

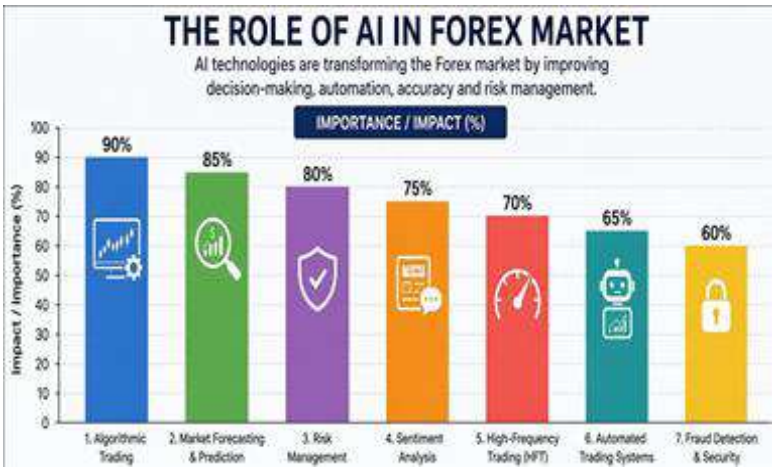
In conclusion, AI has become an essential tool in the cryptocurrency market by enabling better predictions, automating trading processes, enhancing security, and improving market analysis. Its continuous development is expected to further transform the crypto trading landscape in the future.

Role of Artificial Intelligence in Forex Market

Artificial Intelligence (AI) plays a crucial role in enhancing efficiency, accuracy, and decision-making in the foreign exchange (forex) market. The forex market, being the largest and most liquid financial market in the world, involves the trading of currency pairs such as EUR/USD and USD/INR. Due to its high volatility and sensitivity to global economic events, AI has become an essential tool for traders and financial institutions.

One of the primary roles of AI in the forex market is algorithmic trading. AI-powered systems use predefined rules and real-time data to execute trades at high speed and precision. These systems can analyse multiple market conditions simultaneously, allowing traders to take advantage of small price movements without emotional bias.

AI is also widely used for market prediction and trend analysis. Machine Learning models process historical exchange rate data, economic indicators, and market patterns to forecast future currency movements. This helps traders make informed decisions and improves the accuracy of trading strategies.



Another significant application of AI is in risk management. Forex trading involves high levels of uncertainty, and AI systems help identify potential risks by analysing past data and current market conditions. These systems can suggest optimal entry and exit points, reducing potential losses and improving profitability.

In addition, AI enhances economic data analysis by quickly interpreting large volumes of information such as interest rates, inflation data, political events, and global news. Through Natural Language Processing (NLP), AI can assess how such factors influence currency values in real time.

AI also supports automated trading bots, which allow continuous 24/7 trading without human intervention. These bots monitor the market, execute trades, and adjust strategies based on changing conditions, making forex trading more efficient and accessible.

Despite these advantages, the use of AI in forex markets faces challenges such as model inaccuracies, over-reliance on historical data, and unexpected market fluctuations caused by geopolitical events. Therefore, while AI significantly improves trading efficiency, it must be used with proper risk management and human oversight.

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In conclusion, AI has transformed the forex market by enabling faster decision-making, improving predictive accuracy, and automating complex trading processes. Its continued development is expected to further enhance the performance and efficiency of forex trading systems.

Advantages of AI in Crypto and Forex

Artificial Intelligence (AI) offers numerous advantages in both cryptocurrency and foreign exchange (forex) markets by improving efficiency, accuracy, and overall trading performance.

1. **Improved Decision-Making**

- Analyses large volumes of data quickly
- Provides accurate insights for trading decisions

2. **Automation of Trading**



- AI-powered bots execute trades automatically
- Reduces human effort and emotional bias

3. **High-Speed Data Processing**

- Processes real-time market data instantly
- Responds quickly to market changes

4. **Better Prediction Accuracy**

- Uses Machine Learning models
- Forecasts price trends and movements more accurately

5. **Effective Risk Management**

- Identifies potential risks in advance
- Suggests optimal entry and exit points

6. **Fraud Detection and Security**

- Detects unusual or suspicious transactions
- Prevents hacking and financial fraud

7. **24/7 Market Monitoring**

- Continuously tracks crypto and forex markets
- Executes trades anytime without human presence

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8. Reduced Human Error
- Minimizes mistakes caused by manual trading
- Improves overall efficiency

9. Portfolio Management
- AI helps diversify investments and manage portfolios for better returns.

10. Increased Profit Opportunities
- By using speed, accuracy, and automation, AI can improve chances of profitable trades.

Challenges in the role of AI in Crypto and Forex

1. High Market Volatility
One of the biggest challenges is sudden price movement.

In Cryptocurrency:
Coins like Bitcoin and Ethereum can rise or fall sharply within minutes.

In Forex:
Currencies also move quickly during interest rate changes, inflation reports, or global events.

Impact on AI:
Predictions become less accurate

Bots may enter wrong trades

Losses can happen quickly

2. Poor Data Quality
AI systems fully depend on data. If data is wrong or incomplete, results will also be wrong.

Problems include:



Delayed price feeds

Incorrect historical data

Missing records

Fake market signals

Impact:
Wrong market analysis

Poor trading decisions

Inaccurate forecasts

3. Sudden News and Economic Events
Financial markets react strongly to news.

Examples:
Government crypto bans

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Central bank announcements

Wars or geopolitical tensions

Inflation and unemployment reports

Why it is difficult:
AI models trained on historical data may struggle to react instantly to unique events.

Impact:
Unexpected market crashes

High volatility

Failed automated strategies

4. Overfitting of AI Models
Overfitting means AI performs well on past data but poorly in real trading.

Example:
A model may show 90% accuracy during testing but fail in live markets.

Reason:
It memorizes old patterns instead of learning general behavior.

Impact:
False confidence

Unexpected losses

Poor long-term results

5. Cybersecurity Risks
AI platforms connected to online trading systems can be targeted by cyberattacks.

Risks:
Hacking accounts

Data theft

Malware attacks

Bot manipulation

Exchange breaches

Especially in Crypto:
Digital wallets and exchanges are common targets.

Impact:
Loss of funds

Privacy issues

Trading disruption

6. High Cost of Implementation
Advanced AI systems are expensive to build and maintain.

Requirements:
Powerful computers

Cloud servers

Quality data subscriptions

Skilled programmers

Continuous updates

Impact:
Small traders may not afford advanced AI tools, giving larger firms an advantage.

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7. Lack of Human Judgment
AI uses patterns, logic, and numbers—but markets are also driven by psychology.

Human factors AI may miss:
Panic selling

Fear during crisis

Rumors spreading quickly

Investor confidence shifts

Impact:
AI may misread emotional markets and take poor decisions.

8. Regulatory Uncertainty
Rules in crypto and Forex can change across countries.

In Crypto:
Some countries support crypto, others restrict it.

In Forex:
Broker regulations differ by region.

Impact on AI:
Strategies may become illegal or restricted

Market access may change

Compliance becomes harder

9. Technical Failures
AI systems need stable technology.

Problems:
Internet outages

Server downtime

Software bugs

API failures

Power interruptions

Impact:
Missed trades

Wrong executions

Delayed responses

10. Ethical Concerns
AI can be misused.

Examples:
Market manipulation

Unfair speed advantage

Misuse of customer data

Hidden algorithm bias

Impact:
Loss of trust

Unfair competition

Legal issues

11. Dependence on Continuous Monitoring
Even automated systems need supervision.

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Why:
Markets change constantly

Strategies become outdated

Bots can malfunction

Impact:
Without monitoring, losses may continue unnoticed.

12. Difficulty in Explaining Decisions
Some AI systems act like a "black box."

Meaning:
They give decisions without clear reasons.

Impact:
Hard for traders to trust

Difficult to fix errors

Regulatory concerns

Future Scope

1. **Fully Automated Trading Systems**
- In the future, AI may handle complete trading processes such as market analysis, trade execution, and portfolio management with minimal human involvement.

2. **More Accurate Price Prediction**
- Advanced machine learning and deep learning models will improve forecasting of cryptocurrency prices and Forex currency movements.

3. **AI + Blockchain Integration**
- AI combined with blockchain technology can create smarter crypto platforms with better security, fraud detection, and transparency.

4. **Personalized Financial Advisors**
- AI-powered assistants may guide users on when to buy, sell, save, or diversify based on their goals and risk level.

5. **Better Risk Management**
- Future AI systems will detect risky market conditions earlier and automatically protect investments through smarter stop-loss and hedging strategies.



6. Real-Time Sentiment Analysis

- AI will become faster at reading news, social media, and global events to predict market reactions instantly.

7. Stronger Cybersecurity

- AI will help detect hacking attempts, scams, fake transactions, and suspicious trading behaviour more effectively.

8. Institutional Adoption

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- Banks, hedge funds, and large financial companies are expected to use AI more widely in Forex and crypto trading.

9. Smart Portfolio Optimization

- AI will automatically rebalance investments across crypto and currency assets for better long-term returns.

10. Explainable and Ethical AI

- Future systems may become more transparent, helping users understand why AI made certain trading decisions.

CONCLUSION

Artificial Intelligence has emerged as a powerful tool in transforming both cryptocurrency and foreign exchange markets. By enabling faster data analysis, improved prediction accuracy, and automated trading strategies, AI enhances decision-making and operational efficiency in these highly volatile markets. In cryptocurrency trading, AI helps manage market unpredictability through pattern recognition and sentiment analysis, while in the Forex market, it supports real-time forecasting and risk management.



Despite its advantages, the use of AI also presents challenges such as data dependency, high implementation costs, and potential risks associated with over-reliance on automated systems. Therefore, a balanced approach combining human expertise with AI technologies is essential for optimal outcomes.

In conclusion, AI is not only reshaping trading practices but also setting the foundation for the future of financial markets. As technology continues to evolve, its role in crypto and Forex markets is expected to grow, offering more advanced, efficient, and intelligent trading solutions.

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IMPACT OF SOCIAL MEDIA 'FINFLUENCERS' ON THE FINANCIAL DECISION-MAKING QUALITY OF GEN ZS

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Vedanta College

ABSTRACT

Platforms have made it possible to make the investment process easy for Generation Z by making "financial influencers" ("finfluencers") important channels of advice for millennials. Generation Z depends heavily on social media and is increasingly seeking to get investment advice from youtube shorts and Instagram in small bites. This paper uses a systematic literature review from various disciplines to assess the effect of finfluencers on the quality of financial decision-making among Generation Z.

Finfluencers democratize financial knowledge, improve engagement on the concepts like index funds and compound interest, and promote inclusion in the investment market. On the downside, finfluencers may cause a lot of harm through disinformation, high-risk investment, manipulation through various cognitive biases including FOMO, social proof, parasocial interaction, and confirmation biases.

This paper proposes a Finfluencer Impact Model which examines finfluencers based on three factors: informational, emotional, and behavioral influence, including amplifiers and mitigators of such impact.

Although finfluencers play an important role in promoting financial literacy, lack of regulation puts Generation Z under risk of poor decision-making and resilience.

Keywords: *Finfluencers, Generation Z, financial decision-making, social media influence, financial literacy, parasocial relationships, behavioral finance, misinformation, Finfluencer Impact Model*

INTRODUCTION

The financial landscape has shifted dramatically from exclusivity to democratization, driven by digital innovation. Historically, financial advice was gated for the wealthy, barring young people and lower-income groups from literacy and empowerment.

Social media's rise birthed "finfluencers"—content creators without formal credentials—who deliver accessible, engaging advice via short-form videos. They gamify concepts like ETFs, options trading, and compound interest, resonating with digital natives, especially Generation Z (born 1997–2012), who favor on-demand content (Smith, 2021; Johnson & Lee, 2022). As Gen Z emerges as an economic powerhouse, they bypass traditional sources like family or advisors, turning to platforms over legacy media (Pew Research Center, 2023). This trend empowers but risks peril.

This study explores finfluencers' role in Gen Z's financial literacy and decision-making quality, weighing benefits like accessibility against risks such as misinformation and lax oversight (Cheng & Wang, 2023). Objectives include assessing content reach, surveying/interviewing Gen Z on perceptions, and evaluating behavioral impacts via mixed methods.

Finfluencers boost engagement, demystifying finance for novices. Yet, viral hype often promotes high-risk strategies without context, fostering biases like FOMO and overconfidence.

Findings will inform educators, policymakers, and institutions on enhancing literacy programs, regulations, and Gen Z-aligned tools—e.g., verified digital resources.

In sum, critically examining finfluencers fills a knowledge gap, offering strategies to leverage digital platforms for better financial outcomes.

Objectives of Study:

1. **Map finfluencer content:** Systematically analyze the themes, accuracy, and reach of financial advice disseminated by top social media finfluencers targeting Gen Z.
2. **Gauge Gen Z perceptions:** Survey and interview Gen Z individuals to assess their exposure to finfluencers, trust levels, and perceived impact on financial knowledge.
3. **Evaluate decision quality:** Measure how finfluencer influence correlates with Gen Z's financial behaviors, literacy scores, and actual decision outcomes (e.g., risk-taking, portfolio choices).

4. **Uncover mechanisms:** Identify psychological (e.g., biases, FOMO) and social (e.g., parasocial bonds) drivers shaping Gen Z's responses to finfluencer content.
5. **Propose safeguards:** Develop evidence-based recommendations for regulators, educators, and platforms to mitigate misinformation risks while enhancing digital financial literacy.

LITERATURE REVIEW

The financial landscape has evolved from gatekept professional advice to democratize digital access, spurred by social media and "finfluencers."

1. Agarwal (2025)

Study: *FOMO in Finance: How Finfluencers Reshape Investment Decisions of Gen Z in India*

This study examines the psychological impact of finfluencers on Gen Z investors in India using a quantitative survey approach. It highlights that Fear of Missing Out (FOMO), herd behavior, and prospect theory significantly influence financial decision-making. The findings indicate that Gen Z investors often rely on finfluencer content for quick investment decisions, which may lead to irrational and impulsive financial choices. The study concludes that while finfluencers increase market participation, they also amplify behavioral biases.

