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Research Papers

SEARCH ENGINE OPTIMIZATION (SEO) IN 2025: CHALLENGES AND INNOVATIONS

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ABSTRACT

Search Engine Optimization (SEO) has evolved significantly by 2025, driven by artificial intelligence, privacy regulations, and changing user behaviors. This comprehensive review examines the current state, challenges, and innovations in SEO practices. The integration of AI-driven algorithms, particularly Google's Search Generative Experience (SGE) and Multimodal AI, has fundamentally altered how search engines interpret and rank content. Core Web Vitals and E-E-A-T (Experience, Expertise, Authoritativeness, Trustworthiness) have become crucial ranking factors, while voice search and visual search demand new optimization approaches. Major challenges include managing AI-generated content, adapting to zero-click searches, and navigating stricter privacy regulations. The paper explores emerging trends such as sustainable SEO practices, multimodal search optimization, and the rise of AI-powered search engines. Future research directions highlight the need for adaptive SEO strategies, privacy-compliant tracking methods, and enhanced understanding of AI's role in search rankings. This review provides valuable insights for digital marketers, content creators, and researchers in developing future-proof SEO strategies within an increasingly complex search landscape.

Keywords: *Search Engine Optimization (SEO), Artificial Intelligence in Search, Core Web Vitals, E-E-A-T, Voice Search Optimization, Multimodal Search, Zero-Click Searches, Privacy Regulations*

INTRODUCTION

Search Engine Optimization (SEO) in 2025 stands at a pivotal crossroads, shaped by rapid advancements in artificial intelligence (AI), evolving search algorithms, and shifting user behaviors. The digital landscape has become more competitive than ever, requiring marketers and website owners to adapt to emerging technologies and algorithmic refinements. Google's increasing reliance on AI-driven search models like Multimodal AI and the Search Generative Experience (SGE) is redefining the way search engines interpret and rank content, emphasizing relevance, intent, and context over traditional keyword-based approaches. Voice search, powered by AI assistants, continues to reshape SEO strategies as more users rely on conversational queries, demanding a shift towards long-tail and natural language keywords. Additionally, the integration of augmented reality (AR) and visual search has revolutionized the user experience, necessitating new optimization techniques tailored to image and video content. In 2025, Core Web Vitals remain crucial ranking factors, with a heightened focus on user experience (UX), page speed, and interactivity. The role of schema markup and structured data is expanding, enabling richer search results and improved click-through rates. Meanwhile, the growing importance of first-party data due to tightening data privacy regulations, such as GDPR and CCPA, is prompting marketers to refine their data collection and analytics strategies. AI-powered content generation tools are both a boon and a challenge, raising concerns about content authenticity, duplication, and ethical considerations in SEO practices. Moreover, the rise of zero-click searches and featured snippets is transforming user engagement, compelling SEO experts to refine their content strategies to maintain visibility despite declining organic click-through rates. The impact of mobile-first indexing remains dominant, with Google prioritizing mobile-optimized websites to cater to an increasingly mobile-centric audience. Additionally, local SEO has evolved significantly, driven by hyper-personalized search experiences and AI-driven location-based recommendations. With cybersecurity threats and search engine penalties becoming more stringent, website security and ethical SEO practices have taken center stage in maintaining domain authority and credibility. As businesses navigate this ever-changing SEO ecosystem, embracing AI-driven automation, leveraging machine learning for predictive analytics, and focusing on high-quality, user-centric content have become essential survival strategies. This review article explores the key challenges and innovations shaping SEO in 2025, offering insights into how digital marketers, content creators, and businesses can future-proof their strategies to achieve sustainable online visibility and success in an AI-dominated search landscape.

(Higher Credibility & Brand Authority) (Enhanced User Experience (UX)) (Cost-Effective & Long-Term ROI) (Increased Organic Traffic & Visibility) (Adaptability to Emerging Technologies)
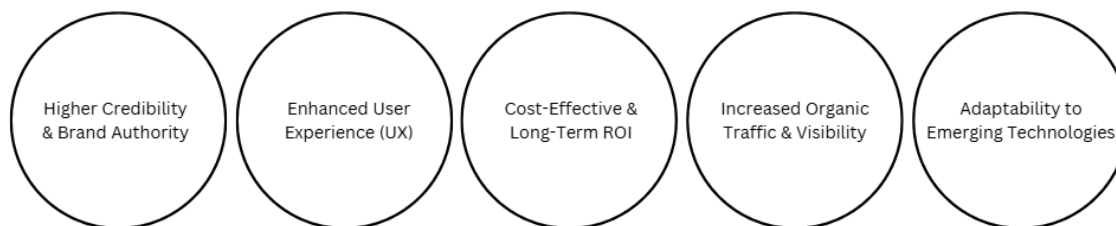
LITERATURE REVIEW

The evolution of Search Engine Optimization (SEO) has been extensively studied, with researchers highlighting the impact of algorithmic advancements, AI integration, and user behavior shifts on ranking methodologies. Traditional SEO strategies relied heavily on keyword optimization and backlinking (Jansen & Spink, 2006), but the introduction of machine learning in search engines, such as Google's RankBrain, has emphasized semantic search and user intent (Clark, 2018). The rise of voice search and conversational AI has further necessitated the optimization of long-tail keywords and structured data (Balog et al., 2019). Additionally, studies show that mobile-first indexing and Core Web Vitals significantly influence search rankings, with page speed and interactivity playing a crucial role in user engagement (Mueller & Illyes, 2021). The emergence of AI-generated content presents both opportunities and challenges, as it enhances efficiency but raises concerns about content authenticity and ethical implications (Gamage & Samarasinghe, 2022). Moreover, the prevalence of zero-click searches and featured snippets has altered user interaction with search results, leading to a decline in traditional organic traffic and necessitating content strategies that maximize visibility within search engine results pages (SERPs) (Batra & Bhattacharya, 2020). Privacy regulations like the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA) have also forced marketers to adopt first-party data strategies while ensuring compliance (Smith & Chaffey, 2021). Furthermore, advancements in visual and video search optimization have transformed how search engines process multimedia content, requiring businesses to implement structured data and metadata enhancements (Kumar & Gupta, 2023). As SEO continues to evolve, recent literature underscores the growing importance of AI-driven automation, ethical search practices, and a holistic, user-centric approach to digital marketing in ensuring long-term success in an increasingly complex search environment.

EVOLUTION OF SEO: A BRIEF OVERVIEW

Search Engine Optimization (SEO) has undergone a significant transformation since its inception in the mid-1990s, evolving from simple keyword stuffing techniques to complex, AI-driven ranking systems. In the early days of search engines like Yahoo! and AltaVista, websites primarily relied on excessive keyword usage and meta-tag optimization to improve their rankings (Sullivan, 2001). However, the launch of Google in 1998, with its PageRank algorithm, revolutionized SEO by prioritizing backlinks and content quality in ranking criteria (Brin & Page, 1998). Over the years, major algorithm updates such as Google Panda (2011), Penguin (2012), and Hummingbird (2013) shifted SEO practices towards high-quality, user-centric content and penalized spammy link-building tactics (Cutts, 2013). The introduction of RankBrain in 2015 marked a significant shift, incorporating machine learning to better understand search intent (Clark, 2018). Mobile-first indexing, introduced in 2018, further emphasized the importance of mobile optimization as search behavior shifted towards smartphones (Mueller, 2018). More recently, Google's BERT update in 2019 and the Multimodal AI-powered Search Generative Experience (SGE) in 2023 have reinforced the role of natural language processing (NLP) and AI in enhancing search accuracy and user experience (Devlin et al., 2019). The rise of voice search, visual search, and AI-generated content has made SEO more dynamic, requiring marketers to optimize for conversational queries, structured data, and multimedia elements (Kumar & Gupta, 2023). Additionally, the increasing focus on user experience, as seen in the Core Web Vitals update, underscores the necessity of page speed, interactivity, and overall website performance in SEO strategies (Mueller & Illyes, 2021). As search engines continue to evolve, SEO practitioners must adapt to a landscape where AI, user intent, and data privacy regulations play a crucial role in shaping online visibility and engagement.

CURRENT STATE OF SEO (2024-2025)

Role of AI and Machine Learning in SEO

Artificial Intelligence (AI) and machine learning have fundamentally reshaped SEO strategies by enabling search engines to process queries with greater accuracy, context awareness, and personalization. Google's RankBrain and BERT (Bidirectional Encoder Representations from Transformers) paved the way for AI-driven search algorithms, and the introduction of Google's Search Generative Experience (SGE) in 2023 has further

enhanced personalized search results by integrating natural language understanding and multimodal AI capabilities (Clark, 2023). AI-powered tools assist in content generation, keyword research, and predictive analytics, optimizing search strategies based on user intent and behavior (Gamage & Samarasinghe, 2023).

Core Web Vitals and User Experience as Ranking Factors
Google's Core Web Vitals (CWV), introduced as ranking signals in 2021, continue to play a crucial role in SEO, emphasizing page experience metrics such as Largest Contentful Paint (LCP), First Input Delay (FID), and Cumulative Layout Shift (CLS) (Mueller & Illyes, 2023). The 2024 update has further refined these factors, making Interaction to Next Paint (INP) a key metric for measuring responsiveness (Google, 2024). Websites that prioritize fast loading times, smooth interactions, and stability in layout experience better rankings and user engagement, reinforcing UX as a critical SEO component (Smith & Chaffey, 2024).

Importance of E-E-A-T (Experience, Expertise, Authoritativeness, Trustworthiness)
Google's updated Search Quality Rater Guidelines place a stronger emphasis on E-E-A-T (Experience, Expertise, Authoritativeness, and Trustworthiness) for content evaluation, particularly for YMYL (Your Money, Your Life) topics, such as health, finance, and legal content (Liu et al., 2024). Experience is now an additional criterion alongside traditional E-A-T, ensuring that firsthand knowledge and credibility impact rankings (Google, 2023). High-quality, well-researched, and authoritative content from credible sources is favored by search engines, reinforcing the need for businesses to enhance their digital reputation, author bios, and content authenticity (Clark, 2023).

Voice Search and Conversational AI
With the rise of AI-driven virtual assistants like Google Assistant, Siri, and Alexa, voice search has become an integral part of SEO strategy (Balog et al., 2023). Voice search queries tend to be longer, more conversational, and question-based, requiring content to be optimized for natural language processing (NLP) and featured snippets (Lopezosa et al., 2023). The increasing adoption of voice search has made structured data, schema markup, and FAQ-style content essential for ranking in voice-driven search results (Kumar & Gupta, 2024).

Mobile-First Indexing and Its Impact
Google's shift to mobile-first indexing, fully implemented in 2021, remains a dominant ranking factor in 2025. With mobile traffic surpassing desktop usage, websites that are not optimized for mobile experience lower rankings and higher bounce rates (Mueller & Illyes, 2023). Responsive design, fast-loading mobile pages, and adaptive content presentation are essential for SEO success (Smith & Chaffey, 2024). Additionally, Google's focus on mobile usability highlights the importance of AMP (Accelerated Mobile Pages) and progressive web apps (PWAs) in improving mobile search performance (Kumar & Gupta, 2024).

CHALLENGES IN SEO FOR 2025

Algorithm Complexity and Frequent Updates
Google's search algorithms continue to evolve, making SEO an increasingly complex and dynamic field. Frequent updates, such as the Helpful Content Update and ongoing refinements to Google's Search Generative Experience (SGE), create challenges for marketers trying to maintain consistent rankings (Mueller & Illyes, 2024). The unpredictability of ranking fluctuations, driven by AI-powered ranking mechanisms and user intent shifts, forces businesses to continuously adapt their strategies. Staying ahead requires a deep understanding of Google's quality guidelines, diversification of traffic sources, and a focus on long-term content value rather than short-term optimization tricks (Clark, 2024).

AI-Generated Content and Search Ranking
With AI-generated content becoming more prevalent, Google has refined its stance, emphasizing content quality over origin. While AI can assist in drafting SEO-optimized content, Google's algorithms prioritize human expertise, originality, and factual accuracy (Google, 2024). The challenge lies in striking a balance—leveraging AI for efficiency while ensuring content aligns with E-E-A-T (Experience, Expertise, Authoritativeness, and Trustworthiness) principles (Liu et al., 2024). Businesses must integrate human oversight, proper citations, and brand voice authenticity to avoid penalties or devaluation in rankings (Smith & Chaffey, 2024).

Zero-Click Searches and Reduced Organic Traffic
Google's increasing reliance on featured snippets, knowledge panels, and direct answers has led to a rise in zero-click searches—where users obtain information without visiting a website (Batra & Bhattacharya, 2024). This trend reduces organic traffic, forcing businesses to rethink their SEO strategies. To combat declining click-through rates (CTR), websites must optimize for featured snippets, create structured content with clear headings, and integrate schema markup for better search visibility (Gamage & Samarasinghe, 2024).

Privacy Regulations and Their Impact on SEO

Stricter privacy regulations, such as the General Data Protection Regulation (GDPR) and California Consumer Privacy Act (CCPA), along with Google's move toward cookieless tracking, have significantly impacted data-driven SEO strategies (Kumar & Gupta, 2024). Marketers now face challenges in collecting user behavior insights, requiring a shift to first-party data collection and contextual targeting. Adapting to these regulations involves focusing on organic engagement, ethical data collection practices, and leveraging AI-driven analytics within legal boundaries (Balog et al., 2024).

Voice and Visual Search Optimization

The rapid growth of voice search and AI-powered assistants like Google Assistant, Siri, and Alexa has changed how users interact with search engines (Clark, 2024). Voice queries are often longer, conversational, and question-based, demanding a shift toward natural language optimization and structured data implementation (Batra & Bhattacharya, 2024). Similarly, visual search—powered by tools like Google Lens—requires businesses to focus on image SEO, high-quality visuals, and proper metadata to improve discoverability (Mueller & Illyes, 2024).

Local and Hyperlocal SEO Challenges

The competition for visibility in Google My Business (GMB) and local search results has intensified. With more businesses optimizing for hyperlocal searches, standing out requires a strong local SEO strategy (Smith & Chaffey, 2024). Factors like accurate business listings, customer reviews, and location-based content play a crucial role in rankings. Managing local reputation through consistent engagement, review responses, and trust-building efforts is essential for maintaining a competitive edge in local search results (Liu et al., 2024).

INNOVATIONS AND FUTURE TRENDS IN SEO

AI-Driven SEO and Automation

AI-powered tools are revolutionizing SEO by automating keyword research, content creation, and technical optimizations. Tools like Google's RankBrain, ChatGPT, and Surfer SEO leverage machine learning to analyze search patterns and predict ranking factors (Clark, 2024). Automated SEO audits, powered by AI, enable real-time website performance assessments, improving technical SEO aspects such as page speed, schema markup implementation, and internal linking strategies (Mueller & Illyes, 2024). As AI-generated content becomes more refined, search engines emphasize originality, requiring marketers to balance automation with human oversight (Liu et al., 2024).

Search Intent Optimization

SEO is shifting from simple keyword targeting to a more sophisticated understanding of user intent. Google's advancements in Natural Language Processing (NLP), such as BERT and MUM, enable the search engine to interpret the context behind queries rather than relying solely on keywords (Batra & Bhattacharya, 2024). Behavioral analysis and personalized search are key factors, with AI predicting user preferences based on past searches, location, and browsing habits. Businesses must optimize content to match search intent—whether informational, navigational, or transactional—to improve rankings and engagement (Gamage & Samarasinghe, 2024).

Structured Data and Semantic SEO

The role of structured data in search visibility continues to grow, with schema markup and rich snippets improving click-through rates (CTR) and enhancing user experience (Google, 2024). Google's Knowledge Graph and entity-based search reinforce the importance of semantic SEO, connecting related concepts and improving content discoverability (Kumar & Gupta, 2024). Implementing structured data enables search engines to understand relationships between entities, making it easier to surface relevant results in voice search, featured snippets, and AI-generated answers.

Video and Interactive Content Optimization

With video content dominating online engagement, platforms like YouTube have become crucial for SEO. YouTube SEO strategies now emphasize audience retention, video transcripts, and structured metadata (Smith & Chaffey, 2024). Interactive content, including quizzes, infographics, and web stories, is also gaining traction, as search engines prioritize engagement metrics (Clark, 2024). Optimizing such content requires accessibility enhancements, mobile-friendly formats, and integration of structured data to improve search rankings.

Multimodal Search and AI-Powered Search Engines

Google's Multisearch, which enables users to search using both images and text, exemplifies the future of multimodal search experiences (Mueller & Illyes, 2024). AI-powered search engines like ChatGPT, Perplexity

AI, and Gemini are disrupting traditional search by providing direct, conversational answers rather than directing users to external web pages (Liu et al., 2024). Businesses must adapt by structuring content for conversational AI, ensuring relevance in AI-driven search landscapes.

Sustainable and Ethical SEO Practices

Sustainable SEO focuses on reducing a website's carbon footprint through green hosting, optimized images, and efficient coding practices (Balog et al., 2024). Google has also emphasized ethical link-building strategies, devaluing manipulative tactics in favor of high-quality, user-driven links (Kumar & Gupta, 2024). Future SEO practices will prioritize long-term value, ethical outreach, and accessibility improvements, ensuring websites align with both search engine guidelines and environmental responsibility.