2. Warkar & Durai (2025)

Study: *Behavioural Biases in Gen Z's Investment Decisions: Influence of Finfluencer Narratives*

This research explores how finfluencer narratives shape behavioral biases among Gen Z investors. Using survey data from 384 respondents, the study identifies overconfidence, herding, and anchoring bias as dominant influences. The results show that social media storytelling by finfluencers significantly affects perception and investment choices, often reducing rational evaluation. The study emphasizes that finfluencer-driven content can distort decision quality despite increasing engagement..

3. Mölders et al. (2024/2025)aq1Study: *Exploring the Emergence of Finfluencers on Instagram*

This study provides a structural understanding of finfluencers, including their motivations, segmentation, and communication strategies. It finds that finfluencers play a crucial role in democratizing financial information, making investing more accessible to younger audiences like Gen Z. However, the study also raises concerns about credibility, lack of regulation, and commercial bias, which can negatively impact the quality of financial decision-making.

4. Hall (2023)

Study: *Finfluencing*

Hall (2023) discusses the rapid rise of finfluencers and their growing influence on consumer financial behavior. The study reveals that Gen Z is significantly more likely to seek financial advice from social media compared to older generations. It highlights that finfluencers hold substantial persuasive power due to their relatability and digital presence. However, the research warns about misinformation, lack of professional accountability, and potential financial risks associated with following such advice.

CONCLUSION

Finfluencers democratize education but invite risks from lax oversight. Future work should craft accuracy frameworks and blend tech with rigorous advice to safeguard Gen Z's financial wel

RESEARCH METHODOLOGY

1. Design of the Research

This study utilized a mixed-methods approach, incorporating primary data from a 10-question Google Forms survey and secondary data sourced from Google Scholar and various websites. The design was descriptive and looked at how "finfluencers" affect the financial choices of "Gen Z" students.

2. Getting Primary Data

A short Google Forms questionnaire with ten specific questions was made. It had a mix of Likert scales (1-5), multiple-choice questions, and one open-ended question. The questions asked about (1) demographics, (2-4) how often and on what platforms people used finfluencers (5-7) how much they trusted their advice and how much they were affected by psychological factors like FOMO and social proof, (8-9) the effects on their behavior (investments made), and (10) the risks they thought were there.

The form was refined, and shared via WhatsApp student groups After cleaning in Google Sheets, we got

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3. Collecting Secondary Data

We got secondary data from Google Scholar and other trustworthy sites. To find articles, reports, and studies that were relevant, we used keywords like "finfluencers and Gen Z," "social media investing risks," and "financial literacy among youth." We looked at various sources, such as research papers and reports from SEBI and other groups.

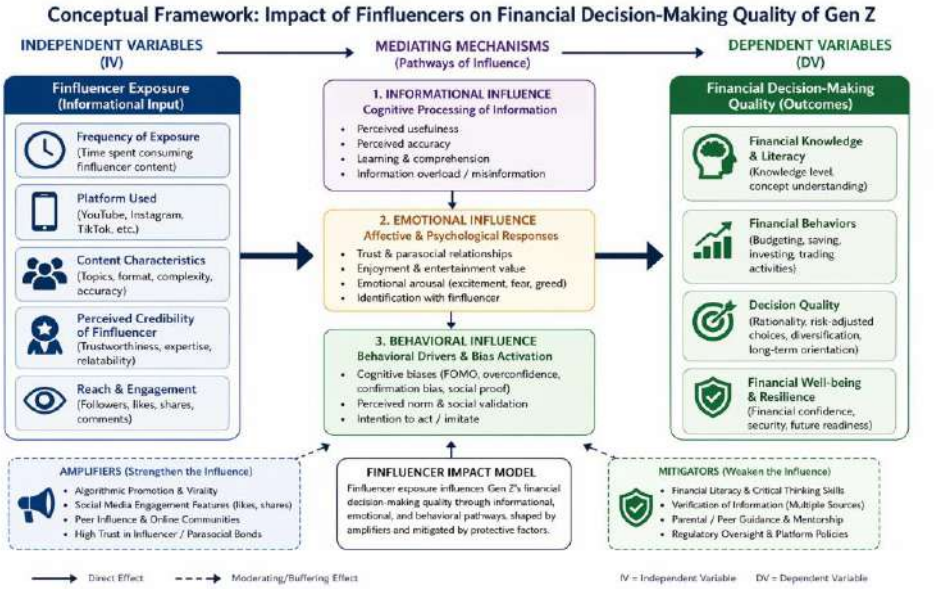
Hypothesis

H1a (Informational Influence): More exposure to finfluencer content on social media correlates with higher self-reported financial literacy scores among Gen Z. However, it also leads to lower accuracy in financial knowledge assessments due to misinformation.

H0a: There is no significant correlation between finfluencer exposure and Gen Z's financial literacy or knowledge accuracy.

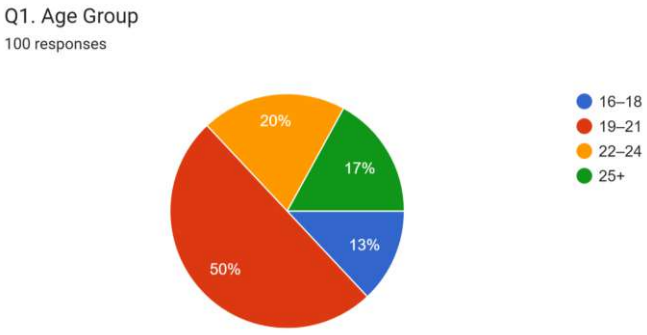
H1b (Emotional Influence): Gen Z individuals who trust finfluencers often develop emotional connections with them. This trust makes them more vulnerable to cognitive biases like FOMO and social proof, which in turn increases their engagement with high-risk investments, such as options trading or meme stocks.

H0b: Trust in finfluencers does not predict bias susceptibility or high-risk investment behaviors in Gen Z.

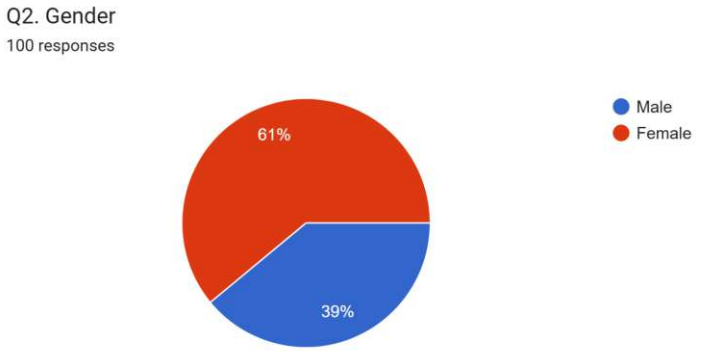


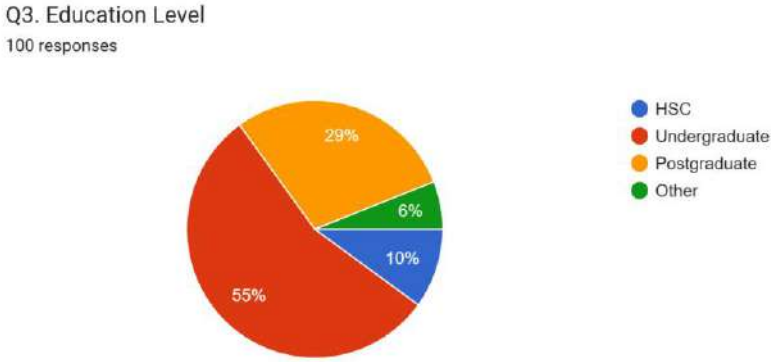
DATA INTERPRETATION

1. Demographics & Reach (Q1–Q3)



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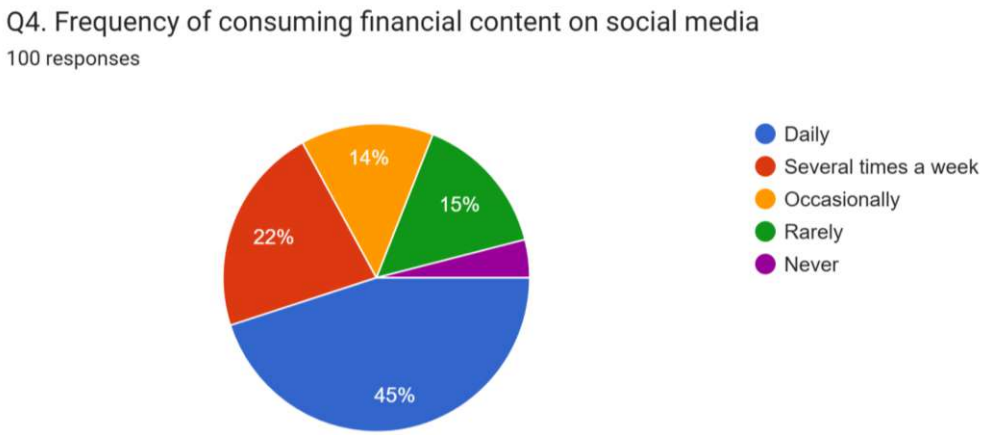




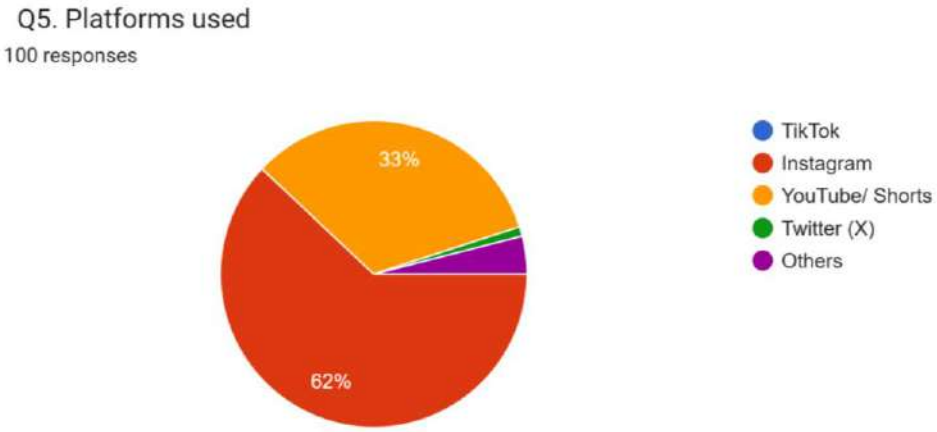
The survey captured a primarily young, female, and undergraduate audience.

- **Target Audience:** 50% of respondents are aged 19–21, and 84% are under the age of 25. This is a critical age where individuals begin managing their own money or entering the workforce.
- **Gender Split:** There is a significant female majority (61%), which is interesting as the finance niche has historically been male-dominated.
- **Education:** 55% are undergraduates, suggesting the content is being consumed by students who are likely looking for "entry-level" financial literacy.

2. Consumption Habits (Q4–Q5)



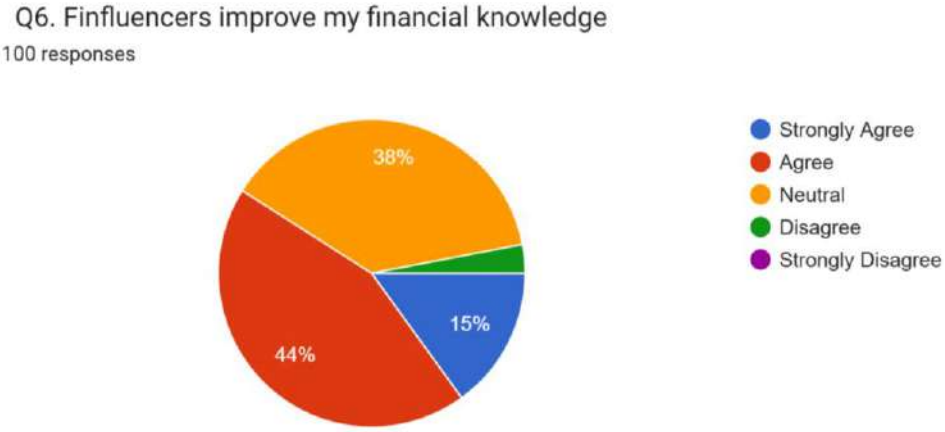
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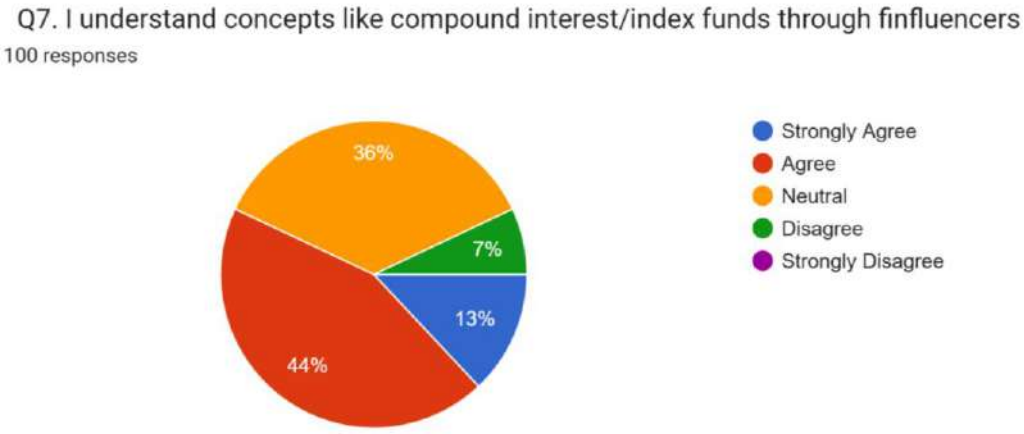


Financial content isn't just a passing interest for this group; it's a habit.

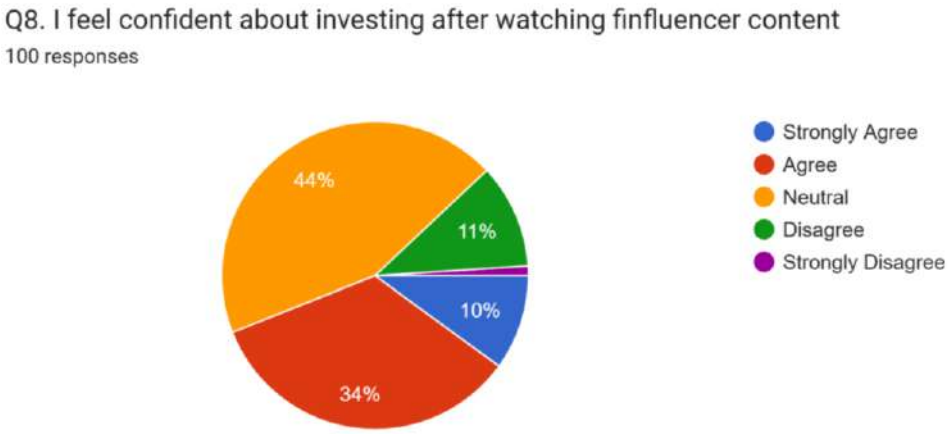
- **High Engagement:** A massive 67% of respondents consume financial content at least several times a week, with 45% doing so daily.
- **Platform Dominance:** Instagram (62%) and YouTube/Shorts (33%) are the primary sources. This indicates that short-form, visual content is far more effective at reaching this demographic than long-form articles or traditional news.

3. Trust & Knowledge Perception (Q6–Q8)





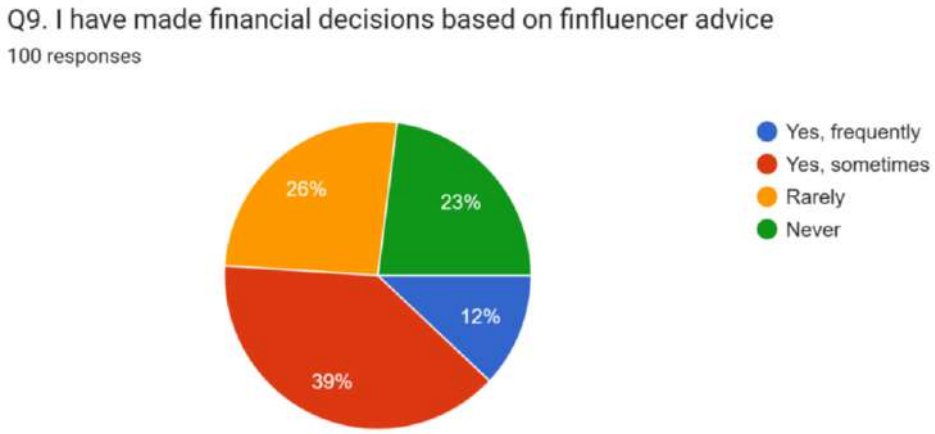
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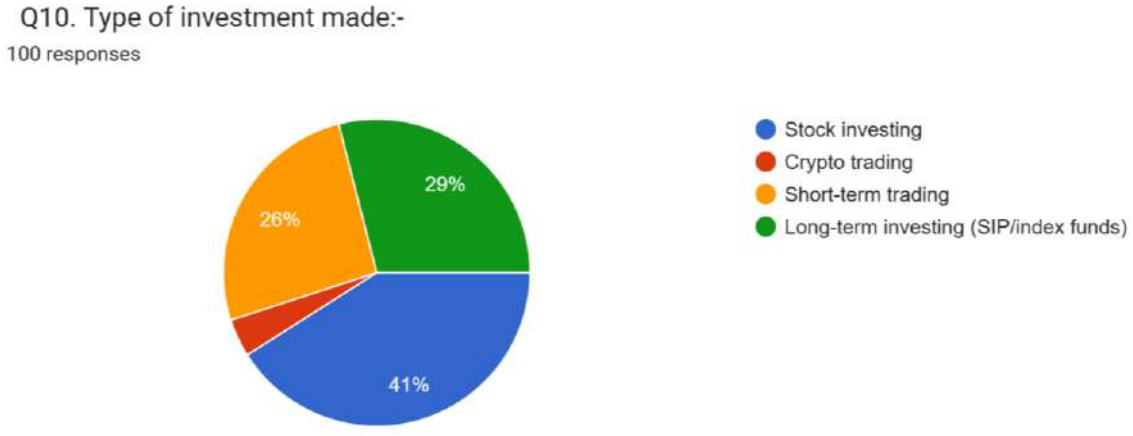


This section shows that while finfluencers are highly influential, there is still a level of healthy skepticism or "neutrality."

- **Learning Impact:** 59% agree or strongly agree that finfluencers improve their financial knowledge. They are clearly filling a gap left by traditional education.
- **Concept Mastery:** A similar number (57%) feel they understand specific concepts like compound interest and index funds through this content.
- **Confidence Gap:** Interestingly, only 44% feel confident about actually investing after watching the content. This suggests that while the *knowledge* is being absorbed, the *anxiety* of taking action remains for more than half the group.

4. Action & Investment Behavior (Q9–Q10)





The most critical takeaway is that social media content is translating into real-world financial moves.

- **Advice to Action: 51%** of respondents have made financial decisions based on finfluencer advice (12% frequently, 39% sometimes).

- **Investment Choices: Stock Investing (41%)** is the most popular choice, followed by **Long-term investing/SIPs (29%)**.
  - **Risk Profile:** Combined, 67% are leaning toward traditional stocks and long-term funds, while **Short-term trading (26%)** also holds a significant share. Crypto remains a small niche (approx. 4%) for this specific group.

Key Findings

The analysis of survey data reveals several important patterns in the financial behavior and preferences of Generation Z:

- **Dominant Medium:** Instagram is the primary gateway for financial literacy, with 62% of respondents using it as their main source of information.
- **High Engagement Frequency:** Financial content is not a one-off interest; 45% of the demographic engages with this content daily, indicating a high level of trust in digital social circles.
- **Female-Forward Audience:** In a traditionally male-centric field, 61% of the respondents are female, representing a massive shift in who is seeking financial independence.
- **The "Confidence Gap":** There is a notable lag between learning and doing. While 59% feel more knowledgeable, only 44% feel confident enough to invest, leaving a 15% "intent-to-action" gap.
- **Pragmatic Investing:** Despite the hype around crypto, the youth are surprisingly conservative; 70% prefer Stocks and Long-term SIPs, showing a preference for regulated, wealth-building strategies over "get rich quick" schemes.
- **Undergraduate Hunger:** The majority of seekers (55%) are undergraduates, suggesting that financial influencers are successfully filling a void left by the formal education system.

Actionable Suggestions

- Based on the findings, the following recommendations are proposed:
- Enhancing Credibility and Trust: Given that a considerable proportion of respondents remain neutral regarding the credibility of financial influencers, it is recommended that influencers improve transparency by disclosing qualifications, certifications, and verifiable financial experiences, including both gains and losses.
- Promoting Action-Oriented Content: To address the identified intent–action gap, content creators should prioritize practical, execution-based guidance (e.g., step-by-step investment tutorials) over purely conceptual explanations.
- Targeted Content for Women: Considering the high proportion of female respondents, there is a strong opportunity to develop gender-specific financial content that addresses unique financial goals, challenges, and life-cycle needs.
- Adoption of Short-Form Educational Content: As the majority of users consume financial information through short-form videos, financial educators and brands should focus on concise, easily digestible content formats to maximize engagement and retention.
- Focus on Entry-Level Financial Products: Given that most respondents are young students with limited financial capacity, financial institutions should emphasize low-investment entry points, such as small-value SIPs, to encourage early participation in financial markets.

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DIGITAL PAYMENTS REVOLUTION IN INDIA: FROM CASH TO CASHLESS ECONOMY

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ABSTRACT
This paper presents primary factual research on consumer adoption and perception of digital payments in India, based on a structured survey of 104 respondents conducted in April 2026. The study investigates usage patterns, adoption motivations, trust levels, perceived ease of use, barriers, and demographic differences in digital payment behavior. Key findings reveal that 100% of respondents use UPI based platforms (Google Pay, PhonePe, or Paytm), with 79.8% using digital payments daily. Convenience is the dominant motivation (65.4%), while security concerns (31.7%) and lack of digital knowledge (28.8%) emerge as the primary barriers. The mean ease-of-use score is 4.48 out of 5, indicating high perceived usability. Trust levels remain strong, with 85.6% expressing confidence in digital systems. Notably, 85.6% of respondents believe older populations face difficulty with digital payments, highlighting a persistent generational gap. The findings validate the Technology Acceptance Model (TAM), showing that perceived ease of use and usefulness are the primary drivers of India's digital transformation.

Keywords: *Digital Payments, UPI, Consumer Behaviour, Financial Inclusion, Barriers to Adoption*

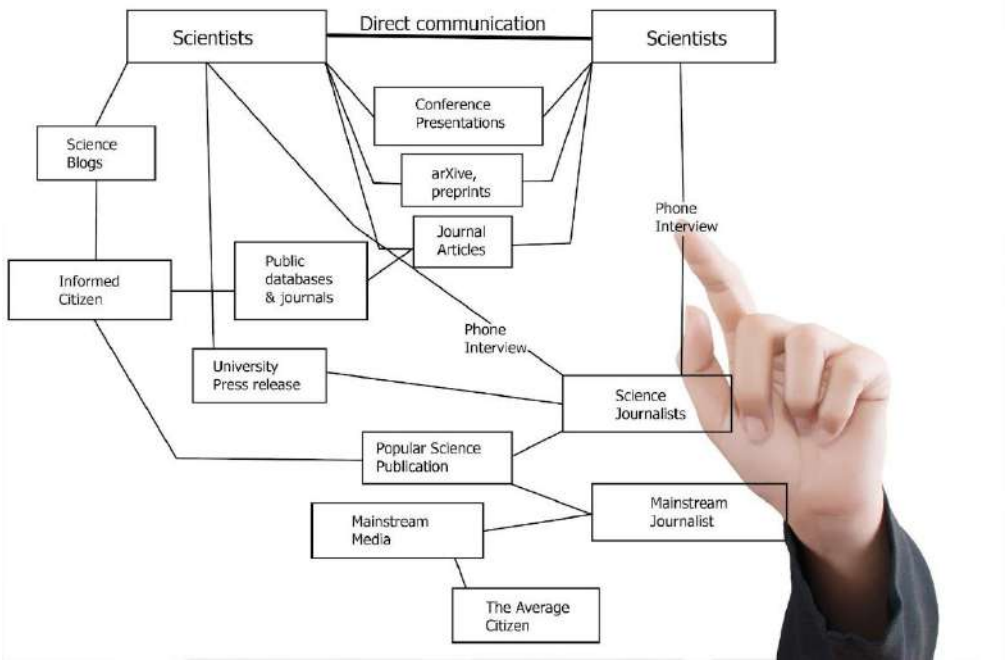
Statement of the Problem
Despite the rapid growth of the Unified Payments Interface (UPI) and the government's push for a "Digital India," the transition from a cash-heavy to a cashless economy faces nuanced challenges at the consumer level. While macro-level transaction volumes suggest a total revolution, individual adoption is often hindered by psychological and structural barriers such as fear of cyber-fraud, varying levels of digital literacy across age groups, and intermittent internet connectivity in non-urban areas. There exists a significant gap in understanding how different demographic segments—especially older populations—perceive the security and usability of these systems. Furthermore, the persistence of cash as a preferred mode for nearly half of the respondents (who use both cash and digital) suggests that digital payments have not yet fully replaced traditional methods but rather coexist with them. This study seeks to identify these specific barriers and behavioral patterns to provide a clearer picture of the ground-level reality of India's digital payment ecosystem.

Objectives of the Research
- To examine the frequency and patterns of digital payment usage among Indian consumers.
- To identify the primary motivations driving digital payment adoption.
- To assess consumer trust levels and measure the perceived ease of use of digital platforms.
- To identify the most significant barriers preventing 100% digital adoption.
- To investigate the perceived difficulty faced by the older generation in using digital payment technology.

Hypothesis of the Research
- **Hypothesis 1:** There is no significant relationship between the age of the consumer and the perceived difficulty faced by older people in using digital payments.
- **Hypothesis 2:** Consumer trust in digital payment systems is independent of their geographic location (Urban vs. Semi-Urban/Rural).

LITERATURE REVIEW
The adoption of digital payments in India has been a subject of extensive academic study. **Davis (1989)** established the Technology Acceptance Model (TAM), highlighting "Perceived Usefulness" and "Perceived Ease of Use" as the core pillars of technology adoption.

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Venkatesh et al. (2003) further expanded this into the UTAUT model, emphasizing the role of social influence and facilitating conditions. **Agarwal et al. (2020)** analyzed the impact of electronic payments on consumer spending, finding that digital modes often increase spending frequency due to the "decoupling effect" of cashless transactions. **Shree et al. (2021)** conducted a survey-based study highlighting that while convenience is a driver, the user experience is often marred by transaction failures. **Gupta (2020)** focused on consumer perception, noting that trust is the most critical factor for long-term retention of fintech users. **Singh & Khan (2024)** discussed how UPI has democratized financial services, though **Raisagar (2024)** argued that the "digital divide" remains a hurdle for absolute cashless status. **Mandal (2024)** identified that while urban centers are saturated, rural adoption is hampered by low gadget penetration. **Wang & Zhang (2025)** emphasized that insufficient digital infrastructure in rural zones continues to contribute to financial exclusion. **Hussain et al. (2024)** pointed out that "perceived risk" and "digital illiteracy" are the two primary inhibitors. Finally, **Kadam & Jadhav (2025)** used Chi-square tests to prove that demographic variables like age and education significantly influence the choice of payment mode.

RESEARCH METHODOLOGY

The study employs a descriptive research design based on primary data. A structured questionnaire was administered via Google Forms to a diverse group of consumers.

- **Sample Size:** 104 Respondents.
- **Sampling Method:** Convenient Random Sampling.
- **Data Collection Tool:** Online Survey (April 2026).
- **Analysis Tools:** Descriptive statistics, frequency distribution, and percentage analysis using Python-based data processing.