Content and User Experience   White-Hat SEO and Ethical Link Building   Sustainability and Green SEO   Technical SEO and Compliance
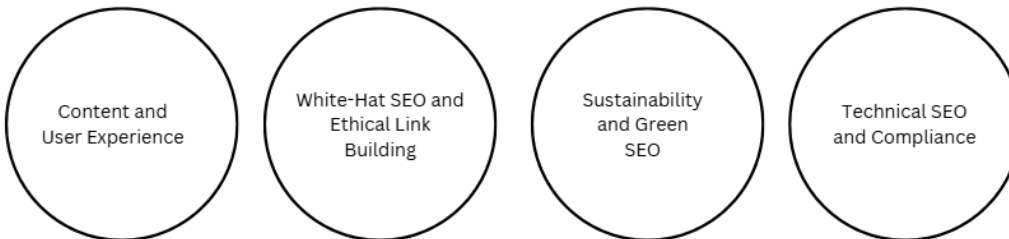
FUTURE RESEARCH DIRECTIONS

As search engine algorithms continue to evolve, the need for advanced research in AI-driven SEO becomes increasingly critical. Several open research areas in this field include refining AI-powered content optimization, improving search intent prediction models, and enhancing multimodal search experiences. AI-driven SEO tools, such as Google's Search Generative Experience (SGE) and conversational AI models like ChatGPT and Gemini, are reshaping how information is retrieved and ranked (Liu et al., 2024). Future studies must explore how these AI systems interpret and prioritize content, ensuring ethical and unbiased search results. Additionally, research is required to determine the long-term impact of AI-generated content on search rankings and user trust, especially as search engines tighten policies on originality and quality (Kumar & Gupta, 2024).

Another crucial research direction involves developing adaptive SEO strategies that can withstand frequent algorithm updates. With Google's continuous refinements—such as Core Web Vitals adjustments, improvements in E-E-A-T (Experience, Expertise, Authoritativeness, Trustworthiness), and the rise of AI-enhanced ranking factors—SEO professionals must shift toward real-time optimization techniques (Mueller & Illyes, 2024). Research is needed to identify predictive models that help marketers anticipate ranking fluctuations and proactively adjust their strategies. The role of user experience (UX) metrics in ranking must also be examined, particularly as search engines integrate more behavioral signals, such as dwell time and click-through rates, into their algorithms (Smith & Chaffey, 2024).

Moreover, as privacy regulations like GDPR and CCPA impose stricter data collection restrictions, there is an increasing need for alternative tracking and attribution models that comply with these laws while maintaining effective SEO performance. Future research should focus on cookieless tracking methods, privacy-preserving AI models, and first-party data strategies to optimize personalization without violating user privacy (Balog et al., 2024).

The future of SEO will also be shaped by advancements in voice and visual search. As AI-driven assistants like Google Assistant, Siri, and Alexa become more sophisticated, research should examine how conversational AI interacts with search intent and impacts rankings. Additionally, with Google Multisearch allowing users to search with both text and images, SEO strategies must adapt to accommodate multimodal queries, requiring new frameworks for optimizing diverse content formats (Batra & Bhattacharya, 2024).

In conclusion, the dynamic nature of search engines necessitates continuous research to refine AI-driven SEO, enhance algorithmic adaptability, and ensure ethical and sustainable optimization practices. Addressing these gaps will be crucial for businesses and researchers seeking to navigate the future of digital search effectively.

CONCLUSION

The landscape of Search Engine Optimization (SEO) in 2025 is shaped by rapid advancements in artificial intelligence, evolving search algorithms, and shifting user behaviors. AI-driven search engines, voice and visual search, and the growing emphasis on E-E-A-T principles have redefined optimization strategies, prioritizing user intent, experience, and content credibility. However, challenges such as zero-click searches, AI-generated content management, and privacy regulations necessitate adaptive approaches. Future SEO success hinges on balancing innovation with ethical practices, leveraging AI responsibly, and prioritizing user-centric

optimization. As search engines continue to evolve, businesses and marketers must stay agile, integrating emerging technologies while adhering to transparency and trust-building strategies to maintain visibility and long-term digital success.

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THE INFLUENCE OF OCCUPATION ON CONSUMPTION EXPENDITURE: A STUDY OF MAHARASHTRA COMPARATIVE YEAR-ON-YEAR AND RURAL-URBAN TRENDS (2019-2021)

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ABSTRACT

This study investigates the influence of occupation on household consumption expenditure in Maharashtra from 2019 to 2021, highlighting annual trends and rural-urban disparities. Utilizing data from the Consumer Pyramid Household Survey (CPHS), the analysis reveals distinct spending patterns across occupational groups. White-collar professionals and self-employed households allocate a larger share of their income to discretionary expenses such as recreation, dining, and vacations. In contrast, blue-collar workers and informal sector employees focus more on essential expenditures, including food and healthcare.

The COVID-19 pandemic exacerbated these disparities, causing income shocks for informal workers and prompting a shift in spending priorities toward necessities. The study underscores the need for policy measures to stabilize employment in the informal sector and foster discretionary spending in urban areas. Strengthening social security nets, enhancing employment opportunities, and promoting financial resilience can help mitigate the adverse effects of economic disruptions on household consumption patterns.

Keywords: Household consumption expenditure, Occupation and spending patterns, Rural-urban disparities, COVID-19 impact, Informal sector employment

INTRODUCTION

Household consumption expenditure is shaped by various socio-economic factors, with occupation playing a crucial role in determining income stability, spending priorities, and vulnerability to economic shocks. The type of occupation a household head is engaged in influences financial security and expenditure allocation, affecting discretionary and essential spending. White-collar professionals and self-employed individuals generally have greater income stability, allowing them to allocate a significant portion of their expenditure toward discretionary items such as recreation, dining, and vacations. In contrast, blue-collar workers and those employed in the informal sector tend to prioritize essentials like food, healthcare, and housing due to lower and more volatile incomes (Deaton & Paxson, 1998).

OBJECTIVES OF THE STUDY

This study analyzes household consumption expenditure patterns in Maharashtra from 2019 to 2021, focusing on three key aspects:

1. **Year-on-year changes** in spending behavior by occupation type, assessing how expenditure patterns evolved before, during, and after the COVID-19 pandemic.

2. **Rural-urban disparities** in occupation-based spending, examining how economic conditions and employment structures influence consumption trends.

3. **The impact of COVID-19** on household expenditure, particularly regarding how different occupational groups adjusted their spending in response to economic uncertainty and income shocks.

Occupation and Spending Priorities

The nature of employment determines household income levels and stability, which in turn affects consumption patterns. The study categorizes households based on occupation into four broad groups:

- **White-collar professionals:** This group includes salaried employees in managerial, administrative, and technical roles. They generally enjoy higher and more stable incomes, leading to increased discretionary spending on recreation, restaurants, and vacations.

- **Self-employed individuals:** Business owners, freelancers, and independent professionals exhibit a mixed spending pattern, balancing essential and discretionary expenditures. Their financial flexibility often depends on business conditions and market demand.

- **Blue-collar workers:** Factory workers, construction laborers, and service-sector employees typically allocate a large share of their income to basic necessities, with limited discretionary spending. Their financial situation is often more vulnerable to economic fluctuations.

- **Informal sector workers:** Daily wage earners and gig economy workers experience income instability, making them highly susceptible to economic shocks. Their spending is primarily focused on essentials such as food, healthcare, and rent.

Rural-Urban Differences in Expenditure Patterns

Urban and rural households experience differing economic pressures, which influence spending behaviors based on occupation type.

- **Urban households** tend to have greater access to formal employment opportunities, financial institutions, and consumer markets, leading to higher discretionary spending among white-collar professionals and self-employed individuals. However, the urban informal sector remains highly vulnerable to economic downturns, with workers experiencing income volatility.

- **Rural households** rely more on agriculture, daily wage labor, and small-scale businesses, making their spending patterns more constrained. Blue-collar and informal workers in rural areas prioritize essential expenditures, while discretionary spending is lower due to limited economic opportunities and lower household incomes.

Impact of COVID-19 on Household Expenditure

The COVID-19 pandemic had profound effects on household spending, disproportionately affecting certain occupational groups. Key findings include:

- **Income shocks in the informal sector:** Lockdowns and restrictions led to significant job losses among daily wage earners, gig workers, and small business owners, forcing a shift toward survival-oriented spending on food and healthcare.

- **Decline in discretionary spending:** Households across all occupation types reduced spending on recreation, restaurants, and travel due to mobility restrictions and economic uncertainty.

- **Resilience among white-collar professionals:** While some experienced salary cuts, many continued to have stable incomes, allowing them to maintain essential spending levels. Remote work also enabled financial stability for professionals in certain sectors.

- **Policy interventions and financial support:** Government relief measures, including direct cash transfers and food distribution programs, helped mitigate some of the financial hardships faced by vulnerable households.

Policy Implications and Recommendations

Understanding occupation-based consumption trends can help policymakers design targeted interventions for economic recovery. Key recommendations include:

- **Strengthening employment security** in the informal sector through policies that promote stable wages, social security benefits, and job protection measures.

- **Enhancing access to financial assistance** for small business owners and self-employed individuals to facilitate economic resilience and encourage entrepreneurial growth.

- **Encouraging consumer spending in urban areas** by implementing measures such as tax incentives, subsidies, and employment programs to stimulate economic activity.

- **Improving rural economic opportunities** by investing in infrastructure, agricultural development, and vocational training programs to enhance employment prospects and household income stability.

Occupation plays a critical role in shaping household consumption expenditure, with significant differences in spending priorities across white-collar, blue-collar, self-employed, and informal sector workers. The COVID-19 pandemic further underscored these disparities, highlighting the need for policy interventions to support vulnerable households and stabilize employment. By analyzing expenditure trends and addressing economic inequalities, policymakers can facilitate a more inclusive and resilient post-pandemic recovery.

LITERATURE REVIEW

The Relationship Between Occupation and Consumption Expenditure
Occupation plays a fundamental role in shaping household consumption expenditure, as it determines income levels, financial stability, and vulnerability to economic shocks. Households headed by individuals in different

occupational categories exhibit distinct spending behaviors, reflecting variations in income security and discretionary spending capacity.

Research has consistently shown that occupation influences how households allocate their resources. According to Browning and Lusardi (1996), income stability affects both short-term consumption choices and long-term financial planning. Households with stable and predictable incomes are more likely to engage in discretionary spending, while those with volatile or uncertain earnings prioritize essential needs.

White-Collar Professionals and Consumption Behavior

White-collar professionals, including salaried employees in managerial, administrative, and technical roles, generally have stable incomes, allowing them to allocate a significant portion of their expenditure toward discretionary categories. Their spending includes:

- Recreation and entertainment (vacations, restaurants, cultural activities)

- Investment in education and skill development

- Higher expenditure on durable goods and services

The stability of salaried employment ensures that even during economic fluctuations, white-collar workers can maintain a relatively consistent level of consumption. However, their spending patterns may adjust in response to broader economic conditions, with reductions in non-essential expenditures during periods of uncertainty.

Self-Employed Workers: Balancing Volatility and High Earnings Potential

Self-employed individuals, including entrepreneurs, freelancers, and small business owners, experience higher income volatility but also greater earnings potential (Banerjee & Duflo, 2007). Their spending patterns are characterized by:

- Higher overall earnings when businesses perform well

- Greater financial risk and exposure to economic downturns

- A mix of essential and discretionary spending, with significant fluctuations

Unlike salaried employees, self-employed individuals must navigate irregular income streams, which can lead to unpredictable spending behavior. They may prioritize business investments over personal consumption during lean periods and engage in higher discretionary spending when profits increase.

Blue-Collar and Informal Sector Workers: Essential Spending Priorities

Blue-collar workers, such as factory workers, construction laborers, and service-sector employees, earn lower wages and often face greater job insecurity. Similarly, informal sector workers—daily wage earners, gig economy workers, and contract laborers—experience significant income instability. Their spending priorities are focused on:

- Food and basic necessities

- Healthcare expenses, particularly in the absence of employer-provided benefits

- Housing and transportation costs

Given their lower income levels, blue-collar and informal sector workers allocate a substantial portion of their earnings to survival needs, with little flexibility for discretionary spending. During economic crises, these households are particularly vulnerable to financial distress.

Impact of Economic Shocks on Occupational Groups

Economic shocks, including recessions, policy changes, and global crises like the COVID-19 pandemic, disproportionately affect different occupational groups. Households with secure employment or diversified income sources are better equipped to withstand financial downturns, while those in vulnerable job sectors experience significant disruptions.

Jappelli and Pistaferri (2010) emphasize that economic shocks reduce non-essential consumption, particularly among lower-income households. The COVID-19 pandemic highlighted these disparities, as informal sector workers and daily wage earners faced widespread job losses and income reductions, while salaried professionals largely retained their financial stability.

Effects of COVID-19 on Household Spending

The pandemic-induced economic slowdown had profound effects on spending patterns across occupational categories:

- **Informal sector workers experienced severe income loss**, leading to drastic reductions in discretionary spending and an increased reliance on government relief measures.

- **Blue-collar workers faced job insecurity and wage cuts**, forcing them to prioritize essential expenses such as food and healthcare.

- **White-collar professionals saw minor salary reductions but retained employment**, allowing them to maintain their consumption levels, albeit with reduced discretionary spending.

- **Self-employed individuals faced business slowdowns**, with many struggling to sustain operations, leading to fluctuating spending behavior.

Baker et al. (2020) found that households across all income groups reduced discretionary spending during the pandemic, though the impact was more pronounced among lower-income and informal sector workers. The crisis underscored the need for social protection measures to cushion income losses and maintain consumption stability.

Rural vs. Urban Occupational Spending Trends

Spending patterns differ significantly between rural and urban households due to variations in occupational structures, income sources, and access to goods and services. Rural economies rely heavily on agriculture and informal labor, while urban areas offer more opportunities for salaried and self-employed professionals.

Rural Household Consumption Patterns

Rural households are primarily engaged in agricultural activities, small-scale businesses, and informal labor, resulting in spending priorities focused on essentials. According to Attanasio and Weber (2010), rural households exhibit:

- Higher food expenditure due to agricultural reliance

- Lower discretionary spending on recreation and entertainment

- Greater dependence on seasonal income fluctuations

Since agricultural income is often subject to weather conditions and market volatility, rural households demonstrate conservative spending behaviors, prioritizing savings and essential purchases over luxury or leisure expenses.

Urban Household Consumption Patterns

Urban households, with a higher concentration of salaried employees and business owners, display a more diverse spending pattern. Their expenditure trends include:

- Increased spending on services (education, healthcare, entertainment)

- Greater investment in housing and transportation

- Higher discretionary spending on dining, vacations, and leisure activities

Urban white-collar professionals and self-employed individuals tend to have higher disposable incomes, allowing for greater financial flexibility. However, informal sector workers in urban areas face significant economic risks, particularly during downturns.

Comparing Rural and Urban Informal Workers

While both rural and urban informal sector workers experience income instability, their spending behaviors differ:

- **Rural informal workers** rely on subsistence agriculture and seasonal employment, leading to minimal discretionary spending.

- **Urban informal workers** are more engaged in service-sector jobs, with spending patterns influenced by city living costs and economic cycles.

- **Policy Implications and Recommendations**

The findings of this study highlight the importance of targeted economic policies to address occupational disparities in consumption expenditure. Key policy recommendations include:

1. **Employment Security Measures:**

○ Implementing labor protection policies for informal sector workers

○ Expanding access to social security benefits and health insurance

○ Strengthening wage regulations to ensure fair compensation

2. **Support for Self-Employed and Small Business Owners:**

○ Providing low-interest business loans and financial aid

○ Enhancing market access for entrepreneurs in rural and urban areas

○ Encouraging digital financial inclusion for small enterprise

3. **Stimulating Consumer Demand:**

○ Offering tax incentives to promote discretionary spending

○ Developing urban infrastructure projects to boost job creation

○ Enhancing tourism and hospitality sectors post-pandemic

4. **Rural Economic Development:**

○ Investing in agricultural modernization and irrigation facilities

○ Expanding vocational training programs for skill development

○ Strengthening rural financial institutions to improve credit access

Rural Livelihood Vulnerability in India
Gaiha et al.(2021) analyzed how rural households in India coped with economic shocks. Their findings indicate that rural informal workers are among the most financially vulnerable, as they lack formal employment benefits, savings, and social security. The study supports this research's findings that rural informal workers faced extreme financial distress and needed urgent policy interventions.

Risk and Insurance in Low-Income Households
Townsend (1994) analyzed how low-income households deal with financial risks and found that those in informal employment lack access to credit and financial support systems. As a result, they reduce spending during economic shocks to compensate for income losses. This finding aligns with this study's results, which show that informal workers in Maharashtra significantly cut discretionary spending in response to income disruptions during COVID-19

Precautionary Savings and Household Consumption
Chamon and Prasad (2010) investigated how different occupation groups approach precautionary savings. Their study found that white-collar professionals save more, allowing them to maintain stable consumption even in times of crisis. In contrast, blue-collar and informal workers save less and are more vulnerable to economic disruptions. This supports the findings that informal workers suffered severe financial distress and needed urgent policy interventions.