Data Analysis

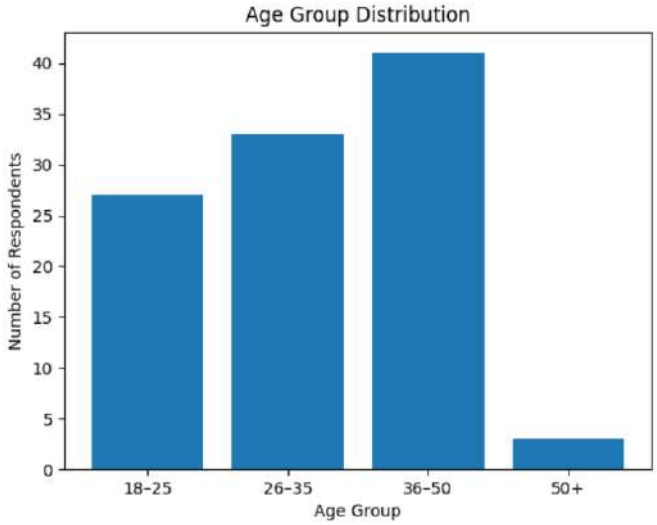
Table 1: Demographic Profile of Respondents

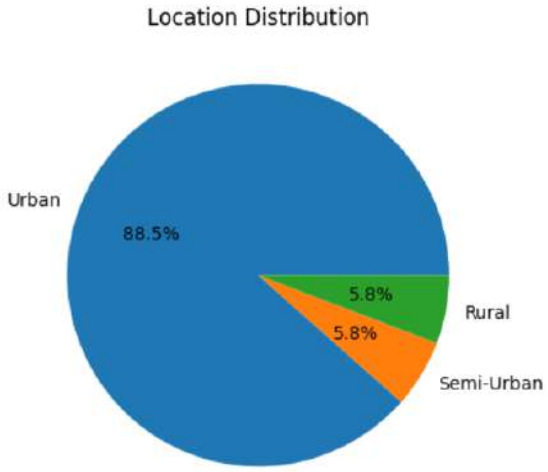
Variable	Category	Count	Percentage (%)
Age Group	18–25	27	25.96%
	26–35	33	31.73%
	36–50	41	39.42%
	50+	3	2.88%
Location	Urban	92	88.46%
	Semi-Urban	6	5.77%
	Rural	6	5.77%
Occupation	Salaried Employee	60	57.69%
	Business Owner	20	19.23%

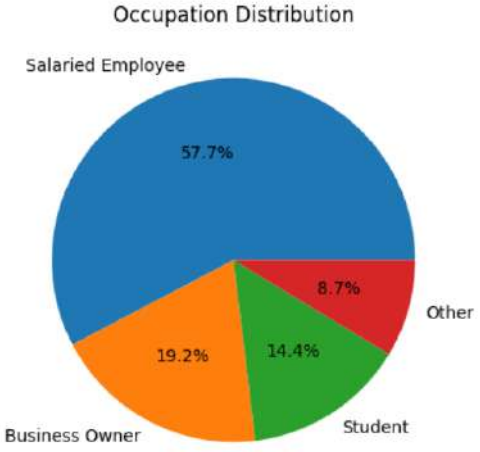
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	Student	15	14.42%
	Other	9	8.65%

The demographic data indicates a predominantly urban (88.46%) and professional workforce, with the 36–50 age group representing the largest segment of participants. This distribution establishes that the research findings primarily reflect the digital payment behaviours of established, salaried urban employees.







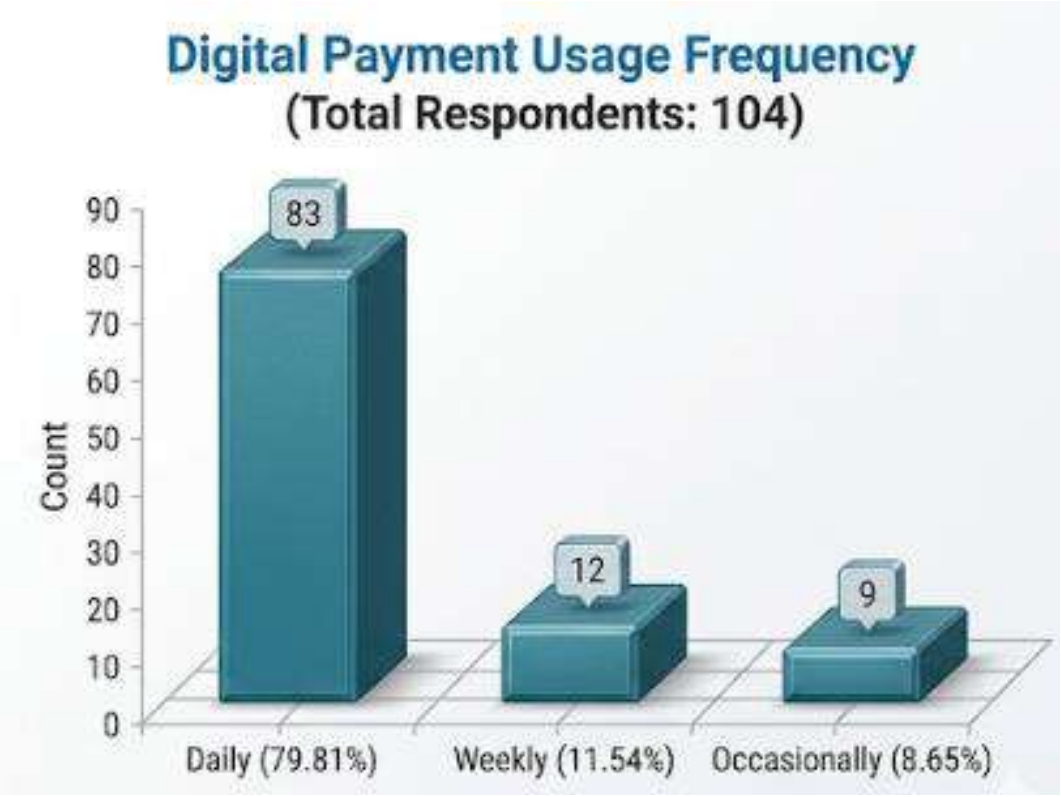
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Demographic Profile of Respondents

Table 2: Usage and Behavioural Patterns

Variable	Category	Count	Percentage (%)
Preferred Mode	Digital	48	46.15%
	Both (Cash & Digital)	50	48.08%
	Cash	6	5.77%
Usage Frequency	Daily	83	79.81%
	Weekly	12	11.54%
	Occasionally	9	8.65%
Main Motivation	Convenience	68	65.38%
	Cashback/Offers	15	14.42%
	Safety	15	14.42%

The data illustrates a high level of engagement with digital payment systems, with nearly 80% of the 104 respondents utilizing these platforms on a daily basis. This significant frequency of use highlights that digital transactions have become a deeply integrated and essential habit within the consumers' daily financial routines.



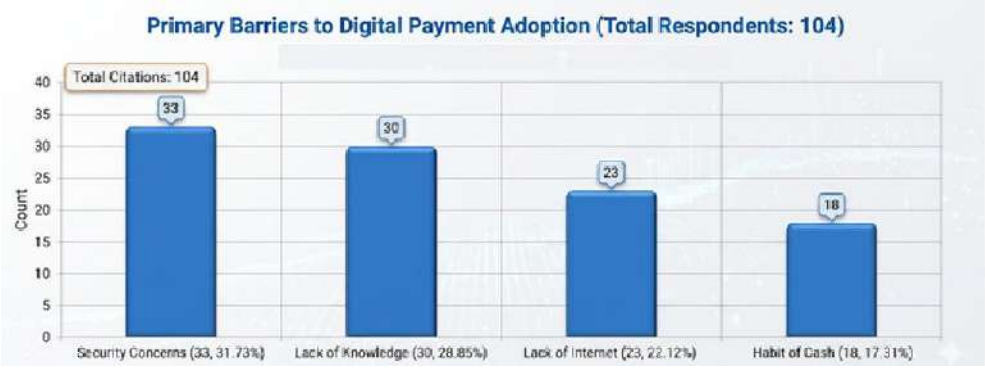
Usage and Behavioural Patterns

Table 3: Trust, Ease of Use, and Barriers

Variable	Category	Count	Percentage (%)
Trust Levels	Yes	89	85.58%
	No / Not Sure	15	14.42%
Difficulty for Seniors	Yes / Maybe	89	85.58%
	No	15	14.42%
Biggest Barrier	Security Concerns	33	31.73%
	Lack of Knowledge	30	28.85%
	Lack of Internet	23	22.12%
	Habit of Cash	18	17.31%

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Security concerns and a lack of digital knowledge are the primary inhibitors of digital payment adoption, representing 31.73% and 28.85% of total barriers respectively. These findings suggest that psychological and educational factors are more significant hurdles than physical infrastructure or the traditional habit of using cash.



Trust, Ease of Use, and Barriers

FINDINGS

- **Universal UPI Adoption:** 100% of the 104 respondents use UPI-based apps, confirming UPI as the backbone of India's retail payment system.
- **High Engagement:** Approximately 80% of users engage with digital payments on a daily basis, primarily driven by the convenience of smartphone-based transactions.
- **Hybrid Payment Behaviour:** Despite the digital push, 48% of respondents still prefer using both cash and digital modes, indicating that India is in a "less-cash" phase rather than a completely "cashless" one.
- **High Perceived Usability:** The mean ease-of-use score is 4.48/5, showing that modern fintech apps are highly user-friendly for the working-age population.
- **Significant Generational Gap:** 85.6% of respondents believe that older people face difficulties, suggesting that the interface or the digital literacy required is not yet inclusive of all age groups.
- **Primary Inhibitors:** Security concerns (31.7%) and lack of knowledge (28.8%) remain the top hurdles, surpassing even infrastructure issues like internet connectivity (22.1%).

CONCLUSION

The "Digital Payments Revolution" in India is characterized by the massive success of UPI and a high level of trust among urban salaried employees. However, the study concludes that for India to reach a truly cashless state, the "trust deficit" regarding security must be addressed. While the younger and middle-aged populations have seamlessly integrated digital payments into their daily lives, the older generation remains largely excluded or hesitant. The transition is currently in a hybrid state where digital convenience is balanced by the traditional habit of carrying cash for emergencies or small-value offline transactions.

SUGGESTIONS

- **Simplified Interfaces for Seniors:** Developers should create "Senior Modes" in payment apps with larger fonts, voice-guided instructions in regional languages, and simplified 2-step verification.
- **Enhanced Cybersecurity Education:** Banks and fintech companies should run localized awareness campaigns to explain safety features and how to identify phishing attempts.
- **Offline UPI Features:** Expanding UPI-Lite and offline payment technologies can mitigate the "lack of internet" barrier.
- **Incentivizing Digital-only Merchants:** Reducing transaction costs for small vendors will encourage them to move away from the "cash-only" habit.

LIMITATIONS OF THE STUDY

- **Geographic Bias:** 88% of the respondents were from urban areas; hence, the findings may not fully represent rural Indian consumer behavior.

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- **Sample Size:** While increased to 104, a larger and more geographically diverse sample would provide more generalized results.
- **Self-Reporting Bias:** The data relies on self-reported perceptions, which may differ from actual recorded transaction behavior.

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IMPULSE BUYING BEHAVIOUR IN THE FMCG SECTOR: A STUDY OF BEHAVIOURAL BIASES WITH PRICE PERCEPTION AS A MEDIATING VARIABLE IN ERNAKULAM CITY

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ABSTRACT
Digital technologies are transforming the retail landscape, with consumer behaviour increasingly shaped by psychological factors rather than actual necessity. In dynamic digital marketplaces, elements such as urgency, popularity, and social influence often drive unplanned purchases. Understanding these evolving patterns is essential for advancing responsible and sustainable consumption practices within contemporary retail environments.

This study investigates the impact of behavioural biases (Fear of Missing Out (FOMO) and Herd Behaviour) on fast-moving consumer goods (FMCG) impulse buying, focusing on the mediating role of price perception. Addressing a gap in literature dominated by external marketing triggers, this research explores internal consumer price justification. Analysing survey data from 106 respondents in Ernakulam City via path mediation, findings reveal that price perception partially mediates this relationship. Behavioural biases not only directly drive impulse purchases but actively distort financial logic; consumers experiencing social pressure or urgency rationalize their decisions by artificially perceiving prices as fair or "worth it," effectively overriding objective valuation.

The study concludes that creating a sustainable digital marketplace necessitates systemic change. Given that individual rationality is often undermined by aggressive digital marketing, policymakers and businesses need to promote transparent pricing and regulate manipulative digital cues. Such reforms are essential for fostering an ethical retail environment that supports informed decision-making within the digital context.

`1. INTRODUCTION
The Fast-Moving Consumer Goods (FMCG) sector represents a high-frequency, low-involvement market where purchase decisions are often made quickly with minimal deliberation. Traditionally, consumers in such markets were assumed to behave rationally, evaluating price and necessity before making purchases. However, insights from behavioural economics challenge this assumption, showing that decisions are frequently influenced by cognitive biases, emotions, and situational cues.

In modern retail environments, particularly digital platforms, these influences are significantly amplified. Techniques such as limited-time discounts, 'only a few left' alerts, and popularity indicators are widely used to shape consumer behaviour. Large-scale events such as the Amazon Great Indian Festival, along with platforms like Blinkit and Swiggy Instamart, create continuous purchase triggers through instant access, time-bound offers, and perceived convenience, encouraging frequent and unplanned buying beyond actual need. These strategies activate behavioural biases such as Fear of Missing Out (FOMO) and herd behaviour, encouraging rapid and unplanned decisions.

A crucial yet underexplored mechanism in this process is how behavioural biases influence consumer price perception, leading to cognitive price justification. Rather than evaluating prices objectively, consumers reinterpret price cues such as discounts, perceived savings, and popularity signals to rationalize impulsive purchases.

Such behaviour has important implications for sustainability, as bias-driven consumption can contribute to over-purchasing and inefficient resource use. Against this backdrop, the present study examines the impact of behavioural biases on impulse buying, with a specific focus on the mediating role of consumer price perception, to better understand and promote more responsible consumption practices.

1.2. Significance of The Study
This study is significant as it advances the understanding of impulse buying by integrating behavioural biases with consumer price perception. It demonstrates how FOMO and herd behaviour influence not only purchase decisions but also the process of post-purchase cognitive justification, where consumers reinterpret price to justify their purchase decisions. By positioning price perception as a mediating factor, the study offers a more nuanced explanation of decision-making beyond traditional stimulus-based models.

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Furthermore, the research highlights how such distorted price perception can normalize unnecessary purchases, leading to overconsumption and unsustainable consumption patterns, aligning with Sustainable Development Goal 12 (SDG 12: Responsible Consumption and Production). By linking behavioural insights with retail practices, the study emphasizes the need for transparent pricing and ethical marketing, contributing to a more informed, balanced, and sustainable marketplace.

1.3. Objectives of the Study

1. To assess the prevalence and intensity of behavioural biases (FOMO and Herd Behaviour) across different age demographics in Ernakulam City.
2. To analyse the direct impact of behavioural biases on impulse buying behaviour in the FMCG sector.
3. To examine how behavioural biases influence consumer price perception.
4. To evaluate the mediating role of price perception in the relationship between behavioural biases and impulse buying behaviour.
5. To propose recommendations for promoting sustainable consumption and ethical marketing practices in retail environments.