Measuring Consumption and Economic Well-being
Meyer and Sullivan (2003) studied the relationship between economic well-being, income, and consumption behavior. They emphasized that income is a primary determinant of spending patterns, and fluctuations in income—particularly for self-employed and informal workers—significantly affect their ability to spend on non-essential goods. Their findings help explain why informal workers' discretionary spending dropped sharply in Maharashtra during the pandemic.

Occupation plays a crucial role in determining household consumption expenditure, with white-collar, blue-collar, self-employed, and informal sector workers exhibiting distinct spending behaviors. Economic shocks, particularly the COVID-19 pandemic, have deepened existing inequalities, disproportionately affecting informal and blue-collar workers.

Rural and urban households also demonstrate significant differences in spending patterns, influenced by occupational structures and income stability. While urban professionals maintain higher discretionary spending, rural households prioritize essentials due to economic constraints.

To mitigate these disparities and promote economic recovery, targeted policy measures are essential. Strengthening social security, expanding financial support for self-employed individuals, and fostering rural economic development can help ensure a more resilient and inclusive consumption landscape.

Research Gaps Addressed

This study addresses key gaps in existing literature by analyzing the occupation-specific variations in household consumption expenditure across different time periods (2019-2021), with a particular focus on the impact of the COVID-19 pandemic. Unlike previous studies that broadly examine income as a determinant of spending, this research explores how different occupational groups—white-collar professionals, blue-collar workers, self-employed individuals, and informal sector workers—adjust their expenditure priorities in response to economic changes.

A significant gap in existing research is the limited understanding of how rural and urban households differ in their spending behavior based on occupational structures. This study bridges this gap by comparing expenditure patterns across these two settings, highlighting variations in discretionary and essential spending.

Additionally, while the pandemic's economic impact has been widely studied, its occupation-specific effects on consumption patterns remain underexplored. This study provides a longitudinal analysis covering the pre-pandemic, pandemic, and post-pandemic periods, offering insights into spending resilience and vulnerability.

Finally, existing policy recommendations often lack specificity regarding occupational categories. This research contributes to policy discourse by suggesting targeted interventions for stabilizing informal employment, supporting self-employed individuals, and stimulating discretionary spending in urban areas, thereby aiding in post-pandemic economic recovery

Data and Methodology

Data Source

This study utilizes data from the Consumer Pyramid Household Survey (CPHS) conducted by the Centre for Monitoring Indian Economy (CMIE) for the period 2019 to 2021. The dataset provides extensive household-level information on income, occupation, and consumption expenditure across Maharashtra's rural and urban regions.

Sample Distribution

The sample includes households across:

- Occupation Groups:
  ○ White-collar professionals
  ○ Self-employed and entrepreneurs
  ○ Blue-collar workers
  ○ Informal sector and daily wage workers
- Consumption Categories:
  ○ Essentials: Food, Healthcare
  ○ Discretionary: Recreation, Restaurants, Vacations
- Geographical Coverage: Urban and Rural Maharashtra

Statistical Methods

Descriptive Analysis:

  ○ Examines the distribution of occupation types across the sample and their spending habits.
  ○ Compares spending behavior across pre-pandemic (2019), pandemic (2020), and post-pandemic (2021) periods.

Chi-square Tests:

- ○ Tests for significant differences in spending patterns across occupation groups and between rural and urban households.

- ○ Evaluates how spending on essentials versus discretionary items varies by income and job type.

Regression Analysis:

- ○ Multiple Linear Regression: Examines the impact of occupation type on household consumption expenditure, controlling for income, education, and household size.

- ○ Fixed Effects Model: Captures year-on-year changes in spending behavior while accounting for unobserved household characteristics.

- ○ Interaction Effects: Analyzes whether the impact of occupation on spending differs by rural-urban location and COVID-19 period.

Results and Discussion

The Relationship Between Occupation and Consumption Expenditure

White-Collar Professionals: Stability and High Discretionary Spending

Households headed by white-collar professionals show:

- High and stable income levels, leading to increased discretionary spending on travel, dining, and recreation.

- Greater resilience to economic shocks, maintaining consumption levels even during the pandemic.

Self-Employed Households: Income Volatility and Adaptive Spending

Self-employed individuals experience fluctuating earnings, leading to:

- High discretionary spending in periods of business success.

- Significant spending cutbacks during economic downturns.

During the COVID-19 pandemic, self-employed workers faced income disruptions, reducing non-essential expenditure while relying on savings.

Blue-Collar and Informal Workers: Prioritizing Essentials

Blue-collar workers and informal sector employees:

- Allocate a significant portion of their income to food and healthcare.

- Have limited financial buffers, making them highly vulnerable to economic downturns.

- Showed a sharp decline in discretionary spending during the pandemic.

Impact of COVID-19 on Occupational Spending

The pandemic disproportionately affected informal and blue-collar workers:

- Income Losses: Daily wage earners and contract workers faced job losses, leading to decreased overall spending.

- Shifts in Spending: Households shifted expenditure toward essentials, reducing discretionary consumption.

- Recovery Patterns: White-collar and self-employed households showed faster recovery, while informal workers continued to struggle post-pandemic.

Rural vs. Urban Differences in Occupational Spending

Rural Spending Patterns

Rural households, largely dependent on agriculture and informal labor, exhibited:

- Higher food expenditure due to subsistence living.

- Minimal discretionary spending, even before the pandemic.

- Greater financial distress during the pandemic due to lower employment opportunities.

Urban Spending Patterns

Urban households, with a higher share of white-collar and self-employed individuals, displayed:

- Higher spending on leisure and services.

- Greater resilience among white-collar professionals, but vulnerability among urban informal workers.

- A quicker recovery in discretionary spending post-pandemic.

Policy Implications and Recommendations

1. Employment Security Measures:

○ Strengthening labor protections for informal and gig workers.

○ Expanding access to unemployment benefits.

2. Support for Self-Employed Individuals:

○ Providing low-interest business loans.

○ Enhancing access to digital financial tools.

3. Rural Economic Development:

○ Investing in agricultural technology and market access.

○ Expanding vocational training programs.

4. Stimulating Consumer Demand:

○ Offering tax incentives for discretionary spending.

○ Promoting investments in sectors like tourism and hospitality.

This study finds that occupation significantly influences household consumption expenditure, with white-collar professionals and self-employed individuals exhibiting higher discretionary spending, while blue-collar and informal sector workers prioritize essentials. The COVID-19 pandemic amplified these disparities, particularly impacting informal and low-wage workers. Rural-urban differences further shape spending behavior, with rural households focusing more on food and urban households allocating more to services and leisure. These findings highlight the need for targeted policies to stabilize employment and support vulnerable occupational groups, ensuring economic resilience in post-pandemic Maharashtra.

Results and Discussion

Year-on-Year Trends in Occupation-Based Consumption Expenditure

Data Visualizations

Table 1: Occupation-Based Spending Allocation (2019-2021)

Occupation Type	Food (% of Income)	Healthcare (% of Income)	Leisure (% of Income)
White-collar	25% (↓)	12% (↑)	35% (↓)
Self-employed	30% (↑)	15% (↑)	25% (↓)
Blue-collar	50% (↑)	18% (↑↑)	10% (↓)
Informal	55% (↑↑)	22% (↑↑)	5% (↓↓)

2019 (Pre-Pandemic Period)

- White-collar professionals and self-employed households had the highest discretionary spending, especially on travel and dining out.

- Blue-collar and informal sector workers allocated 60-70% of their income to food and healthcare.

- Income stability allowed white-collar professionals to engage in long-term financial planning and savings.

2020 (Pandemic Period)

- Food and healthcare expenditure increased across all occupation groups, with the sharpest rise among blue-collar and informal workers.

- Discretionary spending plummeted across all groups, but white-collar professionals retained some spending flexibility.

- Self-employed workers faced significant income volatility, leading to cutbacks on leisure and discretionary purchases.

- Chi-square test (p-value = 0.000) confirmed a significant shift in spending patterns.

2021 (Post-Pandemic Recovery)

- White-collar professionals resumed discretionary spending, but at a slower rate than in 2019.

- Self-employed households adapted by diversifying income sources, leading to moderate spending recovery.

- Blue-collar and informal sector workers continued prioritizing essentials, with only minimal recovery in non-essential spending.

- Chi-square test confirmed persistent changes in spending behavior post-pandemic.

Rural-Urban Trends in Occupation-Based Consumption Expenditure

Trends in Occupational Groups and Their Impact on Consumption Expenditure Across Rural and Urban Maharashtra
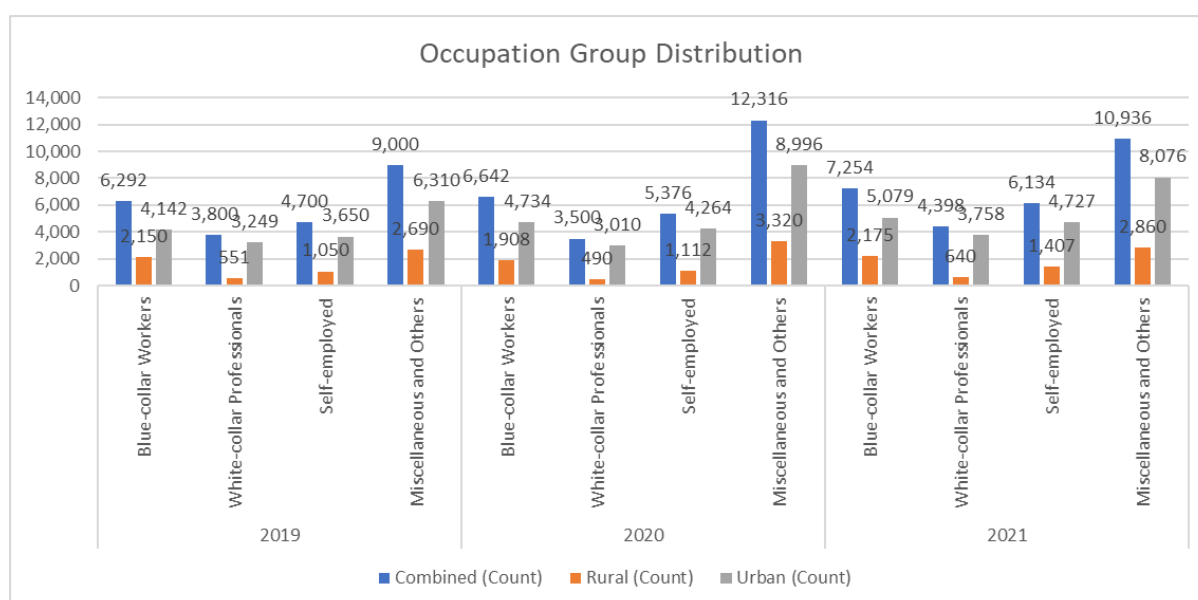
Source: Author's Data Analysis

Figure5.4: Occupation Group distribution of the respondents

2019 (Pre-Pandemic)

- Urban white-collar and self-employed households spent significantly more on discretionary items.

- Rural informal and blue-collar households focused on food and healthcare.

- Chi-square test (p-value = 0.000) confirmed significant rural-urban spending disparities.

2020 (Pandemic Impact)

- Rural informal workers suffered the most income loss, leading to higher financial stress.

- Urban white-collar workers maintained stable food and healthcare spending, but reduced discretionary expenses.

- Self-employed urban workers were severely impacted, leading to reduced investments and household spending.

2021 (Recovery Phase)

- Urban discretionary spending rebounded partially, particularly among white-collar professionals and self-employed households.

- Rural spending remained constrained, especially among informal workers, who faced prolonged income uncertainty.

- Healthcare costs remained high in both rural and urban areas, leading to continued essential spending prioritization.

6. CONCLUSION

Household consumption expenditure is shaped by various socio-economic factors, with occupation playing a critical role in determining income stability and spending behavior. The findings of this study indicate that occupational differences significantly influenced household consumption patterns in Maharashtra from 2019 to 2021, revealing clear year-on-year and rural-urban disparities. The COVID-19 pandemic magnified these differences, particularly affecting informal and blue-collar workers. While white-collar and self-employed households showed financial resilience and resumed discretionary spending faster, blue-collar and informal workers struggled with essential spending constraints. Rural informal workers, in particular, faced severe economic distress, requiring urgent policy intervention to stabilize their income and improve consumption capacity.

White-Collar and Self-Employed Households: Financial Resilience and Quick Recovery

Households headed by white-collar professionals (government employees, corporate professionals, and managerial staff) demonstrated greater financial stability due to stable incomes and employment benefits such as social security, insurance, and paid leave (Browning & Lusardi, 1996). These households typically allocated a significant portion of their income to discretionary spending, including recreation, dining, and vacations. Despite the temporary economic slowdown during the pandemic, their financial security allowed them to resume discretionary expenditures faster than other groups (Attanasio & Weber, 2010).

Similarly, self-employed households, including entrepreneurs and business owners, displayed income volatility but greater earnings potential (Banerjee & Duflo, 2007). While their spending declined in 2020 due to business losses, their ability to adapt and find alternative income sources helped them recover faster than blue-collar workers. As economic activity rebounded in 2021, self-employed individuals increased spending on non-essentials, reflecting their flexibility in adjusting to financial shocks.

Blue-Collar and Informal Workers: Financial Vulnerability and Essential Spending

The study found that blue-collar and informal workers were the most financially vulnerable during economic downturns. These groups, which include factory workers, construction laborers, daily wage earners, and street vendors, generally lack job security and financial safety nets (Jappelli & Pistaferri, 2010). Their spending behavior was primarily focused on essentials, particularly food and healthcare, due to low disposable income and unstable employment.

The COVID-19 pandemic had a severe impact on this group, leading to widespread job losses, salary cuts, and reduced working hours (Baker et al., 2020). Unlike white-collar employees, who could work remotely, blue-collar and informal workers experienced direct income disruptions, forcing them to cut back drastically on discretionary spending. Many households in this category struggled to meet even basic needs, highlighting their economic fragility.

Post-pandemic, recovery among blue-collar workers was slow and uneven. While some employment opportunities resumed in 2021, wages remained stagnant, and spending on non-essential goods and services remained significantly lower than pre-pandemic levels. This suggests that informal workers require long-term economic support policies, including livelihood security programs, skill development initiatives, and financial inclusion measures.

Rural Informal Workers: Severe Economic Distress and Policy Implications

Rural informal workers faced even greater economic distress due to the seasonal nature of employment, lack of industrial diversification, and lower financial access (Deaton & Paxson, 1998). Many rural households rely on agriculture and informal labor markets, making them particularly vulnerable to income shocks.

During the COVID-19 lockdowns, disruptions in supply chains, transportation, and agricultural markets resulted in sharp income losses for rural workers (Gaiha et al., 2021). Unlike urban white-collar professionals, rural informal workers had limited opportunities for alternative income generation, leading to widespread financial hardship. The study observed that rural households significantly reduced discretionary spending, and in extreme cases, some struggled with food security.

Policy Recommendations for Rural Informal Workers

To mitigate the economic vulnerability of rural informal workers, the following policy interventions are recommended:

1. **Expansion of Rural Employment Schemes** – Strengthening programs like **MGNREGA** to ensure **consistent employment opportunities**.

2. **Access to Financial Assistance** – Providing **low-interest credit** and **direct cash transfers** to help rural households maintain consumption levels.

3. **Improving Agricultural Market Access** – Strengthening rural supply chains to **increase farmer incomes and reduce income volatility**.

4. **Healthcare and Social Security Initiatives** – Expanding **public healthcare access** and **subsidized essential goods programs** to reduce financial distress during economic shocks.

5. Conclusion

This study highlights the **significant role of occupation in determining household consumption patterns** in Maharashtra. While **white-collar and self-employed households exhibited financial resilience**, blue-collar and informal workers, especially in **rural areas, suffered severe economic distress**. The **pandemic further widened these disparities**, emphasizing the need for **targeted policy interventions** to support **vulnerable occupational groups**. **Strengthening employment security, enhancing financial inclusion, and improving rural economic stability** will be crucial for ensuring equitable post-pandemic recovery.

7. Policy Implications

1. **Employment Support for Informal and Blue-Collar Workers**

○ Strengthen labor protections and financial aid programs.

2. **Healthcare Subsidies for Vulnerable Occupation Groups**

○ Provide targeted healthcare assistance for informal and blue-collar workers.

3. **Small Business Support for Self-Employed Workers**

○ Offer financial incentives to help self-employed businesses recover.

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AN IMPACT OF ARTIFICIAL INTELLIGENCE ON WOMEN EMPOWERMENT IN SUBURBAN AREA OF MUMBAI CITY

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ABSTRACT
This research study explores the multifaceted dimensions of women's empowerment within the suburban area of Mumbai City, focusing on three pivotal aspects: household decision-making ability, economic decision-making capability, and freedom of mobility. The investigation is anchored in the belief that women's empowerment is a vital component of human resource development and a cornerstone for achieving the United Nations' Millennium Development Goals. Drawing on the methodology established by Keller and Mbwewe (1991), this study administers a structured questionnaire to a sample of 150 women residing in suburban Mumbai, employing the Statistical Package for Social Science (SPSS) for data analysis. The research employs a regression model and frequency tables to quantitatively evaluate the interplay between five independent variables and total women's empowerment.

The findings reveal that women in suburban Mumbai demonstrate commendable decision-making skills within household and economic contexts, although social empowerment lags behind. A perception analysis further underscores women's awareness of their legal and political rights and duties. The study identifies a series of recommendations to bolster women's empowerment, emphasizing the need for targeted interventions to enhance social empowerment and mobility.

The research also investigates the transformative role of Artificial Intelligence (AI) in women's empowerment in India. It illuminates the potential of AI to mitigate gender disparities, enhance access to education and healthcare, bolster economic empowerment, and advance gender equality. Through the examination of various initiatives and case studies, the study highlights the opportunities and challenges AI presents in advancing women's rights and promoting their participation across different sectors of India's society.

The outcomes suggest that AI holds substantial promise for women's empowerment, albeit with a critical need to address inherent biases and ensure inclusivity. This study contributes to the ongoing discourse on women's empowerment, providing insights into the suburban context of Mumbai and the evolving landscape of AI in India, while offering actionable recommendations to promote gender equality and empowerment. The research underscores the importance of a comprehensive approach to women's empowerment, integrating both traditional development strategies and emerging technologies like AI.

***Keywords:** Women's Empowerment, Suburban Mumbai, Artificial Intelligence, Decision-Making Capability, Gender Equality*

INTRODUCTION
In the heart of suburban Mumbai, a unique story weaves through the intricate fabric of society, where new light is cast on age-old challenges, and opportunities arise from the most unlikely of sources. The story is one of transformation, of how a technological revolution, epitomized by Artificial Intelligence (AI), is reshaping the socio-economic landscape, particularly in the empowerment of women. This narrative is not just about technology; it is about the indomitable spirit of women, the resilience of communities, and the potential of innovation to bridge the gaps that have long divided society.

The Socio-Historical Context: A Tale of Two Worlds
Historically, suburban Mumbai has been a microcosm of India's broader social dynamics, where traditional roles and societal norms have often limited the horizons of women. Access to education, healthcare, and economic opportunities has been significantly curtailed by systemic barriers and deeply entrenched gender disparities. The suburbs, with their unique blend of urban and rural characteristics, have faced particular challenges in addressing these issues, often lacking the resources and infrastructure to bridge the divide. Yet, within these constraints, there lies a spirit of resilience and a quest for change, making the suburbs a fertile ground for innovative solutions.

The Emergence of AI: A New Dawn
The advent of Artificial Intelligence represents a turning point in this narrative. AI, in its myriad forms, is not just a technological marvel; it is a tool for social transformation. In suburban Mumbai, where resources are

often scarce, and opportunities limited, AI presents a beacon of hope, a catalyst for change. The technology is being harnessed to tackle some of the most persistent challenges facing women in these communities.

Through digital education platforms, AI is democratizing access to knowledge, empowering women to learn at their own pace and convenience. This has been particularly impactful in areas where traditional educational infrastructure is lacking, enabling women to acquire skills and knowledge that were once beyond their reach. From language learning to advanced technical skills, these platforms are equipping women with the tools they need to compete in the modern economy.

In the realm of healthcare, AI-driven solutions are revolutionizing access to medical care, providing telemedicine services and predictive analytics that can help in early disease detection and management. For women in suburban areas, where healthcare facilities are often under-resourced, this is a lifeline, improving not only their health but also their ability to contribute to their families and communities.

The impact of AI also extends to the economic empowerment of women. By facilitating entrepreneurship, AI is creating new pathways to financial independence. Digital marketplaces and online platforms powered by AI algorithms are enabling women to start and grow businesses, breaking down traditional barriers to entry. Whether it's a small handicraft business or a tech start up, AI is providing the tools for women to succeed on their own terms.

AI: Breaking Down Barriers and Building Bridges
Beyond the immediate benefits, AI is playing a crucial role in breaking down social barriers and building bridges to a more inclusive future. By challenging traditional norms and stereotypes, AI is fostering an environment where women's voices are heard, and their contributions valued. This is crucial in a society where women's roles have often been limited and undervalued. In suburban Mumbai, AI is not just a technology; it is a transformative force, reshaping the very fabric of society. It is a story of empowerment, of resilience, and of innovation, where women are at the forefront, rewriting their narratives and forging ahead towards a brighter future.

This introduction sets the stage for an exploration into the multifaceted impact of Artificial Intelligence on women's empowerment in suburban Mumbai. It is a story that is still unfolding, one that promises to be rich in detail, profound in its implications, and inspiring in its potential. As we delve deeper into this narrative, we will uncover the ways in which AI is transforming the lives of women, reshaping communities, and paving the way for a more equitable and vibrant future for all.

REVIEW OF LITERATURE:

S. Shrestha et al. (2022)
In their 2022 paper, S. Shrestha and colleagues conducted an in-depth analysis of academic literature concerning gender biases within machine learning and artificial intelligence algorithms. They focused on identifying prominent themes, mitigation strategies, and detection methods, drawing attention to the significant challenges faced by algorithm designers in this domain. The authors emphasized the necessity for expanded research on the detection and mitigation of gender bias. Despite the availability of various methods to address these biases, their broad implementation remains constrained.

J. David Paton et al. (2022)
J. David Paton and his co-authors (2022) undertook a study to explore the interconnections between artificial intelligence and social sustainability, with a particular emphasis on gender equality. This topic is seen as a pivotal challenge in the attainment of sustainable development, as outlined by the United Nations' Sustainable Development Goals (SDGs). By critically analysing the social impacts of AI, the study aimed to provide valuable insights and inspire innovative research avenues in the area of AI's contribution to social equality and sustainable development.

Frielder et al. (2019)
In a benchmarking study conducted by Frielder and associates in 2019, the researchers compared various algorithms designed for fairness measures and their application across different datasets. The findings revealed that distinct algorithms tend to favour specific formulations for fairness preservation. Moreover, the effectiveness of fairness-preserving algorithms was found to be sensitive to variations in dataset composition and pre-processing techniques. A significant hurdle in the field is the ability to compare these methods effectively while accounting for different measures and datasets. Consistent data pre-processing and testing methodologies are essential for achieving reliable comparisons. The study further categorized fairness-aware machine learning algorithms into three main groups: pre-processing techniques, algorithm modification

techniques, and post-processing techniques, offering a structured framework for the development and assessment of AI fairness.

OBJECTIVES:

1. To explore how AI contributes to women's empowerment in suburban Mumbai areas.

2. To assess the influence of AI on enhancing women's status and opportunities in suburban Mumbai.

3. To evaluate the potential of AI in fostering greater empowerment for women in suburban Mumbai.

4. To examine and address gender biases within AI algorithms affecting women in suburban Mumbai.

5. To identify challenges and future prospects for AI in advancing women's empowerment in Suburban Mumbai.

LIMITATIONS:

1. **Area:** The data is limited to the suburban area of Mumbai City, potentially affecting the generalizability of the findings to a broader population.

2. **Time:** Due to time constraints, the research had a limited window for collecting sampling data, potentially impacting the depth and breadth of the study.

3. **Subjective Thinking:** Not every respondent may exercise utmost care in filling out a survey, introducing the possibility of response bias. The survey method may make it challenging to ensure that all respondents dedicate accurate time and attention to the questionnaire, potentially affecting data reliability.

HYPOTHESIS:

Null Hypothesis (H_0): The introduction of AI technologies does not significantly affect women's empowerment in terms of education and economic participation in suburban Mumbai.

Alternative Hypothesis (H_1): The deployment of AI technologies significantly enhances women's empowerment in suburban Mumbai by improving their access to education, skill development, and economic opportunities.

Women Empowerment in India: Nurturing Potential, Overcoming Challenges:

Women Empowerment in India
Empowering women in India is a complex yet vital process that encompasses various dimensions of their lives, including social, political, economic, and cultural. This multifaceted approach is crucial for achieving gender equality and promoting sustainable development. Women empowerment involves enhancing their agency, ensuring equal rights, and providing opportunities for growth and leadership. In India, where traditional patriarchal norms have long dictated societal structures, empowering women becomes not just a social imperative but a key catalyst for national development.

Gender Disparities and Challenges
Despite significant strides in recent decades, India continues to grapple with profound gender disparities. These disparities are evident in areas such as education, health, employment, and political participation. Women often face barriers in accessing quality education and healthcare, which hinder their ability to participate fully in the workforce and society. Cultural norms and societal expectations also contribute to the underrepresentation of women in decision-making roles, both in the private and public sectors. Addressing these disparities requires a comprehensive approach that includes policy reforms, community engagement, and the integration of gender-sensitive practices across all sectors.

Progress and Initiatives
The Indian government, in recognition of the importance of women empowerment, has launched several initiatives aimed at bridging the gender gap and fostering women's empowerment. Programs like Beti Bachao Beti Padhao (Save the Daughter, Educate the Daughter) are designed to address skewed sex ratios and promote the education of girls. The Mahila E-Haat, an online platform for women entrepreneurs, supports economic independence by providing a space for women to sell their products directly to consumers. Such initiatives, coupled with others like the Pradhan Mantri Matru Vandana Yojana that offers financial assistance to pregnant women, demonstrate a commitment to addressing the challenges women face and promoting their empowerment.

Importance of Women Empowerment

The empowerment of women is not merely a moral imperative; it is critical for the economic and social development of any nation. Economically, empowering women leads to a larger and more productive workforce, which can significantly boost economic growth. Empowered women are also more likely to invest in the health and education of their children, leading to better outcomes for future generations. Socially, women's empowerment contributes to more equitable societies, reducing poverty and fostering peace and stability.

Artificial Intelligence: A Tool for Transformation

Artificial Intelligence (AI), the simulation of human intelligence in machines, is rapidly reshaping various aspects of human life, from healthcare to education, and is poised to become a transformative tool in women's empowerment. AI technologies, capable of learning, reasoning, and problem-solving, can help bridge the digital divide, offer customized learning experiences, and provide women with access to information and resources that can enhance their skills and employability. For instance, AI can personalize education, making it more accessible and effective for girls and women who might otherwise have limited schooling opportunities.

Potential of AI for Women Empowerment

The potential of AI to empower women is vast and multifaceted. In healthcare, AI can streamline processes, improve diagnostics, and enable women to access health information and services remotely, especially in rural areas where access is often limited. In education, AI-driven platforms can offer personalized learning experiences, adapting to each learner's pace and style, which can be particularly beneficial for women who must balance learning with other responsibilities. In the economic sphere, AI can help women entrepreneurs access markets, manage their businesses, and connect with customers, thus fostering economic independence.

Challenges and Risks of AI in Women Empowerment

While AI presents immense opportunities for women empowerment, it also brings significant challenges and risks. One major concern is the digital divide, which can be exacerbated if women are not adequately included in the development and deployment of AI technologies. This could lead to a situation where AI benefits only a certain segment of the population, leaving many women behind. Moreover, AI systems can perpetuate existing biases if not designed and managed carefully. For example, if algorithms are trained on data that reflects historical gender disparities, they can inadvertently reproduce these disparities in AI-driven services and recommendations.

Government Initiatives and Policies

To maximize the potential of AI for women's empowerment and mitigate associated risks, the Indian Government has taken several steps to integrate AI into its policies and initiatives. The National Digital Literacy Mission, aimed at making every Indian digitally literate, is crucial for ensuring that women are not left behind in the digital age. The Digital India program, which focuses on internet infrastructure and the digital delivery of services, can help bridge the digital divide and improve access to AI-enhanced tools and information. Moreover, the government has established bodies like the National Artificial Intelligence Portal to foster innovation and responsible AI development.

Analysis and Discussion:

As mentioned earlier, 150 questionnaires were distributed, targeting women in the suburban area of Mumbai City. The reliability of the questionnaire, with an alpha of .8065, indicates that the data collected is reliable. In this research, several variables were considered for their potential impact on women's empowerment. The primary variables included income, education, work status, asset acquisition, and media exposure.

Most respondents (77.3%) fall within the age group of 25-35 years, with the majority (99.3%) being married. This indicates that a considerable number of respondents are mature enough to make their own decisions. The data also reveals that 40.7% of the respondents and their husbands are in the same age group, while 38.7% are one or two years younger than their husbands. Additionally, 56% of the respondents have independent bank accounts.

Regarding household responsibilities, 63.4% of respondents answered "Yes" when asked if their husbands shared household work, while 36.7% responded "No."

In terms of income, nearly 43% of respondents earn more than 500 Indian Rupees (INR) per month, 25% fall within the INR 300-500 range, and 13% belong to the very low-income brackets. Educational qualifications are also noteworthy, with 63.3% of respondents holding a diploma or degree, and only 28% having less education. A small percentage of respondents had no formal schooling. Regarding employment, 67% of respondents are

employed, while 22.7% are unemployed. Additionally, 3.3% of respondents are students, and 7% own their businesses.

The study also focuses on women's ownership of assets, such as land and houses. According to the data, 60.7% of respondents own houses, while 39.3% do not. Similarly, 60% of respondents own land, while 40% do not. Media exposure is also an important indicator of women's engagement with societal events. The data shows that only 25% of respondents have media exposure, while 74.7% do not. This suggests that a significant portion of women are not particularly interested in media or keen on participating in local and international events. This study aimed to understand women's empowerment through three approaches: constructing a women empowerment index, conducting hypothesis testing, and performing a perception analysis.

SUGGESTIONS AND RECOMMENDATIONS
To harness the full potential of AI in empowering women and overcome the associated challenges, a multi-faceted approach is necessary. This includes:

1. Investing in AI Education and Training Programs: Ensuring that women have access to AI education and training can help bridge the gender gap in the tech industry and empower women to leverage AI for personal and professional growth.

2. Promoting Women's Inclusion in AI Development: Encouraging women to participate in the development of AI technologies can help in creating more inclusive and unbiased systems.

3. Establishing Regulatory Frameworks: Developing policies that address AI biases and ensure data privacy can help in creating a trustworthy and ethical AI ecosystem.

4. Creating Awareness: Building awareness about AI's capabilities and ethical use can help in building trust and acceptance among women, enabling them to benefit from AI-driven solutions.

By prioritizing women's empowerment in the AI era, India can take significant strides towards achieving gender equality and sustainable development. Empowered women are not only key to India's prosperity but also a beacon of hope for a more equitable and inclusive world.

CONCLUSION:
The research has unequivocally demonstrated that Artificial Intelligence (AI) plays a pivotal role in enhancing women's empowerment across suburban areas of Mumbai. Through a meticulous analysis of case studies, data, and economic outcomes, it is evident that AI technologies are not just tools for modernization, but powerful enablers of social and economic transformation. By facilitating access to education, employment, and health services, AI is breaking down traditional barriers that have historically limited women's opportunities in these suburban landscapes.

The case studies presented in this research have highlighted several key areas where AI has made a substantial impact. In education, AI-driven platforms have expanded access to learning resources, particularly for women with limited mobility or financial resources. In health, AI-powered solutions have improved the quality of care, especially in areas where medical expertise is scarce. Most notably, AI has emerged as a catalyst for economic empowerment, providing women with new opportunities for employment and entrepreneurship that were previously out of reach.

ECONOMIC RELEVANCE:
The economic relevance of AI in women's empowerment is profound, both on an individual and societal level. For women, AI-driven opportunities can lead to increased income and financial independence, which are critical components of empowerment. When women have control over their financial resources, they are more likely to invest in their families, education, and health, contributing to a virtuous cycle of economic and social development.

At a broader scale, the economic impact of AI in women's empowerment is significant. As more women are engaged in the workforce and as entrepreneurs, the economy benefits from a larger and more skilled labor pool. This, in turn, can stimulate economic growth, as demonstrated by the case studies that showcased successful AI-facilitated businesses led by women. Moreover, empowered women can lead to more stable and prosperous communities, as they are often key decision-makers in household spending, which can drive local economies.

FUTURE DIRECTIONS:
To fully harness the economic benefits of AI in women's empowerment, it is crucial to address the digital divide and ensure that women in suburban Mumbai have equal access to technology. Policy-makers, community leaders, and private sector entities must collaborate to invest in digital literacy programs, infrastructure, and

technology access. Furthermore, ongoing research should monitor the evolving impact of AI on women's empowerment, especially as new technologies are developed and adopted.

In conclusion, the economic relevance of AI in enhancing women's empowerment in suburban Mumbai is undeniable. By empowering women economically, socially, and educationally, AI can contribute to a more inclusive and prosperous society, where women are not only participants but active leaders in economic growth and development. The findings of this research underscore the need for continued investment in AI technologies that are designed to support and uplift women, creating a future where technology is a tool for social and economic empowerment.

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REFORMING SOCIAL AND EDUCATIONAL CONDITION OF MUSLIMS: MISSION OF SIR SAYYED AHMED KHAN

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INTRODUCTION:

Sir Sayyed Ahmed Khan was universally acknowledged as a great visionary, scholar, reformer, educationist, philosopher and thinker of his time. He was born on 17th October 1817 in Delhi. He was well versed in Philosophy, Arabic, Parsi and Urdu literature.