2. LITERATURE REVIEW

Babu et al. (2026) explored purchase intention in flash sales using the Theory of Planned Behaviour, highlighting FOMO as a central psychological factor. Urgency and limited availability were found to elevate FOMO, significantly shaping consumer decisions. The findings suggest that emotional pressure often outweighs rational evaluation.

Hamimah et al. (2025) analysed the impact of scarcity and hedonic value on impulse buying with FOMO as a mediating factor. Both variables were shown to increase FOMO, which subsequently led to higher impulsive purchases. Emotional appeal and limited availability emerged as key drivers of impulse buying.

Tooy et al. (2025) analysed how FOMO influenced impulse buying through purchase intention among fast-food consumers. FOMO was found to significantly increase purchase intention, which in turn led to impulsive purchases. The findings indicate that the effect of FOMO is indirect and mediated through consumer intention.

Xu, Song, & Fong (2025) focused on perceived price fairness in the context of sustainable consumption. Price perception functioned as a mediating factor, influencing consumer acceptance and trust. The results emphasize the role of perceived value in encouraging responsible purchasing behaviour.

Jamali (2025) examined the relationship between brand image and consumer behaviour, with price perception acting as an intermediary mechanism. Consumer decisions were found to depend more on perceived value than actual price. Price perception played a crucial role in shaping purchase evaluation and justification.

Amasuba & Apriani (2024) investigated the effects of price discounts, time pressure, and price perception on impulse buying in live commerce. Urgency-driven factors strongly influenced impulsive purchases, while favourable price perception further encouraged buying behaviour.

3. RESEARCH METHODOLOGY

The study adopts a quantitative, cross-sectional, and analytical research design. A combination of purposive and convenience sampling techniques was employed, with a total of 106 respondents from Ernakulam City. Primary data were collected using a structured questionnaire. A 7-point Likert scale (Ibrahim, 2024) was used for psychological and perceptual constructs, and a 5-point frequency scale was used for behavioural outcomes. Each construct was measured using four items capturing the following dimensions:

Table 3.1: Measurement Dimensions

Variable	Underlying Dimensions
FOMO	Emotional discomfort; Anticipated regret; Scarcity-driven urgency; Social comparison
Herd Behaviour	Popularity-based trust; Informational influence; Personal influence; Trend-following tendency
Consumer Price Perception	Discount-based value perception; Social price justification; Trend-based premium acceptance; Deal attractiveness

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Impulse Buying Behaviour	Lack of planning; Stimulus-driven buying; Deviation from intention; post-purchase regret

Data Analysis Techniques

Data were analysed using JASP (version 0.96). The following techniques were applied:

- Reliability Analysis (Cronbach's Alpha)
- Descriptive Statistics (Mean and Standard Deviation)
- Cross-tabulation Analysis
- Correlation Analysis
- Multiple Linear Regression Analysis
- PROCESS Mediation Analysis

3.2. Hypotheses

H1

H_0: Behavioural biases have no significant impact on impulse buying behaviour.

H_1: Behavioural biases have a significant positive impact on impulse buying behaviour.

H2

H_0: Behavioural biases do not significantly influence consumer price perception.

H_2: Behavioural biases significantly influence consumer price perception.

H3

H_0: Price perception does not mediate the relationship between behavioural biases and impulse buying behaviour.

H_3: Price perception mediates the relationship between behavioural biases and impulse buying behaviour.

4. THEORETICAL AND CONCEPTUAL FRAMEWORK

Theory & Key Citation	Application to the Study
Social Comparison Theory (Festinger, 1954)	Explains how consumers compare themselves with others, leading to FOMO and herd behaviour in purchase decisions.
Loss Aversion (Kahneman & Tversky, 1979)	Explains why the fear of missing out on deals or trends drives urgency and impulsive purchasing.
Bandwagon Effect (Leibenstein, 1950)	Describes how consumers rely on popularity cues, assuming products are valuable because others are buying them.
Cognitive Dissonance Theory (Festinger, 1957)	Explains how consumers reinterpret prices to justify impulsive purchases and reduce internal conflict.
Instant Gratification (Mischel, Ebbesen, & Zeiss, 1972)	Explains how immediate emotional satisfaction drives impulse buying, overriding rational evaluation.

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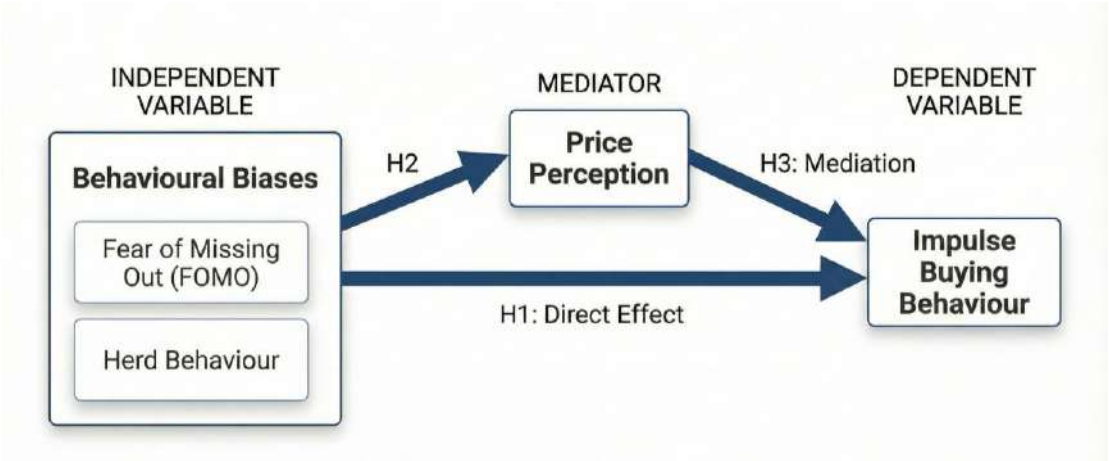


Figure 4.1: Diagrammatic Representation of the Conceptual Framework and Hypotheses

5. DATA ANALYSIS AND INTERPRETATION

5.1. Behavioural Bias Analysis

Table 5.1: Overall Intensity of Behavioural Biases

Variable	Mean	Std. Deviation	Intensity Level
FOMO	3.56	1.75	Moderate
Herd Behaviour	2.83	1.00	Moderate

Table 5.2: Behavioural Bias Levels Across Age Groups (n=106)

Age Group	n	FOMO Mean (SD)	Herd Behaviour Mean (SD)	Intensity
18–25	45	4.53 (0.97)	3.36 (0.44)	High
26–35	15	3.93 (1.89)	3.17 (0.57)	Moderate
36–45	13	4.29 (1.09)	3.06 (0.53)	Moderate
46–55	22	1.61 (0.38)	1.90 (0.49)	Low
56 & above	11	2.07 (1.36)	1.84 (0.72)	Low

Behavioural biases are highest among younger consumers (18–25) and decline significantly with age, indicating greater susceptibility to digital and social influence among younger groups.

5.2. Reliability Analysis

Variable	Cronbach's Alpha
FOMO	0.957
Herd Behaviour	0.855
Price Perception	0.966
Impulse Buying	0.942

Interpretation: All constructs show high internal consistency ($\alpha > 0.70$), indicating reliable measurement.

5.3. Correlation Matrix

Variable	FOMO	Herd	Price	Impulse
FOMO	1			
Herd	0.894***	1		
Price	0.883***	0.815***	1	
Impulse	0.874***	0.898***	0.880***	1

Note: *** $p < .001$

Interpretation: All variables show strong positive correlations ($r > 0.80$, $p < .001$), confirming they move in the same direction and providing initial support for all hypotheses.

5.4. Regression Analysis

Model 1: Behavioural Biases on Impulse Buying

Variable	β	p-value	R^2
Behavioural Bias	0.904	<0.001	0.816

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Interpretation: Behavioural biases have a strong and significant positive effect on impulse buying.

Model 2: Behavioural Bias on Price Perception

Variable	β	p-value	R^2
Behavioural Bias	0.881	<0.001	0.777

Interpretation: Behavioural biases significantly influence consumer price perception.

Model 3: Behavioural Bias and Price Perception on Impulse Buying

Variable	β	p-value
Behavioural Bias	0.573	<0.001
Price Perception	0.375	<0.001

Interpretation: Both behavioural biases and price perception significantly influence impulse buying, with the reduced effect of biases indicating mediation. The model also demonstrates high explanatory power (R^2 = 0.848), showing that these variables strongly explain impulse buying behaviour.

5.5. Mediation

Effect Type	Path	β (Estimate)	p-value	Result
Path a	Behavioural Bias → Price Perception	1.323	< .001	Significant
Path b	Price Perception → Impulse Buying	0.191	< .001	Significant
Direct Effect (c′)	Behavioural Bias → Impulse Buying	0.439	<0.001	Significant
Indirect Effect (a x b)	Behavioural Bias → Price Perception → Impulse Buying	0.253	<0.001	Significant
Total Effect	Behavioural Bias → Impulse Buying	0.692	<0.001	Significant

Note: Confidence intervals are based on bootstrapping (95%).

Interpretation: Both direct and indirect effects are statistically significant ($p < 0.001$), indicating that consumer price perception partially mediates the relationship between behavioural biases and impulse buying behaviour.

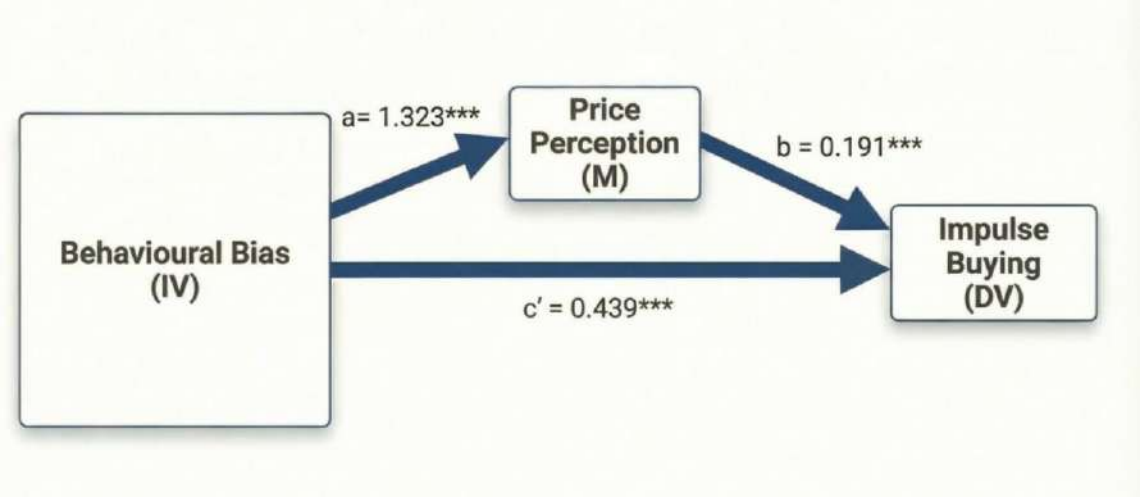


Figure 2: Mediation Effects

5.6 SUMMARY OF HYPOTHESES TESTING

Hypothesis	Statement	Result	Status
H1	Behavioural biases have a significant positive effect on impulse buying behaviour	$\beta = 0.904$, $p < .001$	Supported
H2	Behavioural biases have a significant influence on consumer price perception	$\beta = 0.881$, $p < .001$	Supported
H3	Consumer price perception mediates the relationship between behavioural biases and impulse buying behaviour	Indirect Effect = 0.253, $p < .001$	Supported (Partial)

6. KEY FINDINGS

1. Demographic Insights

The sample is dominated by young consumers (18–25: 42.5%), with a balanced gender distribution and a majority of employed respondents. Most consumers purchase FMCG products on a weekly basis, indicating frequent exposure to retail stimuli and promotional environments.

2. Behavioural Constructs and Consumer Decision-Making

- FOMO exists at a moderate level, with 42% of respondents experiencing deal-related anxiety. Scarcity cues such as limited-time offers create urgency, especially among younger consumers, while social comparison shows weaker influence, indicating FOMO is more situational than social.
- Herd behaviour is moderate, with online reviews (54.8%) and friend recommendations acting as key influencers. Mass trends and product popularity show mixed impact.
- Consumers generally do not strongly justify higher prices based on popularity or trends, but large discounts create divided perceptions of value.
- Impulse buying is present but not extreme. Consumers report planning behaviour, yet show moderate deviation from shopping lists and occasional post-purchase regret.

3. Age-wise Behavioural Differences

Younger consumers (18–25) show the highest levels of FOMO and herd behaviour, while older groups (41+) exhibit predominantly low levels. Middle-aged groups display mixed responses, indicating a shift from socially influenced to more rational decision-making. Younger consumers are more exposed to digital cues and peer influence, making them more susceptible to behavioural biases.

4. The Rationality Paradox

A key finding is the presence of a "rationality paradox." While 60.4% of consumers report checking necessity before purchasing, many still engage in impulse buying during promotions. This reflects an intent–action gap, where perceived rationality differs from actual behaviour.

5. Behavioural Bias–Price Justification Mechanism

The findings reveal that behavioural biases influence impulse buying not only directly but by shaping consumer price perception, leading to cognitive price justification. Consumers reinterpret price cues, such as discounts and urgency signals, to rationalize impulsive purchases, suggesting that decisions are driven more by perceived justification than by actual value. Thus, impulse buying reflects not a lack of rationality, but a redefinition of rationality under behavioural influence.

PRACTICAL IMPLICATIONS FOR SUSTAINABLE CONSUMPTION

The findings highlight the need for behavioural interventions that address cognitive price justification and promote responsible consumption aligned with SDG 12 (Responsible Consumption and Production). Rather than suppressing consumer emotion, the focus should be on redesigning retail environments to reduce manipulative cues and support informed decision-making.

For consumers, adopting "cognitive cooling" habits such as a 24-hour delay before purchase, checking unit prices, and recognizing triggers like FOMO can shift decisions toward actual value rather than perceived urgency.

For businesses, integrating mindful nudges can promote ethical engagement. These may include prompts such as "Do you really need this?" or "You have viewed this item multiple times—take a moment before deciding."