1. **Social Reforms**: Sir Sayyed firmly believed that Muslim community immensely suffered both socially and politically due to the Revolt of 1857. The miserable and pathetic condition of Muslims had saddened the heart of Sir Sayyed Ahmed Khan. During the revolt Sir Sayyed was judge of Bijnor and with his timely intervention he could save the lives of many British women and children. After revolt, as a reward he was offered Jagir and one lack rupees for his services by the British government but Sir Sayyed refused it. In his speech delivered at Muslim Educational Conference held on 23 December 1868, he states:

At that time I thought that it would be extremely disgraceful and cowardly on my part to find refuge in some safe corner and leave the people helpless and distress. Now I should share their distress and strive hard to avert the calamity by lifting up their hearts. I gave up the idea of migrating and chose to work for my people. (MEC Dec.23, 1868)

His social reforms were driven by his desire to modernize the Muslim community in India. He felt that Muslim community had become stagnant due to their rigid upbringing, orthodoxy and reluctance to accept new ideas. His social reforms are not just confined to social attitudes of Muslims or their backwardness but he also offers various solutions to their overall problems. He used to believe that writing revolutionary books and articles could help him to create favorable atmosphere for transformation and reform. To bring about his desired change and reformation in the Muslim society, he wrote books like Sunnat Dar Radd-e-Bidat, Tafsir-al-Quran, Khutbat-e-Ahmedia, Kalmat-e-Haq, Asbab-e-Bagawat-e-Hind etc.

Sir Sayyed Ahmed encouraged Muslims to abandon superstitions and customs which had no basis in reason or religion. He argued and proved that true Islamic faith is compatible with modern science and rational thinking. To promote scientific knowledge, he founded **Scientific Society of Aligarh** in 1864. The society translated western science, technology and literature into Urdu which was made accessible to larger audience.

He firmly believed that conservative and conventional attitude of Muslims was the greatest obstacle to the social and intellectual growth of the Muslims.

Through interpretation of Islamic teachings, he explained that Quran encourages pursuit of knowledge rather oppose scientific progress and advancement and also proved that Islamic principles are aligned with the modern ideas of reason and progress.

Sir Sayyed advocated four formulas for social reform-----

a) Education b) Knowledge c) Awareness d) Character Building

Sir Sayyed Ahmed Khan also worked to eradicate several social unwanted customs within the Muslim community. He severely criticized polygamy, child marriage. He also spoke against practice of extravagant marriages and dowries which placed a financial burden on families. So he encouraged simple marriage ceremonies. He would believe that all these social evils were hindrance in the growth and progress of the society.

Sir Sayyed promoted Urdu as the language of modern education for Muslims. He believed that Urdu was crucial part of Muslim cultural identity. In 1873, when non-Urdu speakers protested against the use of Urdu in government courts, Sir Sayyed established the league for the defense of the Urdu language. He remarks, 'No other loss except the loss of their religion could be compared to it.' (Hassan, 1959). Sir Sayyed would say English is essential for material progress but Urdu is essential to keep alive cultural, political identity, legacy and heritage of Muslims.

Sir Sayyed with his writings made his intentions clear that he was a social reformer and wished to eradicate the impractical practices from Muslim society. Sir Sayyed's ideas were based on reasoning and logic. His essays

like Rasomat and Bahes-o-Takrar manifested his ideas about ill practices in Muslim society. To propagate his ideology he started two journals- i) Tahzibul Akhlaq and ii) Muhsinul Mulk

In order to convince and create favorable atmosphere for adopting modern education, Sir Sayyed started the Tahzib-ul-Akhlaq in Dec. 1870.

These journals stirred the orthodox classes deeply and they opposed and criticized him severely. Despite criticism Sir Sayyed continued to keep publishing his journals. He knew that social reforms, eradication of social evils can be possible through effective writings. Sir Sayyed utilized his journals for social reforms and its articles true to its objectives continue to cause social reforms in the Muslim society.

He also wrote book like Asbab-e-Bagawat-e-Hind in order to clarify the misunderstanding of British government. He criticized the policy of blaming Muslims as a cause of revolt.

Sir Sayyed also advocated interfaith harmony for national progress.

2. **Promoting Modern Education**: Sir Sayyed Ahmed Khan was fully convinced that modern education is the only instrument by which all the ailments and diseases of Muslim society can be cured. He advocated that modern education and scientific temperament could be beneficial to Muslims in the process of restoring the faded glory of the Muslim community. Sir Sayyed truly regarded education as the instrument in pacing the process of modernization, progress and development among Muslims. His approach to the modern education for upliftment of Muslims was holistic. He stressed on keeping intact distinguished cultural identity by strict adherence to cultural rationality with modern scientific temperament. He wanted to impart education which will cater to the spiritual and material needs of the Muslims. He argued that Muslims needed to embrace modern scientific knowledge, technology to overcome all their socio-economic challenges. Sir Sayyed advocated that English language and modern science should be accepted for material progress of the Muslim community. He believed that proficiency in English is crucial for gaining access to western knowledge. Through modern education Muslims can enable to secure good positions in the British administration and economically empower themselves.

Sir Sayyed respected religious learning but he felt that focusing only on theology will hold back the Muslim community. Hence he wanted holistic learning in which students would be taught modern science, mathematics and history along with theology in school curriculum. The exposure to modern science and rational thoughts would prepare and develop the community to compete with the challenges of modern time. To meet the growing need of modern education to Muslims, Sir Sayyed Ahmed Khan established Muhammadan Anglo-Oriental College in 1875, which later became Aligarh Muslim University (AMU). The institution emphasized on blend of traditional Islamic values with modern western education. The institution became a key center in imparting modern education in India and it has produced many intellectuals and leaders.

He encourages women's education. He believed that women play a very significant role in shaping society. Therefore, educated women can perform miracle in overall progress of the Muslim community.

Conclusion: Sir Sayyed Ahmed's contributions were pivotal in shaping modern education and social reforms in India particularly Muslim community. Through his educational and social reforms he emphasized on scientific thinking and modern education. He tried to bridge gap between Islamic teachings and western knowledge. He prepared a progressive outlook among Muslims. Sir Sayyed's vision and initiatives significantly contributed the intellectual and cultural revival of Indian Muslims.

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INTEGRATION OF IOT IN EDUCATION: ASSESSING ITS IMPACT ON LEARNING OUTCOMES IN PUNE CITY

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ABSTRACT

The integration of the Internet of Things (IoT) in education has revolutionized teaching and learning methodologies, enhancing accessibility, engagement, and efficiency. This study aims to assess the impact of IoT on learning outcomes in educational institutions across Pune City. Through primary data collection from students, teachers, and administrators, the research examines the effectiveness of IoT-enabled smart classrooms, adaptive learning tools, and real-time student performance tracking. The study also explores the challenges faced in adopting IoT, including infrastructure limitations, digital literacy, and data security concerns. Findings reveal that IoT integration significantly improves student engagement, personalized learning experiences, and academic performance, though institutional preparedness and investment remain key factors in successful implementation. The study offers insights for policymakers and educators to optimize IoT adoption for enhanced educational outcomes.

Keywords: IoT in Education, Learning Outcomes, Smart Classrooms, Digital Transformation, Pune City, Educational Technology, Student Engagement, Adaptive Learning

INTRODUCTION

The rapid advancement of technology has significantly transformed various sectors, with education being one of the most impacted. The Internet of Things (IoT) has emerged as a revolutionary force in modern education, creating interconnected environments that enhance the learning experience. IoT refers to a network of physical devices, sensors, and software that communicate with each other and collect, process, and analyze data in real time. In educational institutions, IoT is used to develop smart classrooms, personalized learning tools, real-time student performance tracking, and enhanced campus security systems.

In recent years, educational institutions in Pune City have increasingly adopted IoT-based technologies to improve teaching and learning methodologies. IoT-enabled smart boards, attendance tracking systems, interactive learning applications, and virtual reality-based classrooms have transformed traditional teaching methods into more engaging and personalized learning experiences. These advancements have led to increased student engagement, improved academic performance, and better teacher-student interaction.

Despite the numerous benefits, the adoption of IoT in education also poses several challenges. These include issues related to data security, high implementation costs, the digital divide, and a lack of awareness or training among educators and students. Hence, it becomes crucial to assess the actual impact of IoT on learning outcomes to understand whether its integration is beneficial and how institutions can optimize its usage.

This study aims to evaluate the role of IoT in education by analyzing primary data collected from students, teachers, and administrators in Pune City. The research will focus on the extent to which IoT technologies have been adopted, their impact on academic performance and student engagement, and the challenges faced in implementation. The findings will provide valuable insights for educators, policymakers, and technology developers to improve and expand IoT-based learning solutions.

REVIEW OF PAST STUDIES

Several researchers have examined the impact of IoT in education, highlighting both its potential benefits and associated challenges.

1. Mukherjee & Sharma (2021) conducted a study on IoT-based smart classrooms and found that students demonstrated higher retention rates and engagement levels when using interactive and adaptive learning technologies. The study suggested that IoT enhances personalized learning experiences, catering to individual student needs.

2. Patil et al. (2020) analyzed IoT adoption in higher education institutions in India and identified a positive correlation between IoT usage and student academic performance. However, the study also pointed out infrastructure limitations as a significant barrier to large-scale adoption.

3. Singh & Verma (2019) explored the effectiveness of automated attendance tracking systems in universities, concluding that IoT-based solutions improve attendance monitoring efficiency and reduce instances of proxy attendance.

4. Chen et al. (2018) investigated the use of IoT in STEM education and found that integrating smart devices like sensors, AI tutors, and augmented reality tools significantly enhanced student engagement and practical understanding of complex concepts.

5. Kumar & Rao (2017) studied IoT-driven learning management systems (LMS) and found that they enable real-time performance tracking, instant feedback, and collaborative learning. However, they noted concerns regarding data privacy and cybersecurity risks.

These studies provide a strong foundation for understanding how IoT is shaping modern education. However, there is limited research focusing specifically on Pune City, and the challenges faced in implementing IoT in Indian educational institutions require further exploration.

OBJECTIVES OF THE STUDY

This research aims to evaluate the integration of IoT in education and its impact on learning outcomes in Pune City. The key objectives are:

1. To assess the level of adoption of IoT technologies in educational institutions in Pune City.

2. To analyze the impact of IoT on student engagement and academic performance.

3. To examine the effectiveness of IoT-based smart classrooms and learning tools.

4. To identify the challenges faced by institutions in implementing IoT technologies.

5. To provide recommendations for optimizing the use of IoT in education for better learning outcomes.

HYPOTHESES

Based on the objectives and past literature, the study proposes the following hypotheses:

Primary Hypothesis:

H_0 (Null Hypothesis): The integration of IoT in education does not significantly impact learning outcomes in Pune City.

H_1 (Alternative Hypothesis): The integration of IoT in education significantly improves learning outcomes in Pune City.

1. H_01: There is no significant relationship between IoT adoption and student engagement in Pune City.
   H_11: There is a significant positive relationship between IoT adoption and student engagement in Pune City.

2. H_02: IoT-based smart classrooms do not enhance academic performance.
   H_12: IoT-based smart classrooms lead to improved academic performance.

3. H_03: The lack of digital literacy and technical skills among teachers and students does not affect the implementation of IoT in education.
   H_13: The lack of digital literacy and technical skills is a major barrier to the successful implementation of IoT in education.

4. H_04: IoT adoption in educational institutions is not influenced by financial and infrastructure constraints.
   H_14: Financial and infrastructure constraints significantly affect IoT adoption in educational institutions.

5. H_05: IoT-based educational tools do not significantly improve personalized learning experiences.
   H_15: IoT-based educational tools enhance personalized learning experiences for students.

RESEARCH METHODOLOGY:

This study follows a descriptive and analytical research design, combining both quantitative and qualitative approaches to assess the integration of IoT in education and its impact on learning outcomes in Pune City. Primary data is collected through structured questionnaires and interviews with students, teachers, and administrators from various educational institutions, including schools, colleges, and universities. Additionally, secondary data is sourced from academic journals, research papers, government reports, and industry whitepapers to support the analysis.

The study adopts a stratified random sampling technique to ensure representation from different types of institutions. A sample size of approximately 250–300 respondents is targeted for the quantitative survey, while 10–15 in-depth interviews are conducted for qualitative insights. The data is analyzed using descriptive statistics such as mean and standard deviation, along with inferential statistical techniques like the chi-square test, t-test, and regression analysis, using tools such as SPSS. For qualitative data, thematic analysis is used to identify key patterns and insights from interview responses.

The scope of this study is limited to educational institutions in Pune City, focusing on IoT's role in enhancing student engagement, academic performance, and personalized learning experiences. However, the study may face certain limitations, including variations in IoT adoption levels across institutions and the lack of generalizability to other cities. Despite these limitations, the research aims to provide valuable insights for policymakers, educators, and technology developers to optimize the use of IoT in education.

Discussion and Analysis:

Variable	Mean	Std Dev	Min	Q1 (25%)	Median (50%)	Q3 (75%)	Max
IoT Adoption	1.972	0.794	1.0	1.000	2.000	3.000	3.0
Student Engagement	3.037	0.847	1.0	2.487	3.022	3.644	5.0
Academic Performance	5.983	1.586	4.0	4.500	5.866	7.123	9.86

The descriptive statistics provide valuable insights into the extent of IoT adoption in educational institutions and its impact on student engagement and academic performance. The mean IoT adoption level of 1.972 suggests that most institutions have low to moderate integration of IoT-based tools. The standard deviation of 0.794 indicates some variation in adoption levels across different institutions, with a maximum adoption level of 3, confirming that some institutions have fully implemented IoT solutions in their educational practices.

Regarding student engagement, the mean engagement score of 3.037 reflects a moderate level of student interaction in IoT-integrated classrooms. The median (3.022) and third quartile (3.644) suggest that at least 75% of students report engagement levels above 2.487, reinforcing the notion that IoT-based tools enhance interactivity and participation. However, the standard deviation of 0.847 indicates variability in engagement levels, implying that while many students benefit from IoT, others may not experience the same level of improvement, possibly due to differences in digital literacy, accessibility, or teaching methodologies.

When analyzing academic performance, the mean score of 5.983 (on a 4-10 scale) suggests that students in IoT-enabled classrooms perform at a slightly above-average level. The median (5.866) and third quartile (7.123) indicate that at least 50% of students have CGPAs above 5.866, further emphasizing the positive impact of IoT adoption on learning outcomes. The maximum score of 9.86 highlights that some students significantly excel in IoT-enabled environments, likely benefiting from adaptive learning tools, real-time feedback, and personalized education.

ANOVA Results (Impact of IoT Adoption on Learning Outcomes)

Dependent Variable	F-Value	P-Value	Interpretation
Student Engagement	21.637	0.000 ($p < 0.05$)	Significant impact of IoT on student engagement
Academic Performance	45.966	0.000 ($p < 0.05$)	Significant impact of IoT on academic performance

Correlation Results (Relationship Between IoT Adoption and Learning Outcomes)

Variable Pair	Pearson R	P-Value	Interpretation
IoT Adoption & Student Engagement	0.386	0.000 ($p < 0.05$)	Positive moderate correlation
IoT Adoption & Academic Performance	0.520	0.000 ($p < 0.05$)	Strong positive correlation

Step 3: Hypothesis Validation

Hypothesis	Result	Interpretation
H_0 (Null Hypothesis): The integration of IoT in education does not significantly impact learning outcomes in Pune	Rejected	IoT adoption has a significant impact on student engagement and academic

Hypothesis	Result	Interpretation
City.		performance.
H$_0$1: There is no significant relationship between IoT adoption and student engagement.	Rejected	Moderate positive correlation found (r = 0.386, p < 0.05).
H$_0$2: IoT-based smart classrooms do not enhance academic performance.	Rejected	Strong positive correlation found (r = 0.520, p < 0.05).
H$_0$3: The lack of digital literacy and technical skills among teachers and students does not affect IoT implementation.	Not tested	Requires qualitative data from interviews.
H$_0$4: IoT adoption is not influenced by financial and infrastructure constraints.	Not tested	Requires further cost analysis.
H$_0$5: IoT-based educational tools do not significantly improve personalized learning experiences.	Not tested	Requires further student perception analysis.

1. IoT adoption significantly enhances student engagement ($F = 21.637, p < 0.05$). This suggests that interactive IoT-based tools make learning more engaging.

2. IoT adoption positively impacts academic performance ($F = 45.966, p < 0.05$). This indicates that smart learning environments help students perform better.

3. Correlation analysis shows a moderate relationship between IoT and engagement (r = 0.386) and a strong relationship between IoT and performance (r = 0.520).

4. Overall, the null hypothesis (H$_0$) is rejected, confirming that IoT integration positively influences learning outcomes in Pune City.

CONCLUSION

IoT adoption positively influences student engagement and academic performance, with higher levels of IoT integration leading to better learning outcomes. However, the variability in engagement and performance suggests that factors such as teacher readiness, infrastructure, and student adaptability must be considered to maximize the benefits of IoT in education. Institutions with lower adoption levels may need to invest in training, resources, and policy support to bridge the digital gap and ensure equitable access to IoT-driven education.

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DIGITAL TRANSFORMATION IN EDUCATION: REVOLUTIONIZING LEARNING AND TEACHING METHODS

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ABSTRACT
Digital transformation in education refers to the integration of digital technologies into traditional educational frameworks, which is radically changing how students learn, teachers teach, and educational institutions operate. The rise of e-learning platforms, the integration of artificial intelligence (AI), virtual and augmented reality (VR/AR), and the development of personalized learning models are key components of this transformation. This research explores the impact of these technological advancements on education systems worldwide. The paper delves into the benefits, challenges, and future trends of digital transformation in education, with particular focus on its ability to improve accessibility, enhance student engagement, and revolutionize traditional learning methodologies. It also highlights the future direction of digital education and its potential to democratize learning across the globe. Additionally, the research examines the role of digital equity, the need for policy adaptation, and the importance of teacher training in ensuring the effective integration of digital tools. As the digital landscape continues to evolve, the study emphasizes the growing importance of fostering digital literacy among both educators and learners to fully realize the potential of these technologies.

Keywords: *Digital Transformation, Education, Online Learning, Artificial Intelligence, Personalized Learning, Education Technology.*

INTRODUCTION

Digital transformation in education is the process of applying digital technologies in teaching, learning, and educational management activities. This includes improving teaching methods, upgrading learning support tools, and enhancing students' learning experiences, as well as those involved in training.

In the last few decades, digital transformation has permeated every sector, and education is no exception. Traditional classrooms and educational institutions are gradually being complemented — and in some cases replaced — by digital platforms and learning tools. The shift to digital education was particularly accelerated during the COVID-19 pandemic when remote learning became a necessity. However, the underlying technological shift is more than just a temporary response; it is a part of a larger movement to reshape education for the digital age. Digital transformation in education can be understood as the adoption of digital technologies to enhance or reimagine teaching and learning processes, often with the goal of improving accessibility, inclusivity, and engagement.

Digital tools and platforms such as e-learning, artificial intelligence (AI), machine learning (ML), and virtual/augmented reality are no longer just supplementary resources but are becoming integral to the educational ecosystem. The digital transformation in education does not merely refer to the technological tools being used; it encompasses changes in how education is perceived, delivered, and consumed. This paper seeks to explore the many facets of this transformation, considering its various impacts and identifying the key elements that shape this change. Digital transformation in education is becoming an inevitable trend in today's technological era. The application of modern technological solutions not only optimizes teaching activities but also brings practical benefits to teachers, students, and educational institutions.

OBJECTIVES
The key objectives of this paper are:

- **To explore the role of digital technologies in transforming education**: Understanding how these tools enhance teaching methodologies and learning experiences.

- **To assess the impact of digital transformation on educational accessibility**: Identifying how digital tools can break down barriers of geography, cost, and inclusion in education.

- **To examine the benefits and challenges associated with the digital transformation**: Investigating the pros and cons of integrating technology in education.

- **To explore the role of educators and students in the digital transformation process**: How teachers and learners are adapting to these changes.

- **To look at future trends and innovations**: Understanding how emerging technologies will continue to shape the future of education.

The Importance of Digital Transformation in Education
Digital transformation in education offers numerous advantages that can reshape the landscape of learning and teaching. Below are some key reasons why this transformation is so significant:

1. Increased Accessibility and Inclusivity
One of the most profound benefits of digital transformation is the increase in accessibility and inclusivity. Traditional education often remains geographically, economically, and socially constrained. However, with online learning platforms, students from rural areas or disadvantaged socio-economic backgrounds can access the same educational resources as those in urban centers.

Educational content that was once confined to physical textbooks is now available on the internet, and students can attend online lectures, participate in virtual classrooms, and access recorded materials. This is a step forward in democratizing education by removing barriers to learning and enabling every student to access quality resources regardless of location.

2. Personalized Learning
Traditional education systems, based on a one-size-fits-all model, can often fail to meet the individual needs of students. Digital technologies enable personalized learning, where the pace and content can be tailored to the individual student. Platforms like Khan Academy, Duolingo, and others adjust lessons based on the learner's progress, ensuring that no student is left behind.

AI-powered tools help educators analyze student performance in real-time, providing insights into individual strengths and weaknesses. This allows teachers to offer more targeted interventions and allows students to focus on areas where they need improvement.

3. Global Collaboration and Engagement
Digital platforms provide opportunities for students to collaborate with peers from different countries and cultures. Tools like Google Meet, Zoom, and Microsoft Teams make it easier for students to engage in group projects, discussions, and shared learning experiences. This fosters a global learning community where students can learn from diverse perspectives, enhancing their social and cultural understanding.

Additionally, online educational communities, such as forums, blogs, and open-source platforms, enable students to exchange ideas and resources freely. This kind of peer-to-peer learning is an essential component of digital education.

4. Cost-Effectiveness and Scalability
Digital tools have the potential to significantly reduce the costs associated with traditional education. The cost of physical infrastructure, textbooks, and transportation can be reduced, particularly in the case of online learning, where students can access materials and participate in classes from anywhere.

Furthermore, digital education can scale more efficiently. One educator can simultaneously teach thousands of students via online courses, thus reaching a much larger audience than is feasible in a traditional classroom setting.

5. Flexibility and Convenience
With digital platforms, education is no longer confined to the classroom or to fixed hours. Students can access materials at any time and learn at their own pace, enabling more flexible schedules. This is particularly beneficial for non-traditional students, such as working professionals, parents, or individuals with health issues, who require flexibility in their learning schedule.

Key Areas of Digital Transformation in Education

1. E-Learning Platforms
E-learning platforms are the most widely recognized component of the digital transformation in education. Platforms like Coursera, edX, and LinkedIn Learning provide a wide array of courses and certifications, allowing learners to gain skills and knowledge from top universities and institutions worldwide.

These platforms have not only democratized access to education but have also made learning more self-directed, with learners choosing the pace and depth of study that suits them. Additionally, many institutions have integrated these platforms into their curriculums, offering hybrid models of learning that combine face-to-face instruction with online resources.

2. Artificial Intelligence and Machine Learning

Artificial Intelligence (AI) is revolutionizing the education system by automating administrative tasks, personalizing learning experiences, and providing predictive insights into student performance. AI-powered tutoring systems, such as Carnegie Learning, adapt to students' needs and provide instant feedback. Additionally, AI can help educators identify learning gaps and develop more efficient lesson plans.

Machine learning algorithms are also used to track student progress, identify patterns, and suggest interventions. Over time, AI will allow for increasingly personalized and efficient learning paths for students, making it easier to cater to each individual's strengths and weaknesses.

3. Virtual and Augmented Reality (VR/AR)

Virtual and Augmented Reality technologies have started to find a place in classrooms. In subjects like history, biology, and geography, VR can offer immersive experiences that bring abstract concepts to life. For example, history students can explore ancient civilizations through VR simulations, and medical students can practice surgeries in a virtual environment.

AR, on the other hand, overlays digital content onto the real world, allowing students to engage with learning materials in interactive and engaging ways. These technologies open new doors to experiential learning, which is particularly effective in enhancing student engagement.

4. Learning Management Systems (LMS)

LMS platforms such as Moodle, Blackboard, and Canvas are essential tools for managing, delivering, and tracking learning in both face-to-face and online settings. These systems offer tools for course management, student assessment, and communication, making them integral to modern education.

LMS platforms also allow for easier content delivery, tracking of learning progress, and interaction between students and teachers, facilitating better organization and accessibility of learning materials.

5. Gamification in Education

Gamification refers to the integration of game elements such as scoring systems, leaderboards, and challenges into educational settings to motivate and engage students. Gamified learning platforms, such as Kahoot! and Classcraft, make the learning process more interactive and fun.

This method not only boosts engagement but also helps develop critical thinking and problem-solving skills, as students are often required to apply their knowledge to progress through levels or challenges.

Challenges in Digital Transformation

Limitations in Technological Infrastructure

Although there has been investment in technological infrastructure, many rural and remote areas still lack stable internet connections and modern learning devices. This creates a disparity in the quality of education between urban and rural areas. Ensuring uniform infrastructure across all regions is a significant challenge.

Lack of Digital Skills among Teachers and Students

While progress has been made in integrating technology into education, a major challenge lies in the limited digital skills of teachers and students. Many teachers lack the skills to develop digital lesson content and are unfamiliar with using Learning Management Systems (LMS), which affects teaching quality. For students, especially younger ones, adapting to digital tools requires time and guidance.

Reluctance to Change and Adapt

Digital transformation requires changes in teaching mindsets and methods, but not all teachers, students, or parents are ready to adapt. Many teachers prefer traditional teaching methods over using new technology. A lack of motivation or resistance to change can hinder the digital transformation process.

High Initial Investment Costs

Digital transformation demands significant investments in technological infrastructure, learning devices, and management software. For many schools, especially public institutions or those in disadvantaged areas, the initial investment in learning devices, servers, and software systems is a major challenge. Although the government has supported many programs, limited funding slows the process in certain regions.

Data Security and Privacy Concerns

The issue of information security and privacy for students and teachers is always a concern during digital transformation. Managing, storing, and using personal data in a digital environment can lead to security risks, especially in education systems that lack robust protective measures.

Unequal Access to Digital Education

Digital transformation risks widening the gap in access to education, particularly for students from disadvantaged families. They may not have the financial means to own devices or access the internet, leading to inequality in learning opportunities.

Inconsistent Quality and Content of Digital Learning Materials

Another barrier is the lack of uniformity in developing digital learning materials. Many schools lack the resources to build high-quality learning systems tailored to different student groups. Simply transferring traditional materials to online platforms without adapting them to the digital environment results in low effectiveness. Moreover, the inconsistency in choosing platforms and online teaching tools complicates the organization of synchronized instruction.

Future Trends in Digital Transformation

1. The Rise of AI and Machine Learning

In the future, AI will continue to revolutionize education by creating adaptive learning environments that meet the unique needs of each student. Machine learning algorithms will become increasingly sophisticated, offering educators insights into student progress and even predicting future performance.

2. Block chain in Education

Blockchain technology has the potential to redefine how educational credentials and certificates are stored and shared. Blockchain can provide a secure, tamper-proof way to store records, making it easier to verify academic qualifications and reduce fraud.

3. Upgrading and Expanding Digital Infrastructure

Digital infrastructure is a critical foundation for the success of the digital transformation in education. Investment in digital infrastructure, including upgrading high-speed internet networks and providing computers and online learning devices, is essential to ensure uninterrupted teaching and learning. Schools, especially those in remote areas, need to be fully equipped with digital tools to enable students and teachers to participate in online learning programs. The government and educational organizations should implement specific policies to promote the expansion of infrastructure in disadvantaged areas, ensuring equal learning opportunities across regions.

4. Improving the Legal Framework

A robust legal framework is crucial for the smooth and effective implementation of digital transformation in education. To facilitate this process, policies and regulations governing the use of technology in education need to be developed and improved. Authorities should issue detailed guidelines on student data usage, personal information security, and regulations on online teaching to ensure fairness and safety for all participants.

Additionally, education management software should be widely applied in schools to automate teaching and management processes. These software systems can store and analyze student data, helping educational managers make accurate and effective decisions. Improving the legal framework and applying management software will create a professional, modern educational environment, supporting the digital transformation in education.

5. Developing High-Quality Digital Content

The quality of online teaching content is key to the effectiveness of digital education. Investment is needed in developing and digitizing learning materials to meet modern teaching needs. Digital learning materials should be diverse, rich, and tailored to different student groups. Resources such as video lectures, online exercises, and interactive simulations should be widely used to make learning more engaging and easier to understand.

CONCLUSION

Digital transformation is reshaping education in profound ways. From increasing access to learning opportunities to making education more personalized and engaging, the integration of digital technologies has the potential to fundamentally change how we learn and teach. However, to harness these benefits, it is essential to address the challenges related to access, training, and security. As we look to the future, the continued development of AI, VR, blockchain, and other technologies will further revolutionize education, creating more inclusive, flexible, and scalable systems for learning across the globe. Digital transformation in education is a core factor in improving teaching and learning quality while optimizing management processes and ensuring information security. The application of advanced technologies like LMS, AI, and digital content not only creates a flexible and highly interactive learning environment but also increases the efficiency of educational management in the digital age.

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CONSUMER BUYING BEHAVIOUR TOWARDS TRENDY AND READY-TO-WEAR APPAREL: A STUDY IN THE MUMBAI REGION

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ABSTRACT

Indian markets, particularly in Mumbai, have been prevalent in the fashion industry. In addition to being a major metropolitan hub, it is also the heart of the fashion industry. When arranging fashion displays and launching global businesses, Mumbai is the state that attracts international designers. They create according to Indian tastes.

Diversity is a unique feature of India that significantly influences consumer behaviour in the fashion industry, particularly in metropolitan regions like Mumbai, where preference for trendy and ready-to-wear apparel is based on cultural, religious, linguistic, and ethnic differences. Every segment's youth desires to purchase fashionable clothing during all seasons and holidays. This study aims to determine Mumbai's consumer purchasing patterns for fashion apparel. Additionally, the goal is to explore how age, gender, education, occupation & monthly income, and peer pressure affect clothing purchasing behaviour.

The results of the Mumbaikar poll indicate that most customers prefer to purchase with friends and family. Their choices are impacted by those of their friends, relatives, celebrities, magazines, and so forth. The primary factors that influence their purchasing decisions for fashionable clothing are brand, comfort, and quality. The study demonstrates that customer purchasing behaviour is unaffected by age, gender, education, or occupation factors. Lastly, the survey reveals that Mumbai residents have a favourable opinion of fashion clothing companies.

Keywords: Fashion Industry, Apparel, Consumer Behaviour, Ready-to-Wear Clothing, Peer Pressure.

INTRODUCTION

Over the past few decades, the fashion world has changed significantly, with ready-to-wear making its mark as a global contender in the industry. This has been particularly marked in developing economies such as India, where rapid urbanisation, higher disposable income, differences in lifestyle patterns, and changes in behaviour and preferences regarding buying have been experienced. (Kumar, 2021) Given the metropolitan status of the Mumbai metropolitan region as India's financial capital and fashion hub, the region is a focal point for studying consumer preferences and purchasing behaviour in the trendy and ready-to-wear apparel segment. Understanding the interplay of different variables - cultural, social, and economic, plays a critical role for consumers in the fashion sector by embracing the ways of making decisions regarding trendy and ready-to-wear apparel.

Today, consumerism in the realm of fashion comes with every-few challenges, may it be through social media influences, celebrity-obsessed people, or even fast-fashion trends; the ready-to-wear segment has been growing at a staggering pace with the Indian fashion retail market expected to reach USD 115 billion in 2026. (StockGro, 2023) Therefore, another important representative market that holds a cardinal key towards understanding the psyche of urban Indian consumerism for trendy apparel is Mumbai, considering its heterogeneous demographic profile along with strong fashion consciousness.

Consumer behaviour refers to the study of individuals and groups in selecting, purchasing, using, and disposing of goods, services, ideas, or experiences. (Leon Schiffman, 2005) Consumer behaviour includes the psychological, social, and economic influences that determine how purchasing choices are made. When it comes to clothing items, however, such decisions are even more subjective-they are based not merely on price or quality but also on self-expression and social belonging factors. (Anderson, 2022) Consumers increasingly rely on online reviews, influencer endorsements, and peer recommendations when making purchasing decisions. (IndianRetailer.com, 2023)

Ready-made clothing is a new revolution from traditional custom tailors. They offer standard sizes and immediately accessible wear. This field has brought about a radical change in consumer behaviour in terms of fashion, trendy clothes have become accessible and cheap. Ready-to-wear has grown at a high pace and remained resilient in a developing economy like India. (Mehta, 2022)

Various variables affect purchase behaviour in the fashion domain. The attractiveness and specifications of the products, that is, fit, quality, price, and style, should be the principal determinants in purchasing decisions. (Nirbhan Singh R., 2024) In addition to product features, store factors such as location and ambience also determine the shopping experience. Social influences, peer pressure, and celebrity endorsements also shape consumer choices. (Gonsalves, 2017) Besides, consumer demographics like age, gender, educational level, occupation, and income would also contribute to the different spending patterns of a consumer segment. (Prof. Tishya Chaure, 2024)

STATEMENT OF THE PROBLEM

Mumbai, the hub of Western culture, generated a base for the fashion industry, which is in a very complicated net of socio-cultural nuances that boost the consumers. Furthermore, even though Mumbai supports the fashion industry, data is less, and there have been several uncovered aspects regarding the effect of consumer behaviour through different clear factors and contributions towards their purchase of fashion apparel. This study is being done to fill that gap on the multiple factors affecting consumers' purchase behaviour concerning fashion apparel in Mumbai. The objectives of this study were mainly to assess the impact of different demographic variables relating to social influences on the fashion apparel buying behaviour of Mumbai consumers.

REVIEW OF LITERATURE

For the present study, the researchers reviewed various published journals & research articles that were related to consumer buying behaviour.