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Displaying real-time spending summaries, cart value alerts, and transparent discount justifications can further reduce impulsive behaviour while building trust.

For policymakers, strengthening regulations on misleading scarcity cues, standardizing unit pricing, and enforcing transparency in digital retail remain essential.

Ultimately, promoting ethical consumerism through behavioural awareness and transparent retail practices can transform impulsive consumption into more mindful and sustainable decision-making.

CONCLUSION

This study reveals that impulse buying in modern FMCG markets is not merely a reaction to external stimuli, but a cognitively justified behaviour shaped by behavioural biases and price perception. By establishing consumer price perception as a mediating mechanism, the research highlights how individuals reinterpret price to rationalize emotionally driven decisions. This redefines consumer rationality, not as objective evaluation, but as perception-driven justification under behavioural influence. The findings underscore the growing power of digital retail environments in shaping consumption patterns, particularly among younger consumers. In this context, promoting transparency, behavioural awareness, and ethical retail design becomes essential. Ultimately, building a sustainable marketplace requires both smarter systems and informed and self-aware consumers.

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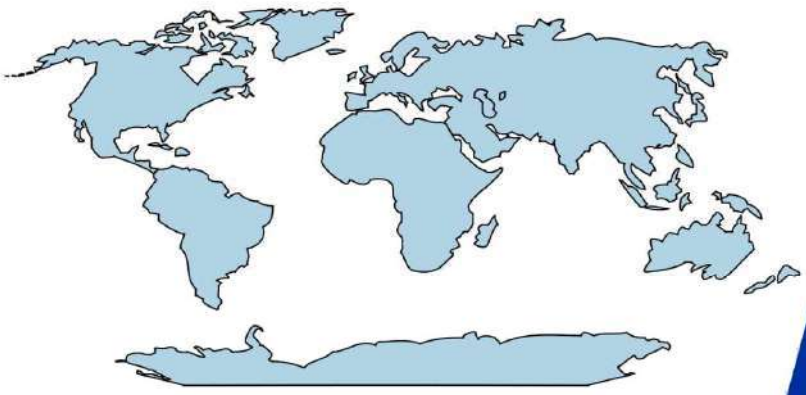
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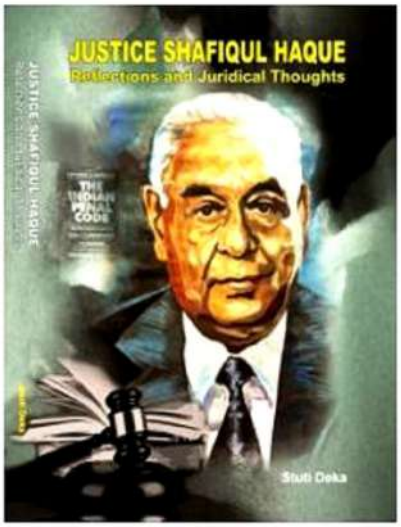
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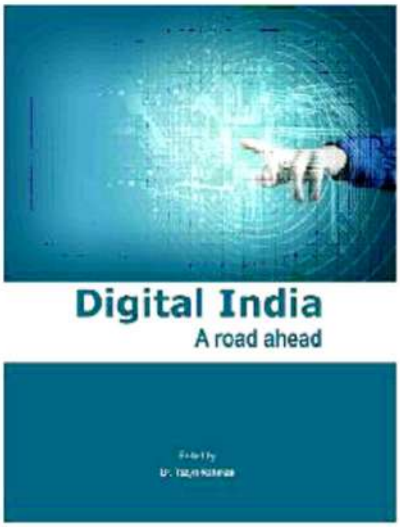
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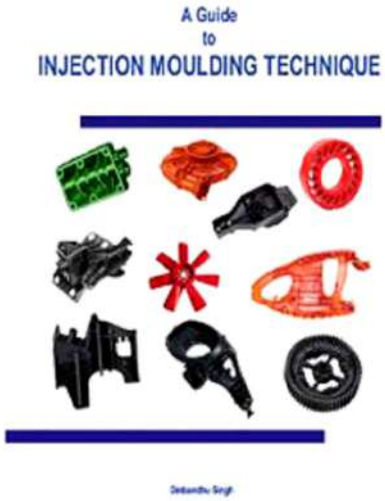
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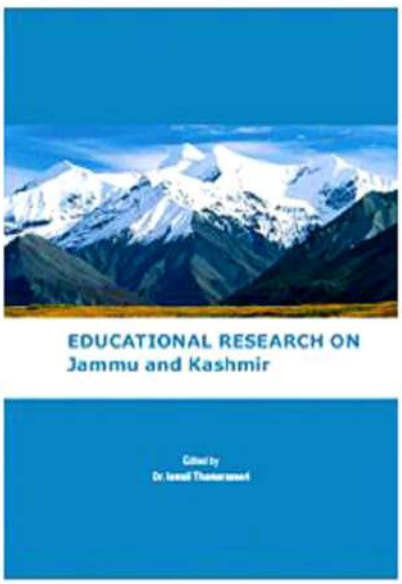
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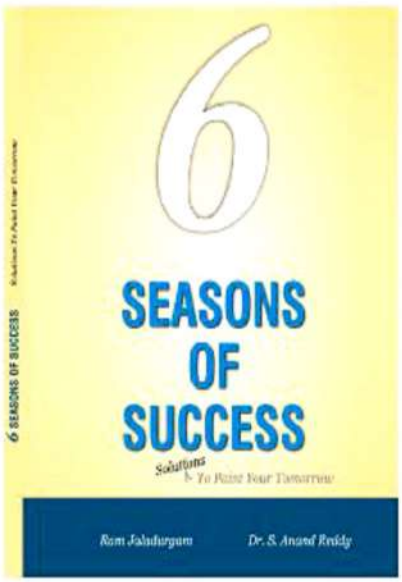
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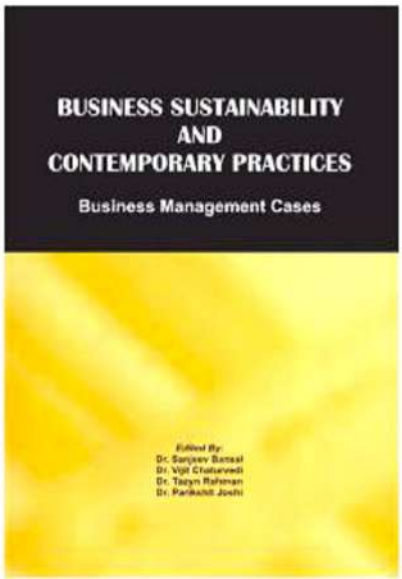
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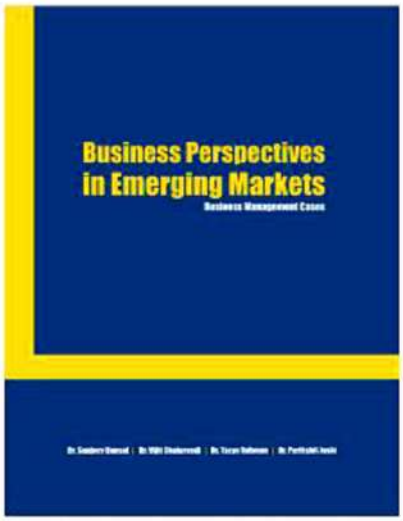
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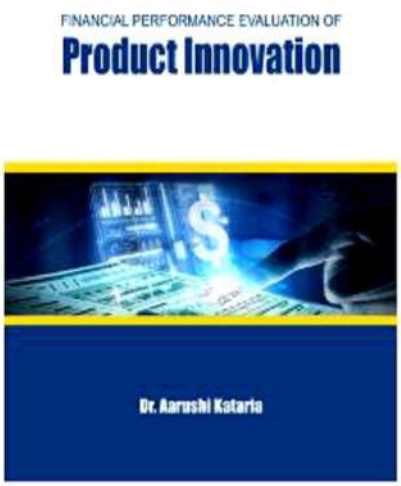