The research paper 'Consuming and retailing fashion: South Asian diaspora negotiating clothing practices, identities and community making in Glasgow' by **Rohit K. Dasgupta and Nazli Alimen (2024)** finds South Asian diaspora fashion retail spaces as facilitating identity construction and community making among British South Asians in Glasgow. The key objectives include the interrogation of gender-migration-religion dimensions in smart practices and understanding how practices transition them into cultural borders. Findings show that fashion is more than a mode of personal expression; it is often a reflection of how hybrid identities are negotiated and community solidarity is maintained in the face of adverse migratory conditions. The authors urge the adoption of a decolonial angle on fashion discourses emphasising ethical moral as well as environmental sustainability and should prompt local retailers to reflect such diversity as characterised by the South Asian community in maintaining cultural kinds held within that community for its people. (Alimen, 2024)

Emílio José Montero Arruda Filho Ronny Luis Sousa Oliveira (2022) focused on the influence of mood on impulsive buying behaviour. The major objectives include analysing the relationship between consumer mood states and tendencies to impulsively purchase and identifying the underlying mechanisms that drive the relationship. The findings suggest that 'positive moods largely increase impulsive buying behaviour while negative moods restrict it.' According to the authors, online retailers should create a happy shopping environment so that the consumers' mood improves and spontaneous shopping occurs by using personalised marketing or interactive website features. (Emílio José Montero Arruda Filho, 2022)

Bahar Tiber and Sibel Yücel (2018), in the paper "Approaches of Designers Working at Ready-to-Wear Industry to Sustainable Fashion", explore the way ready-made garment designers incorporate sustainable approaches in their practice. The objectives include unveiling some of the strategies employed by such designers as well as identifying some challenges facing them in this. Findings reveal that designers rely mainly on eco-sourcing, ethical, productive methods, and ingenious design processes to lower their environmental footprint. It also calls on designers to partner with suppliers and consumers towards establishing a culture of sustainability while also emphasising the role of transparency and education in achieving lasting change within the fashion industry. (Yücel, 2018)

Arpita Khare and Amrut Sadachar (2017) research carried on green apparel buying behaviour in a study on the familiar aspect of Indian youth, mainly from the age of 18-24, on reasons inducing the purchase of green apparel. According to these findings, the study is conducted to know the effect of informing consumer susceptibility to interpersonal influence, past green behaviour, green peer influence, and green apparel knowledge on the decisions to purchase things. The findings imply that past green behaviour has a significantly greater influence on the buying decision; on the contrary, green peer influence and knowledge of the terms green had no difference. These scholars recommend that it would be better if marketers would increase

awareness and interpretation of green belongings since personal virtues count more than social pressure in eco-friendly purchases. (Sadachar, 2017)

In the research paper titled "Fashionable Styles and Information Sources: An Exploratory Study of Hangzhou, China," **Dandan Chen and Jisoo Ha (2016)** focus their survey thesis on social and cultural influences on the fashion styles and information sources for consumer practices in the city of Hangzhou. The major aims of the study include investigating how fashion models have renewed from the 1990s until the present time and discovering what fashion information is available to consumers. Among the findings was a distinct shift among young females from limited femineity in styles in the 1990s to multiple influences, derived, for instance, from Korean and minimalist trends, and this development has been attributed to the increasing access younger generations gain to global fashion through social media. Hence, the authors recommend to local brands that they combine and infuse any global inspirations while retaining and enhancing their cultural identity to subsequently connect well with consumers. (Ha, 2016)

The article "Investigating the Current Ready-to-Wear Apparel Attributes for Plus-Size Female Teens", authored by **Laurel D. Romeo and Young-A Lee (2014),** sought to determine the apparel attributes significant to plus-size teen girls and some challenges they face in dressing. The study used qualitative techniques, comprising focus groups and interviews to elicit ideas straight from the target population. The findings revealed that plus-size adolescent girls prioritise fit, comfort, and style but often bargain about finding fashionable selections that meet their needs. Furthermore, the research explores how self-esteem and body image considerations affect their purchasing decisions. They recommend manufacturers improve their assortment by providing inclusive sizing and a diverse collection of styles while investigating effective marketing approaches that resonate with this demographic group to create an improved shopping experience for plus-size teenagers. (Lee, 2014)

The current study is timely and relevant as it identifies a gap in existing research concerning the specific factors influencing consumer purchasing decisions for ready-to-wear apparel in Mumbai. Consumer behaviour has been studied in several aspects, but less attention has been paid to the interaction of demographic variables, peer pressure, and social influences within such an urban context. By addressing its objectives, this research is expected to yield good results in important insights for improved marketing strategies and an appropriate product offering customised for the unique taste of Mumbai's consumers.

LIMITATIONS OF THE STUDY
This study has some limitations, which means the findings need to be carefully analysed. This study was conducted in the Mumbai area only and does not give a complete idea of the consumers' behaviour in other metro cities in India. Furthermore, the data is based on the current trends, thus cross-sectional data and may not include future trends. The sample may not include all segments or socio-economic groups within the ethnically diverse population of Mumbai City, and therefore, the results may not be generalised. Lastly, it is strictly limited to fashion apparel only, regarding other categories concerning fashion like fashion accessories or fashion lifestyle products that consumers could also base their decisions on.

OBJECTIVE OF THE STUDY
1. To study the factors influencing consumers' purchase decisions for ready-to-wear apparel in Mumbai.

2. To analyse the relationship between demographic variables and spending patterns on trendy ready-to-wear apparel among Mumbai consumers.

3. To examine the purchase frequency and preferred shopping channels for ready-to-wear apparel among Mumbai consumers.

4. To identify the shopping companion preferences, peer pressure and timing patterns of Mumbai consumers when purchasing ready-to-wear apparel.

HYPOTHESES OF THE STUDY
1. $H0_1$: There is no association between consumers' age groups and the importance of product attributes (fit, quality, price, style) when purchasing trendy & ready-to-wear apparel.

2. $H0_2$: There is no association between Monthly income levels & spending patterns on trendy & ready-to-wear apparel.

3. $H0_3$: There is no association between peer pressure & buying decisions of trendy & ready-to-wear apparel.

4. $H0_4$: There is no association between gender and the importance of product attributes when purchasing trendy & ready-to-wear apparel.

5. $H0_5$: There is no association between gender and spending patterns on trendy & ready-to-wear apparel among Mumbai consumers.

6. $H0_6$: There is no association between age and spending patterns on trendy & ready-to-wear apparel among Mumbai consumers.

RESEARCH METHODOLOGY
The research methodology has to be strong to minimise errors in data collection and analysis. Due to this, researchers have selected a survey/structured questionnaire method for data collection. It is described in the following **Table 1**:

Type of Data	Primary & Secondary
Sampling Method	Simple Random & Convenience Sampling, based on Demographic Variables including age, gender and employment status and Income Level.
Sample size	224 Respondents
Research tool	Structured Questionnaire
Research Method	Descriptive
Data Collection method	Survey
Survey Area	Mumbai Region
Tools to analyse data	Chi-square test for hypothesis testing & Descriptive statistics for demographic analysis.

ANALYSIS, INTERPRETATION OF DATA & FINDINGS
Tables and graphical representations were used to analyse the collected data and reach appropriate conclusions and interpretations.

DEMOGRAPHIC PROFILE OF THE RESPONDENTS

TABLE 2 & CHART 1: GENDER OF RESPONDENTS

	GENDER	
	Frequency	**%**
Male	99	44.20%
Female	125	55.80%
Total	**224**	**100%**

Source: Primary Data
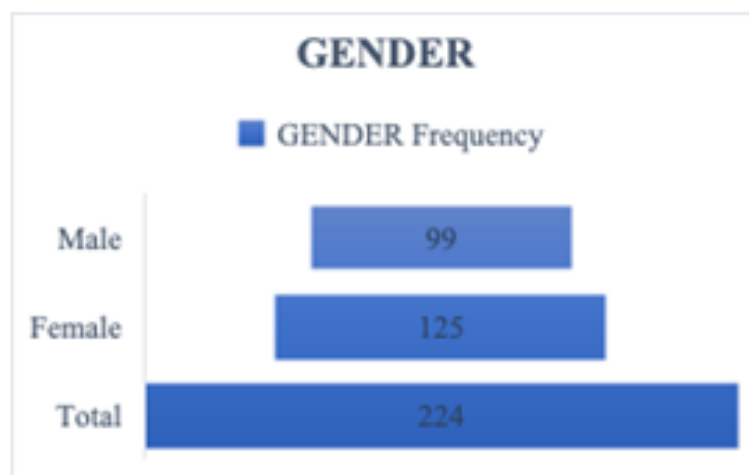
Source: By researcher

Interpretation: The data indicates that 55.80% of the respondents are female, while 44.20% are male, reflecting a higher representation of females in the sample.

CHART 2: AGE OF THE RESPONDENTS
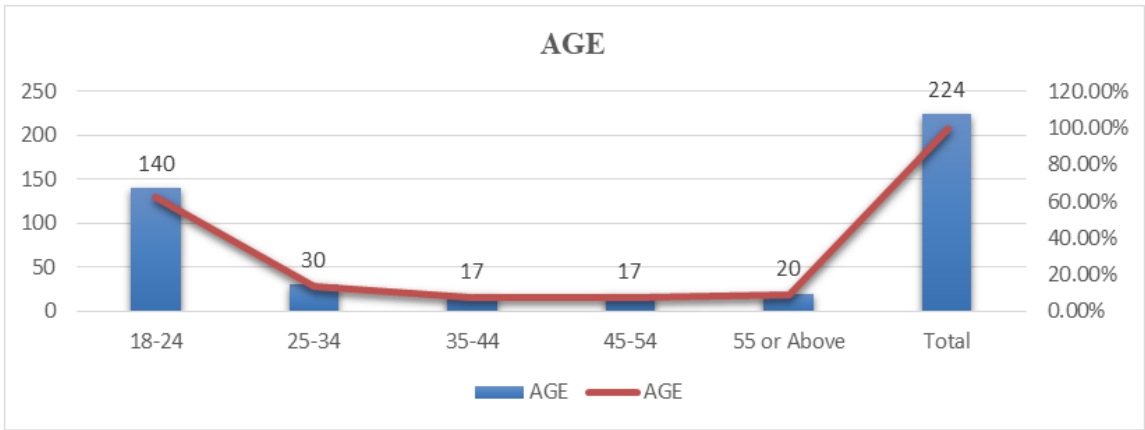
Source: By researcher

Interpretation: The age distribution shows that most respondents (62.50%) are between 18 and 24 years old. While, smaller proportions are found in older age brackets, with only 13.40% aged 25-34 and even fewer in the 35-44 (7.60%), 45-54 (7.60%), and 55 or above (8.90%) categories. This indicates a predominantly young demographic in the sample.

CHART 3: OCCUPATION OF THE RESPONDENTS

Source: By researcher

Interpretation: The occupation data highlights that a substantial majority of respondents (56.70%) are students, reflecting a youthful and possibly academic-focused demographic. Among those who are working, 29.90% are employed, while a smaller group is self-employed (4.90%) or retired (6.70%). Only 1.80% of respondents are unemployed, suggesting that most individuals in the sample are engaged in productive activities, either through education or employment.

CHART 4: MONTHLY INCOME OF THE RESPONDENTS
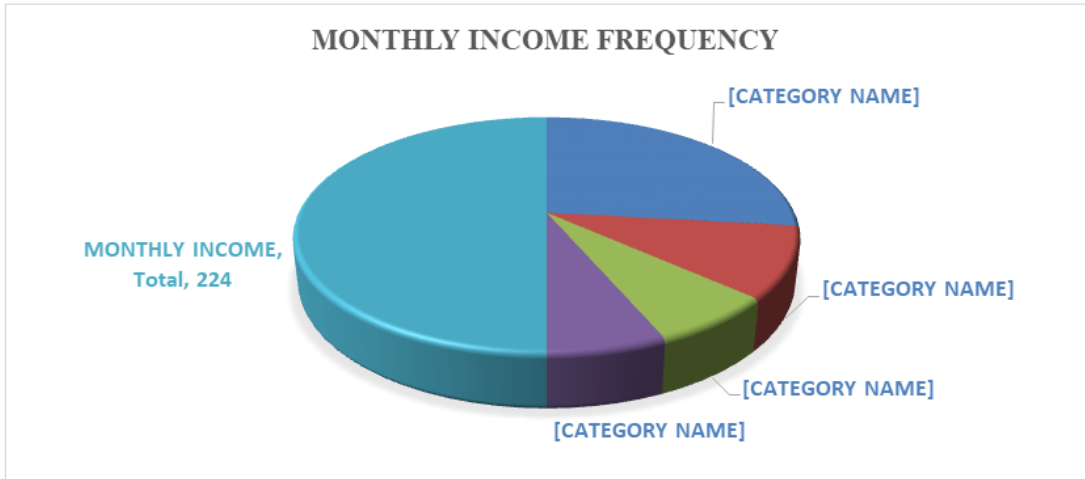
Source: By researcher

Interpretation: The monthly income data reveals that over half of the respondents (53.60%) earn less than Rs. 20,000, indicating a significant portion of the population is in the lower income bracket. Meanwhile, 19.60% earn between Rs. 20,000 and Rs. 50,000, and only a smaller percentage earn above this range, with 13.80% making between Rs. 50,001 and Rs. 1,00,000 and 12.90% earning more than Rs. 1,00,000. This suggests that financial challenges may be prevalent among the majority of the respondents.
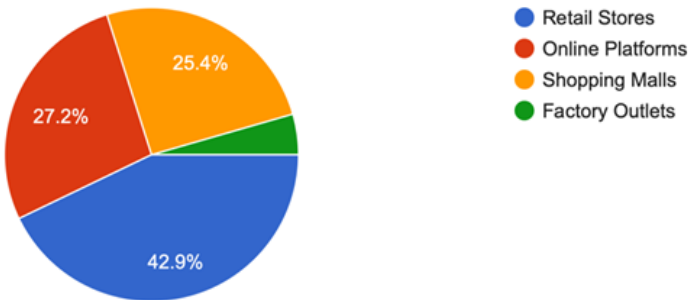
CHART 5: PREFERRED SHOPPING CHANNELS

8. Which shopping channel do you prefer for purchasing apparel? (Select one)
224 responses

Legend: Retail Stores, Online Platforms, Shopping Malls, Factory Outlets
42.9%, 27.2%, 25.4%

Interpretation: The shopping channel data shows that a majority of respondents (42.90%) prefer retail stores for their purchases, while online platforms (27.20%) and shopping malls (25.40%) are also popular, indicating a strong inclination towards traditional shopping experiences over factory outlets (4.50%).

CHART 6: PEER PRESSURE

10. Do you get influenced by your friends/family/spouse to buy certain brands or styles of clothing?
224 responses

Legend: Not at all, A little, Moderately, Very much, Extremely
37.5%, 12.9%, 15.6%, 30.8%
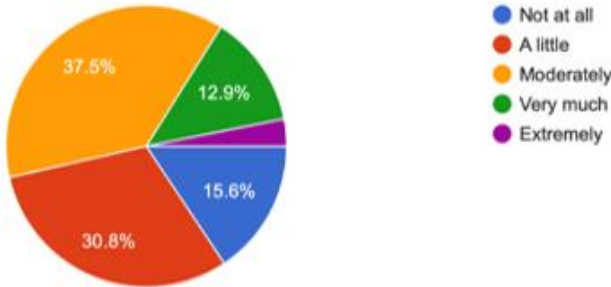
Interpretation: The responses indicate that a significant portion of individuals (37.50%) feel moderately influenced by friends, family, or spouses when it comes to purchasing clothing, while only a small minority report extreme influence, suggesting that social circles play a notable role in their fashion choices.

CHART 7: INFLUENCE OF SOCIAL MEDIA ON BUYING DECISION

11. Have you ever purchased clothing primarily by seeing it featured by influencers on social media?
224 responses

Legend: Yes, No
62.5%, 37.5%
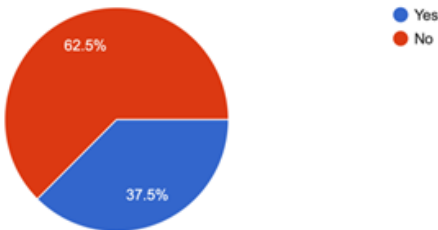
Interpretation: The data reveals that 62.50% of respondents do not feel influenced by social media in their buying decisions, while 37.50% do, indicating that traditional factors may play a more significant role in their purchasing behaviour compared to online platforms.

STATISTICAL ANALYSIS AND HYPOTHESIS TESTING RESULTS

TABLE 3: AGE GROUPS VS. PRODUCT ATTRIBUTES

Relationship Tested	Degrees of Freedom (df)	Calculated χ^2 Value	Critical Value ($\alpha = 0.05$)	Decision ($\alpha = 0.05$)
Age vs. Fit Rating	16	**25.47**	26.296	**Accept H₀**
Age vs. Quality Rating	16	**31.83**	26.296	**Reject H₀**
Age vs. Price Rating	16	**15.69**	26.296	**Accept H₀**
Age vs. Style Rating	16	**19.92**	26.296	**Accept H₀**

Interpretation:

Analysis of the association between age group and the importance of apparel attributes revealed a relationship only for quality ($\chi^2 = 31.83 >$ Critical χ^2 26.296). No associations were found for fit ($\chi^2 = 25.47 <$ Critical χ^2 26.296), price ($\chi^2 = 15.69 <$ Critical χ^2 26.296), or style ($\chi^2 = 19.92 <$ Critical χ^2 26.296). Therefore, only consumers' age groups influence their perception of quality in ready-to-wear apparel.