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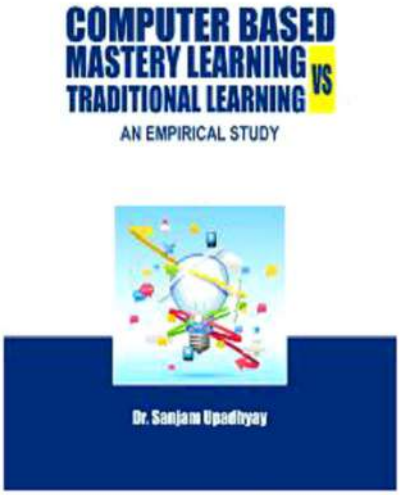
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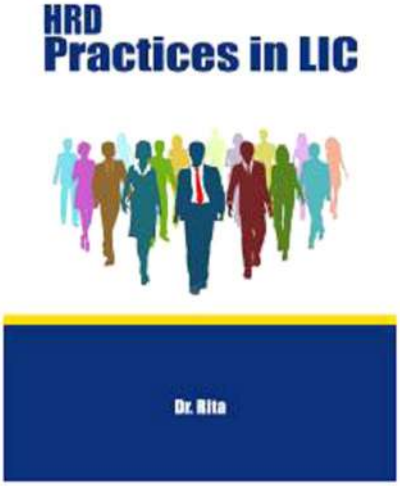
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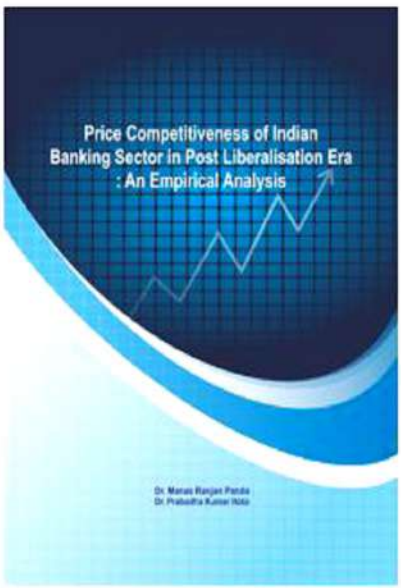
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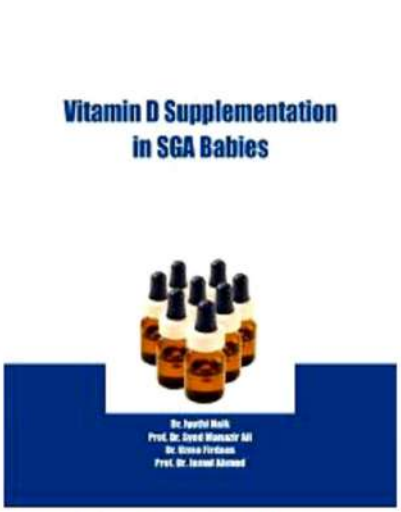
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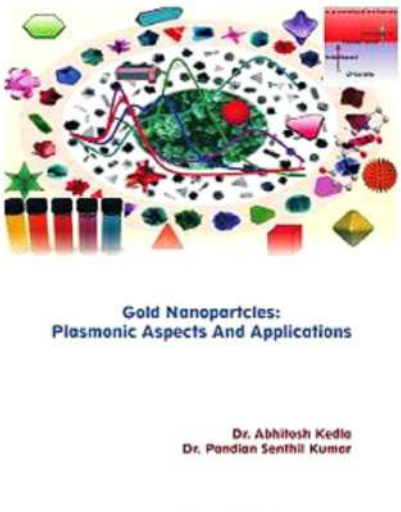
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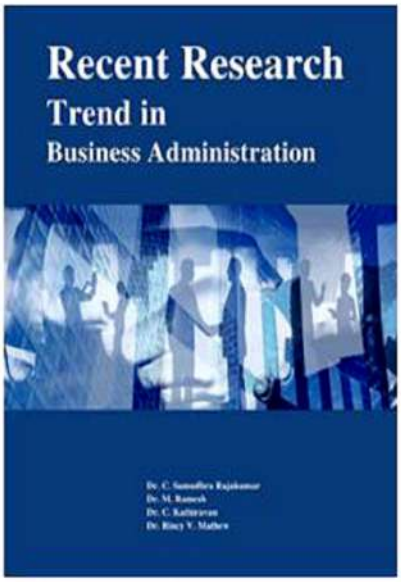
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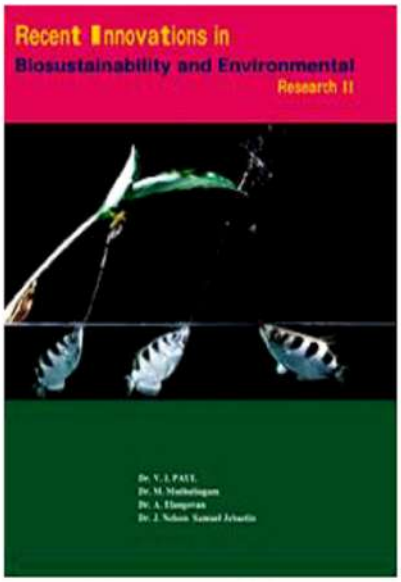
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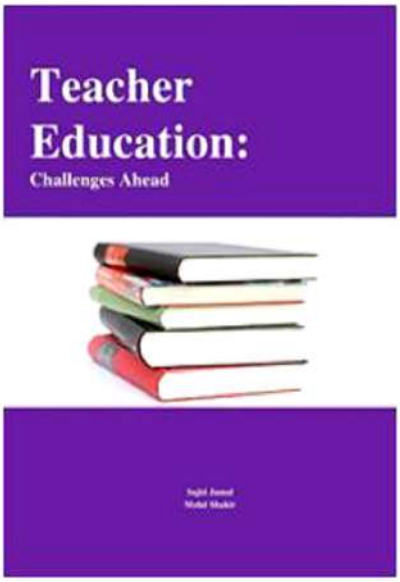
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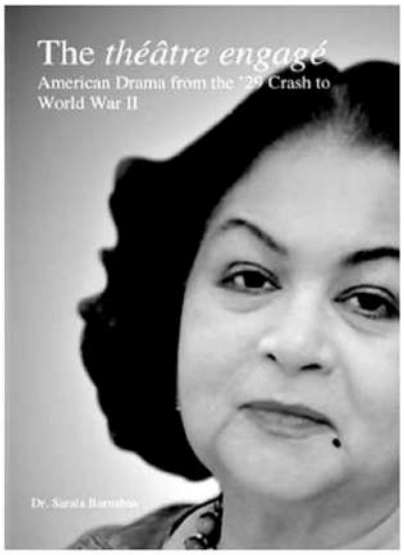
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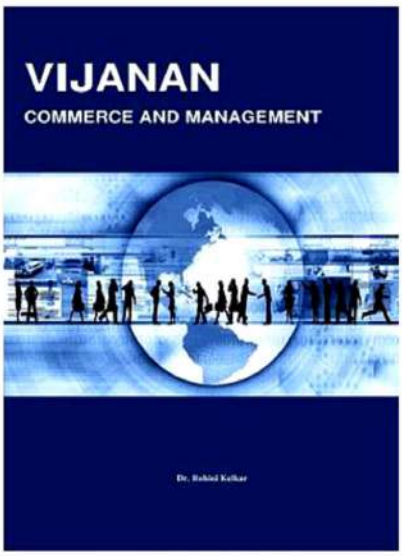
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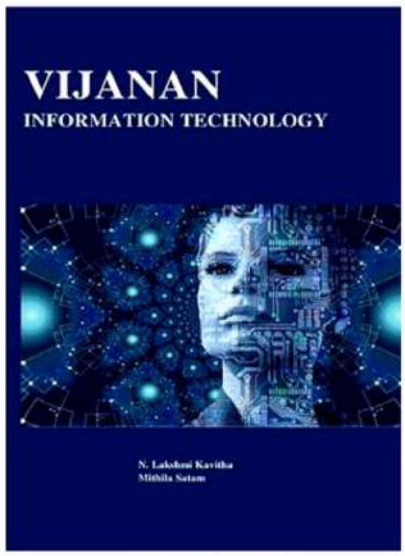
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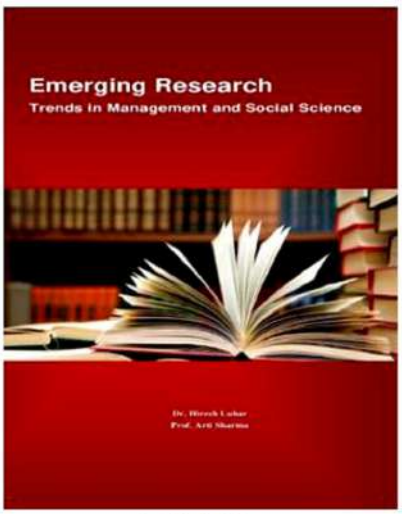
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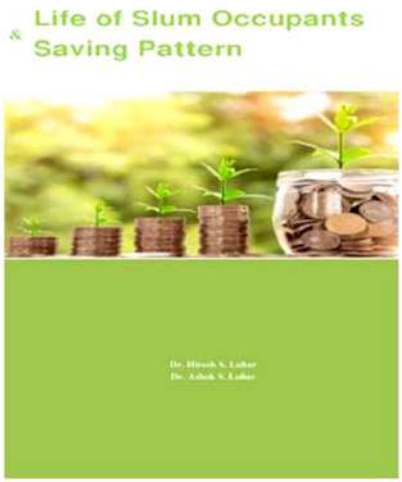
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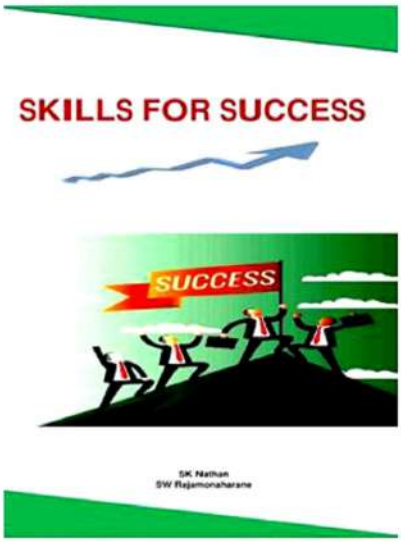
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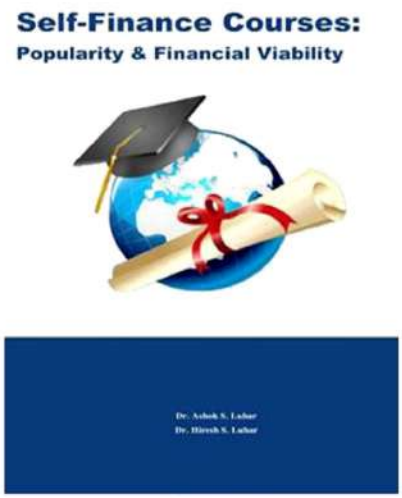
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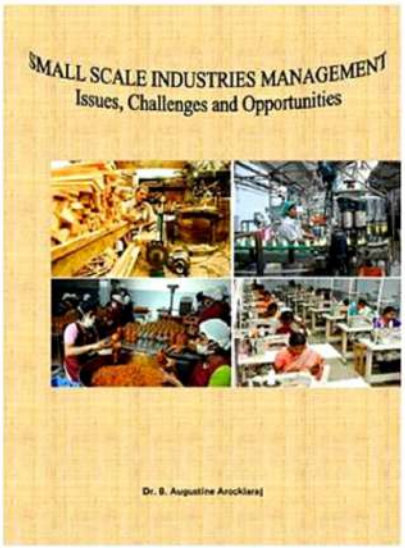
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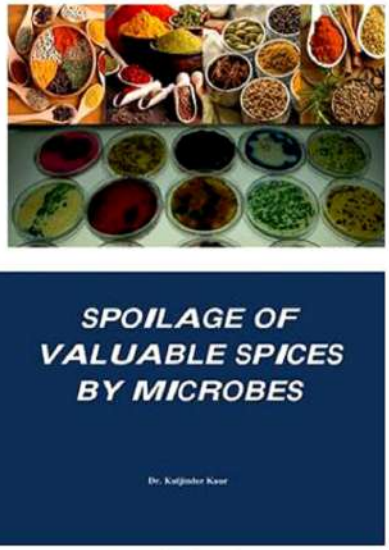
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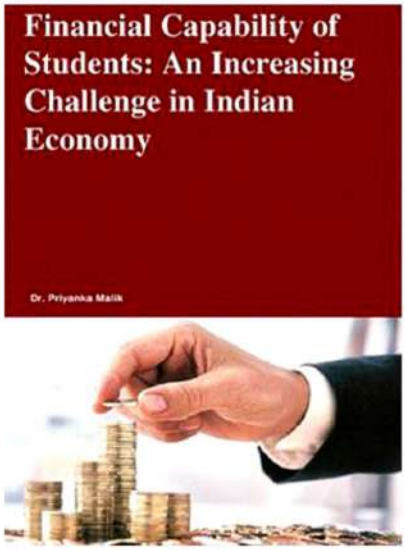
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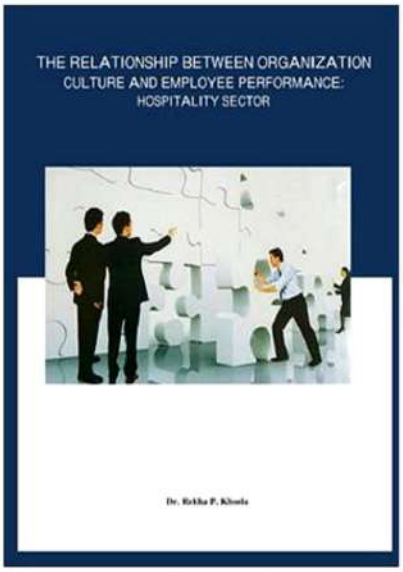
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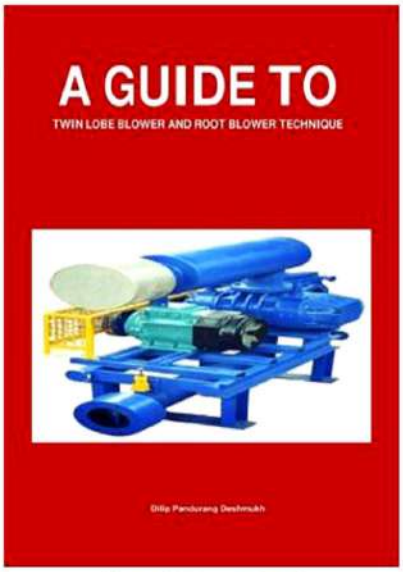
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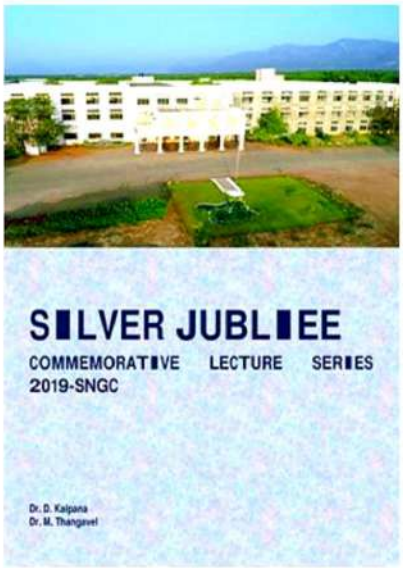
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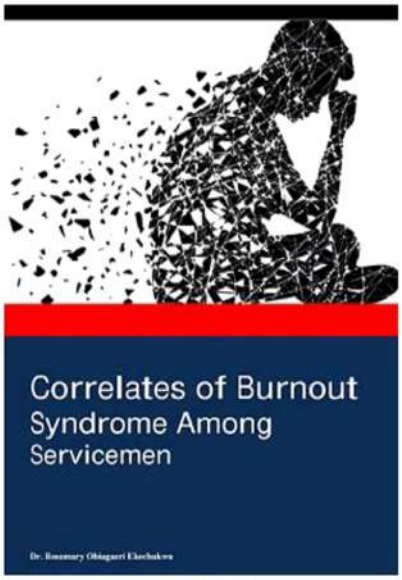
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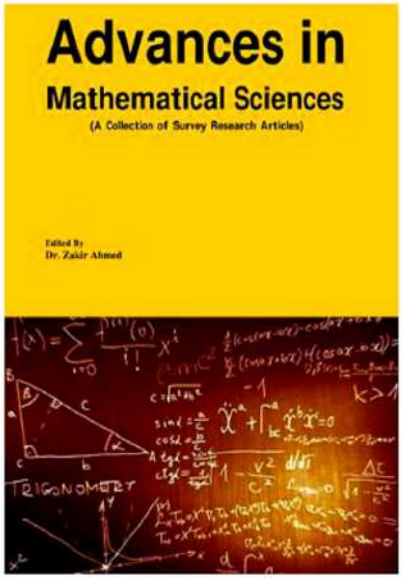
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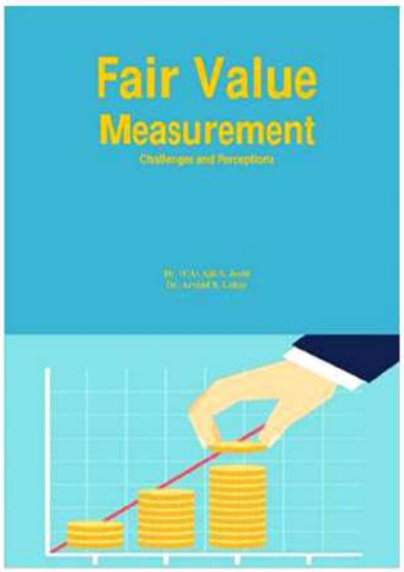
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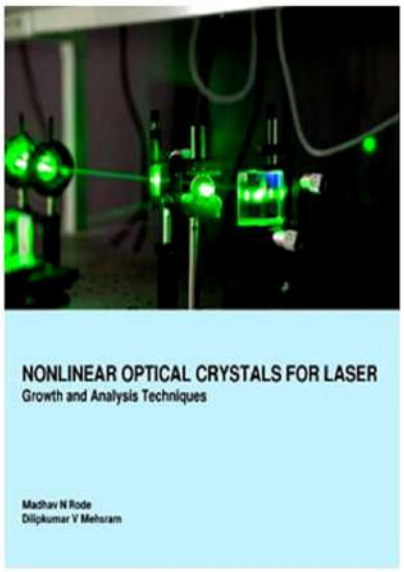
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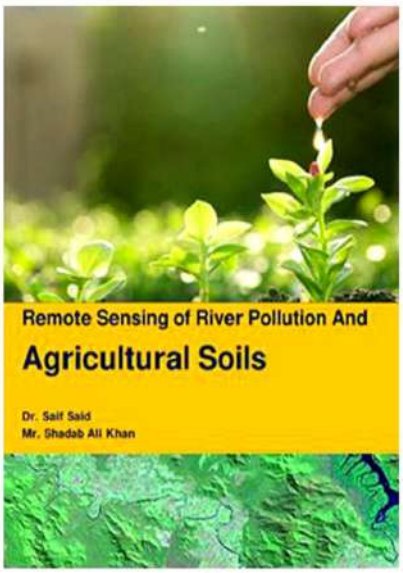
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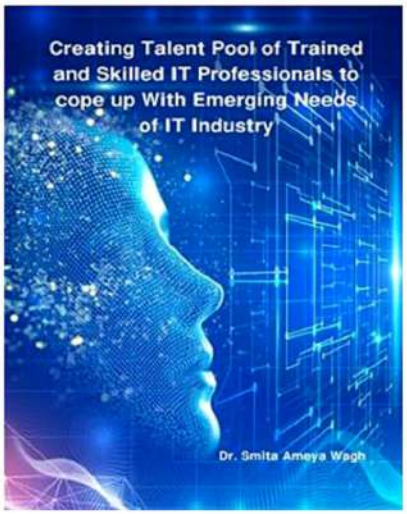
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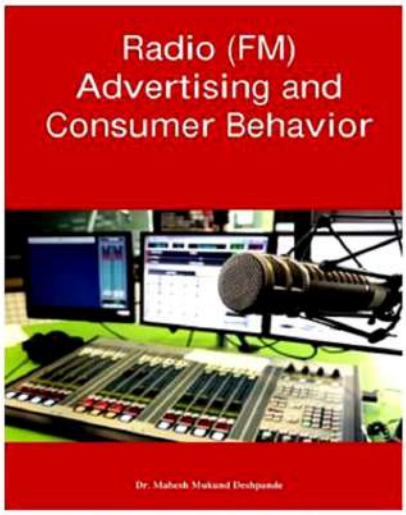
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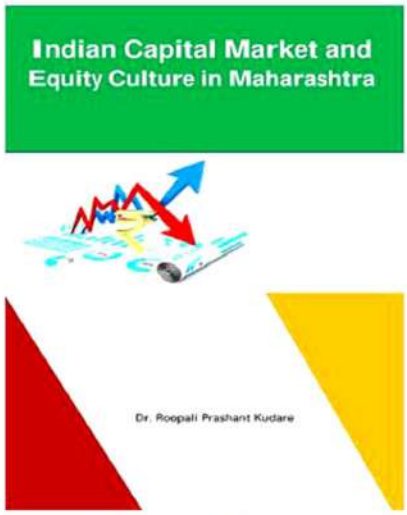
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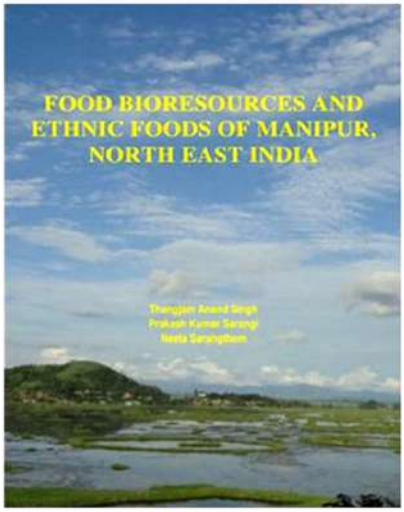
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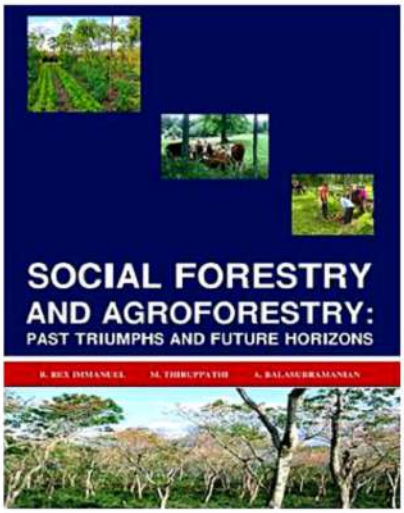
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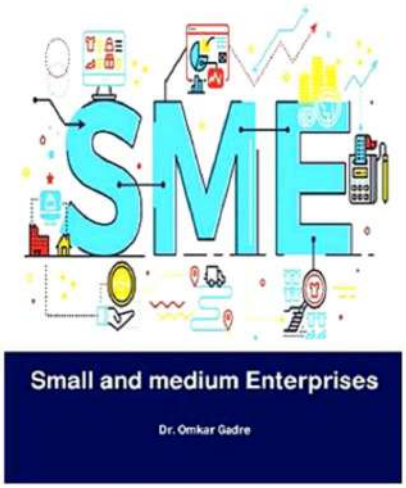
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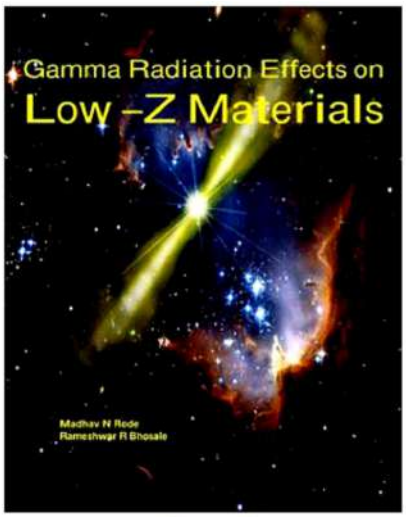
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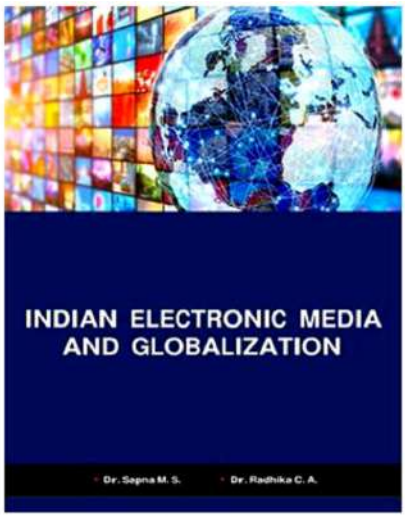
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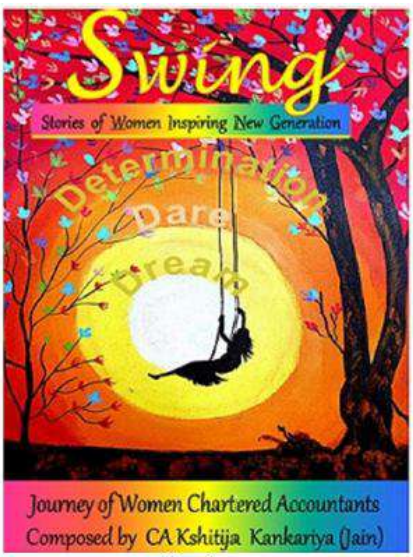
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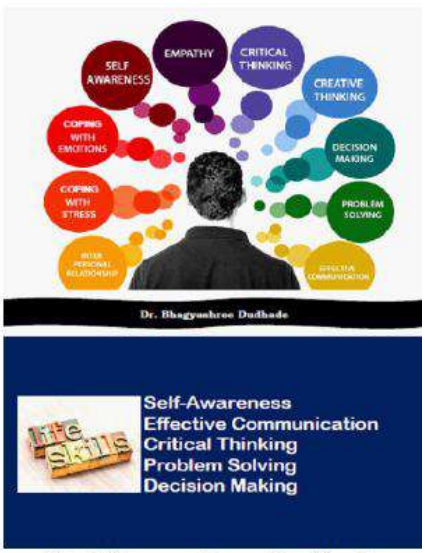
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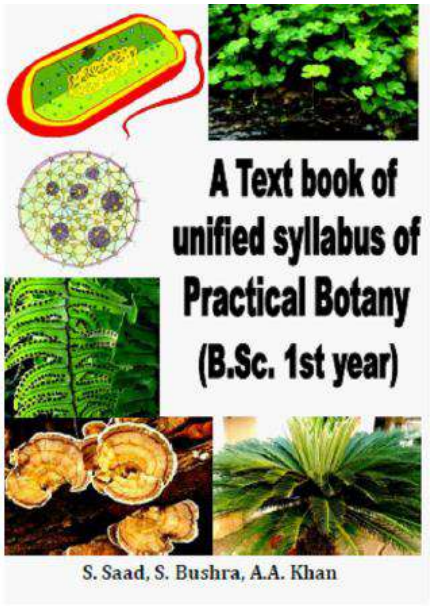
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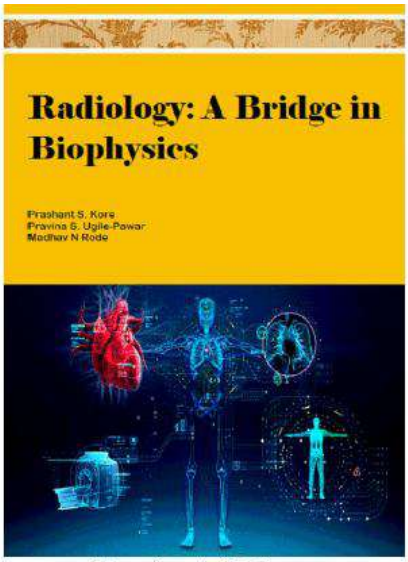
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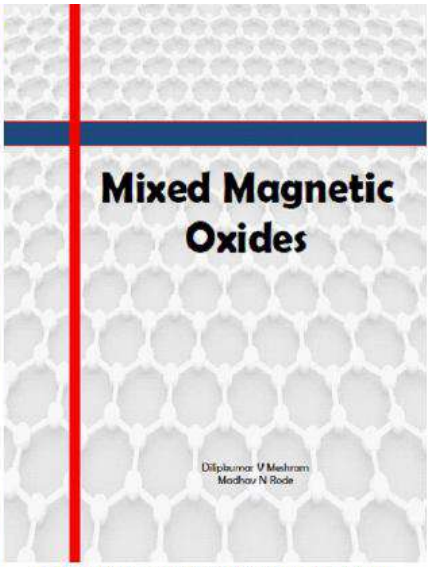
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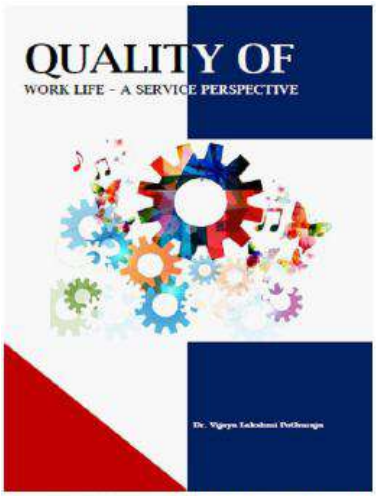
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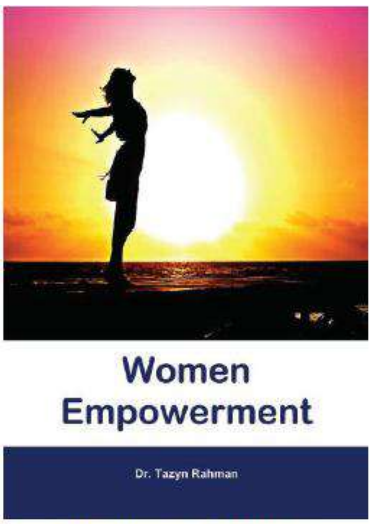
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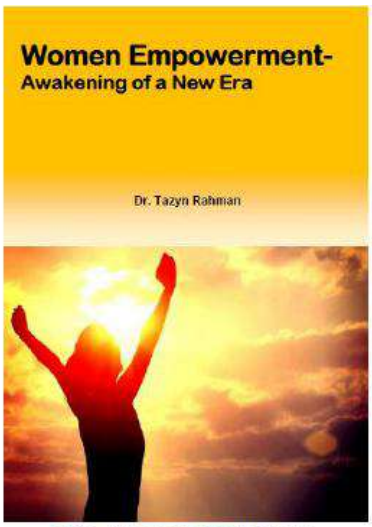
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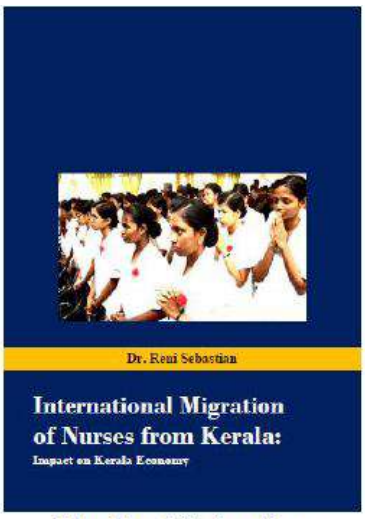
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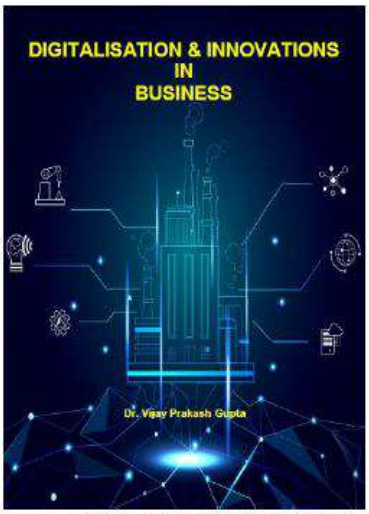
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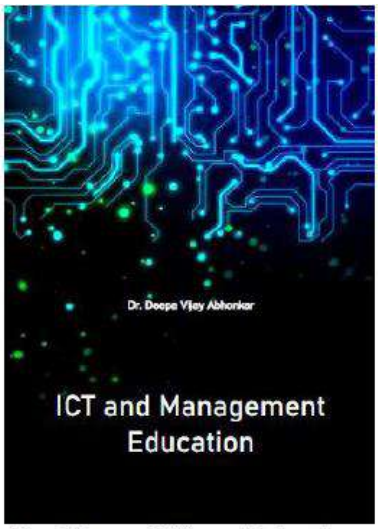
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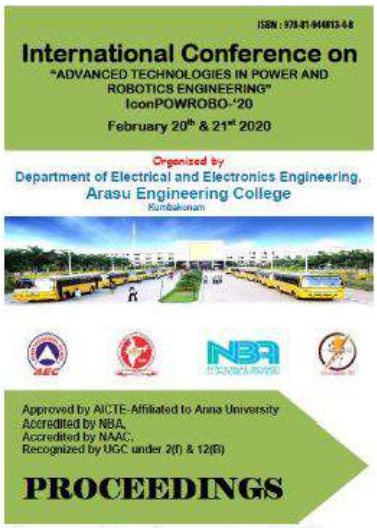
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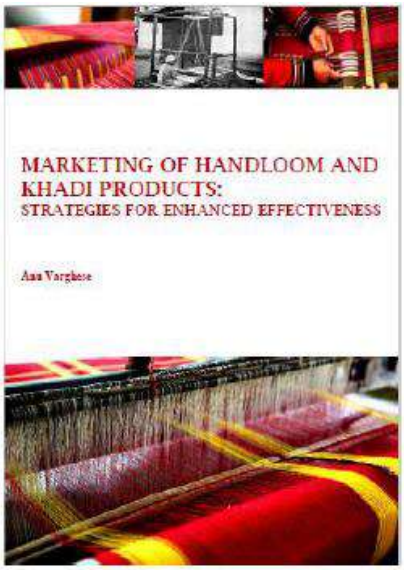
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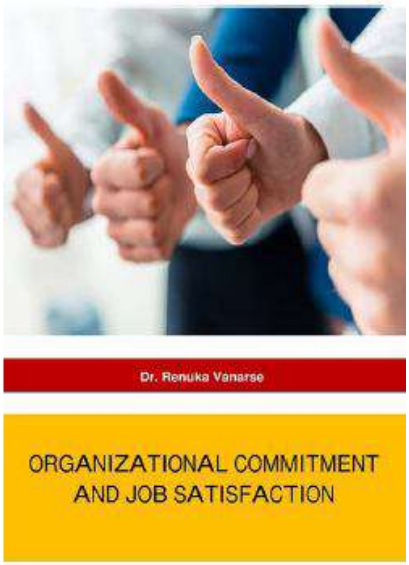
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