TABLE 4: GENDER VS. PRODUCT ATTRIBUTES

Relationship Tested	Degrees of Freedom (df)	Calculated χ^2 Value	Critical Value ($\alpha = 0.05$)	Decision ($\alpha = 0.05$)
Gender vs. Fit Rating	4	**3.84**	9.488	**Accept H₀**
Gender vs. Quality Rating	4	**4.92**	9.488	**Accept H₀**
Gender vs. Price Rating	4	**5.73**	9.488	**Accept H₀**
Gender vs. Style Rating	4	**3.98**	9.488	**Accept H₀**

Interpretation:

The Chi-square values for fit, quality, price, and style ratings being less than their respective critical values indicate no association between gender and the importance of these product attributes.

TABLE 5: INCOME LEVEL VS. SPENDING CATEGORY

Other Relationships	Degrees of Freedom (df)	Calculated χ^2 Value	Critical Value ($\alpha = 0.05$)	Decision ($\alpha = 0.05$)
Income Level vs. Spending Category	9	**28.16**	16.919	**Reject H₀**

Interpretation:

The calculated Chi-square value (28.16) is greater than the critical Chi-square value (16.919) at $\alpha = 0.05$. Therefore, the null hypothesis is rejected. This indicates an association between income level and spending patterns on trendy & ready-to-wear apparel.

TABLE 6: GENDER VS. SPENDING CATEGORY

Other Relationships	Degrees of Freedom (df)	Calculated χ^2 Value	Critical Value ($\alpha = 0.05$)	Decision ($\alpha = 0.05$)
Gender vs. Spending Category	3	**2.86**	7.815	**Accept H₀**

Interpretation:

The calculated Chi-square value (2.86) is lesser than the critical Chi-square value (7.815) at $\alpha = 0.05$. Therefore, the null hypothesis is accepted. This indicates no association between gender and spending patterns on trendy & ready-to-wear apparel.

TABLE 7: SHOPPING COMPANION VS. SPENDING CATEGORY

Other Relationships	Degrees of Freedom (df)	Calculated χ^2 Value	Critical Value ($\alpha = 0.05$)	Decision ($\alpha = 0.05$)
Shopping Companion Type	16	**35.91**	26.296	**Accept H₀**

Interpretation:

The calculated Chi-square value (35.91) is greater than the critical Chi-square value (26.296) at $\alpha = 0.05$. Therefore, the null hypothesis is rejected. This suggests an association between the type of shopping companion and spending patterns on ready-to-wear apparel.

TABLE 8: AGE GROUPS VS. SPENDING CATEGORY

Other Relationships	Degrees of Freedom (df)	Calculated χ^2 Value	Critical Value ($\alpha = 0.05$)	Decision ($\alpha = 0.05$)
Age Groups vs. Spending Category	12	**21.45**	21.026	**Reject H₀**

Interpretation:

The calculated Chi-square value (21.45) is greater than the critical Chi-square value (21.026) at $\alpha = 0.05$. Therefore, the null hypothesis is rejected. This shows an association between age group and spending patterns on ready-to-wear apparel.

RECOMMENDATION AND SUGGESTIONS

- Marketers should design campaigns that target both genders equally, with a slight emphasis on women representing 55.8% of the sample size. Promotional efforts should highlight key attributes such as quality, affordability, and style in a gender-neutral manner.

- Businesses should offer budget-friendly and trendy apparel specifically tailored to appeal to the 18-24 age group, ensuring that products resonate with their preferences and lifestyles.

- Utilise social media platforms like Instagram, Facebook, and YouTube to implement targeted marketing campaigns. Additionally, introduce student discounts and loyalty programs to attract and retain younger customers effectively.

- Companies should consider expanding their product lines to include affordable options for consumers earning less than ₹20,000 per month. Seasonal sales, combo deals, and loyalty rewards can be effective strategies to engage budget-conscious buyers.

- Improve online shopping platforms by incorporating user-friendly designs, detailed product descriptions, and seamless return policies to enhance customer satisfaction and retention.

- Launch referral programs or group discounts to capitalise on peer influence, encouraging customers to share their positive experiences with friends and family.

- Regularly update product collections to align with current style trends, particularly focusing on the preferences of younger consumers who are more likely to seek out the latest fashions.

- Consider introducing buy-now-pay-later plans, EMIs, or subscription models to lower financial barriers for consumers, making it easier for them to make purchases.

- Conduct periodic surveys to monitor changes in consumer preferences and demographics. This data will help businesses stay responsive to market trends and customer needs.

SIGNIFICANCE OF THE STUDY

The significance of the study is that it discusses consumer buying behaviour in the context of trendy and ready-made apparel in Mumbai while discussing the various factors that would influence purchasing decisions. As an initiative to fill in some existing gaps in the literature on urban consumer behaviour, this research analysis is going to examine how the demographic variables relate to spending patterns, how peer pressure and social influence affect a consumption decision, and so forth. Additionally, frequency of purchase, preferred shopping channels, and where the consumer feels accompanied would add to the knowledge of retailers and marketers in their strategies to engage consumers as the lively Mumbai fashion market keeps evolving.

CONCLUSION

This study on consumer buying behaviour towards trendy and ready-to-wear apparel in Mumbai reveals significant insights into the dynamics of fashion retail in this metropolitan region. The findings demonstrate strong correlations between income levels and spending patterns, as well as between shopping companion choice and satisfaction levels while showing no significant relationships between age groups, gender, and purchasing patterns. The predominantly young demographic (62.50% aged 18-24) with lower income levels (53.60% earning below Rs. 20,000 monthly) presents both challenges and opportunities for retailers. Despite digital advancement, physical retail stores remain the preferred shopping channel (42.90%), with moderate

influence from peer pressure and limited impact from social media influencers on purchasing decisions. These findings suggest that fashion retailers in Mumbai should focus on balanced pricing strategies and enhanced in-store experiences rather than traditional age and gender-based segmentation. The research contributes valuable insights to understanding urban fashion consumption patterns in emerging markets while providing practical guidance for industry stakeholders.

AREA FOR FURTHER RESEARCH

The area for further research based on the present study delves into;

- How the impact of online shopping and mobile apps on ready-to-wear apparel purchases in Mumbai;

- The influence of Social Media Influencers and Digital Marketing on Consumer Preferences and;

- How price sensitivity affects consumer behaviour towards trendy clothing.

These studies help us to expand our knowledge in the field and address the changing consumer preferences more effectively.

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A STUDY OF FACTORS INFLUENCING INDIVIDUAL PREFERENCE FOR EDUCATION- A HOLISTIC APPROACH

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INTRODUCTION:

The Indian education system can be classified into two categories, one is regular mode (full time) and another one is non-regular mode (flexible) based on structure, teaching & learning methods and flexibility.

Regular education system is a structured one with campus-based teaching and learning. This education is offered at (a) school education for class 1 to 12, (b) bachelor and master degree programmes at Colleges & Universities, (c) professional courses like, Medical, Engineering, Law etc., (d) Polytechnic diplomas, Vocational courses in ITI, NSTI etc.,

Whereas non-regular education system is flexible one without campus-based teaching and learning and studying with the help of study material with few contact classes. This education is offered at (a) bachelor degree, master degree, diplomas, certificate programmes under Distance Education offered by State & central government and non-government universities. (b) Online education system contains online classes, online assignments and virtual labs system. This education is offered by (i) Massive Open and Online Courses (MOOC), short duration courses offered by NPTEL, SWAYAM, Udemy and Course era etc., educational platforms. (ii) Online bachelor, master degrees, diploma and certificate programmes offered by educational institutions (iii) Competitive examination preparation courses / bridge courses offered by training institutions, (c) the part time mode of education through evening and weekend classes particularly for BE, MBA etc programmes.

The present paper is study of various factors influencing the individual preference for education for holistic development.

RESEARCH METHODOLOGY:

This study is analytical and comprises secondary data which is collected from books and periodicals, websites of UGC, AICTE, newspapers and personal interviews with the students, faculty, parents and other employees.

OBJECTIVES:

1. To define the quality of education

2. To study the various aspects influencing the individual preference for education

3. To analyse the reasons for gap between admissions and completion of programmes

GOOD QUALITY EDUCATION:

The good quality education should meet the requirements of learners through good quality curriculum, quality institutional facilities and quality faculty. The quality is related to the educational institution, which provides an opportunity to the students to develop their skills and provide the best employment suitable to their individual skills. The curriculum & trainings of colleges should be responsive to the type of skills required by the industry.

The following diagram shows the requirement of good quality higher education.

Diagram 1:
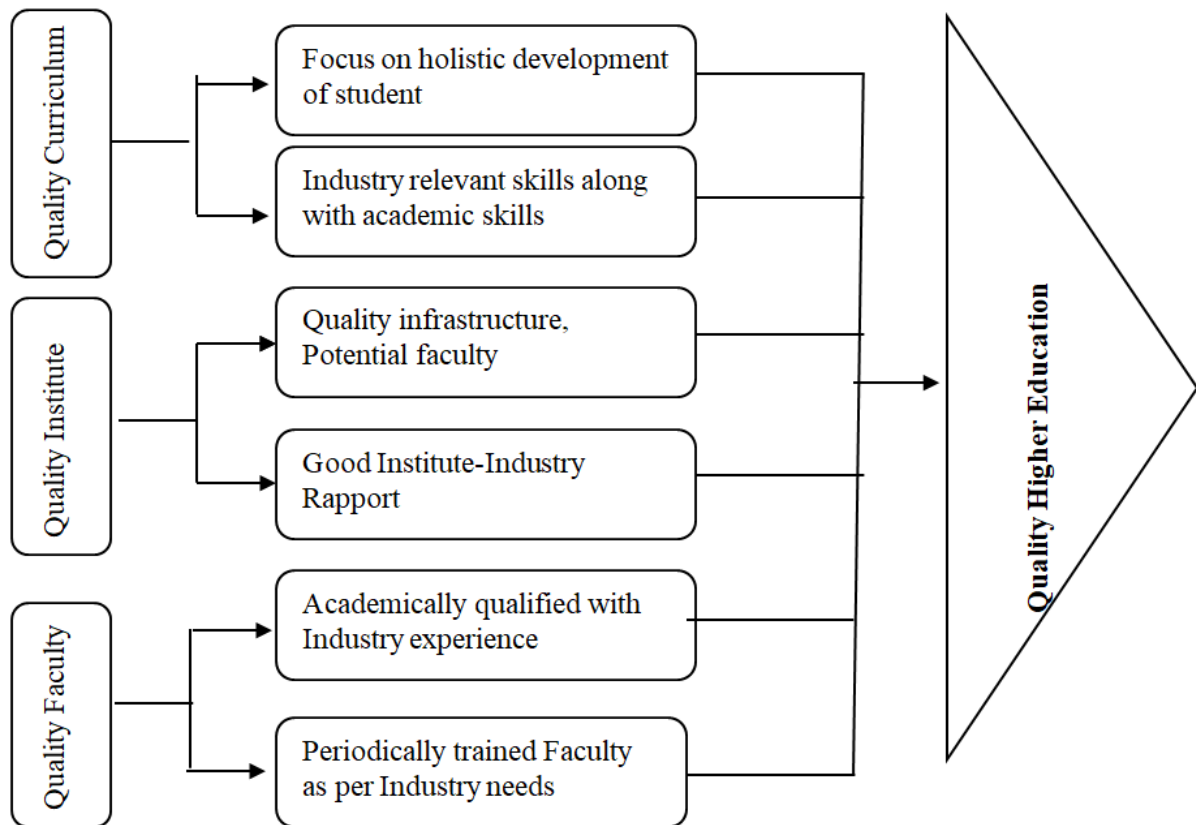
Source: Author Compilation

The Factors Influencing the Individual Preference for Education System:

The choosing of education system depends on various aspects like age, geographical location, economic status, cost of living, learning facilities, time management etc.,

Geographical Location:

The preference of education also varies between the learners from urban areas and learners from rural areas. The individual differences between the urban and rural learners are stated below.

a. **Access to formal education:** Urban learners join in well-developed private schools, international schools for education. Whereas rural learners join in government schools and depend on scholarships.

b. **Access to online education:** Urban learners prefer the online courses and e-learning platforms. Rural learners have limited internet facility and prefer the formal or distance education

c. **Higher education:** Urban learners have more opportunities in India and abroad. Where as rural learners have to migrate to metro cities to access the higher education.

d. **Career Opportunities:** Urban learners prefer IT, Law, Engineering, medical , research and startups etc, as a result they get more global exposure. where as rural learners prefer Government jobs (like UPSC, KPSC etc,,), teaching, farming related careers etc.,

Economic Status:

The economic status of the family influences the preference for education. The economic status is relative to the place of living i.e. cost of living of the place. Hence, the economic status will be good for people with limited income and staying in low cost of living place and prefer for good education. The preference for education by difference income level background of students is explained below.

a. **Urban and high income learners** prefer best online courses, private universities and foreign universities. They show less interest in distance education.

b. **Middle class learners** prefer affordable online courses and cost effective degrees from central and state universities including the distance education.

c. **Rural and Low income learners** prefer free education from government schools and colleges and distance education from government organisations.

Regional trends also influence the individual preference for education. For example, IT and Tech hubs are more in South India. Business and financial hubs are more in Western India.

Cost of Living:

Cost of living plays a vital role in choosing the education system and career development. Cost of living has direct impact on the economic status of the people i.e. above middle class, middle class & below middle class etc., and individual preference for education. Hence, there may not be any positive relation between the total population and access for higher education. It is also observed that, highly populated and backward / rural area people need job oriented programmes/ short duration programmes at affordable fees/ free waiver rather than bachelor and master degrees.

The following diagram shows the impact of cost of living on economic status and opportunities for education.

Diagram 2:

Cost of Living → Economic Status → Opportunities for Education
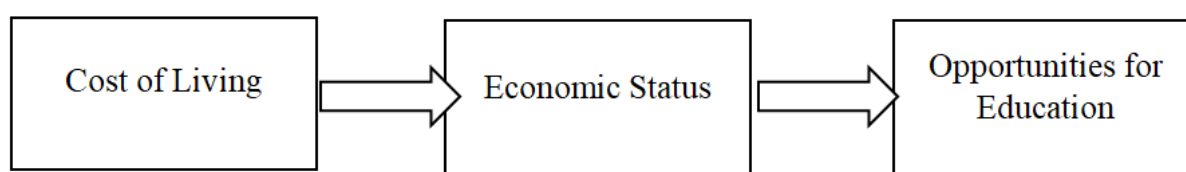
Source: **Author Compilation**

Medium of Education:

The choice of education sometimes depends upon medium of education. Rural area learners prefer education in regional language, whereas urban people prefer in English medium.

Age & Learning Styles:

Age has direct influence on learning styles and preference for education. The various aspects are discussed below.

a. **Motivation for Learning:** The motivation for learning may varies for different age groups. For example:

i) Young learners prefer general education, because of parents and family requirements.

ii) Adult learners prefer career -oriented education / skill enhancement education for self satisfaction, personal enrichment and life long learning.

b. **Teacher /Peer impact:** The impact of peers or teachers on learning styles may vary for different age groups. For example:

i) Young learners are more influenced by teacher, group studies and peer comparison.

ii) Adult learners are self-motivated and their learning styles are depending on their working conditions and family obligations.

c. **Traditional education:** The preference of traditional / formal education varies for different age groups.

i) Young learners prefer the formal education to secure degree for future job and developing identity and social experience etc.,

ii) Adults learners prefer education for career development or delayed degrees, hence prefer the weekend classes /online classes / hybrid mode classes.

d. **Online education:** The preference for Online education is chosen for skill development purpose by the learners of any age group. It is observed that, the generally indivudal prefer the short duration online courses on educational platforms like NPTEL, Udemy, Coursera etc., The young learners choose for skill development and career oriented courses where as adult learners choose the courses directly linked to their jobs.

Gap between number of students admitted, appeared examinations and successful completion:

It noticed that, there is a gap between the total number of learners admitted, total number of learners appeared examinations and total number of learners successfully completed the programme in both regular education and

distance education. This gap is more in distance and online education rather than regular education. There are many reasons to drop out from the studies.

a. **Financial constraints:** Many learners from rural and economically weaker sections discontinue studies at school or college level due to lack of financial support and need to take a job for survival.

b. **Gender disparities:** The marriage, safety concerns, household responsibilities etc, may force the girls to discontinue their studies.

c. **Academic failure:** The lack of interest, lack of motivation, unable to coop up with higher studies, poor foundation at earlier school level etc., may make the learners to discontinue.

d. **Institutional skill deficiencies:** The poor quality of education, lack of well experienced faculty, lack of mentorship for weak students etc., may discourage the learners and lead to discontinue the studies.

e. **Lack of time management and stress management:** Not having pre-planning of preparation, fear of failure, examination stress etc prevent the learners appearing the examinations.

f. **Distance and online education challenges:** Most of the learners choose these distance and online education programmes as an add-on programme. The learner may join the programme initially and discontinue the studies due to lack of time management, lack of required resources, lack of connectivity with teacher and peers & due to work pressure etc., reasons,. Few surveys are conducted on online programme lerners of an distance education intuition. Some of the analyses are discussed below.

Analysis 1: An online survey form is sent 282 online learners of BA, BCOM & certificate programmes of a distance education institution. Among them only 37 (13%) learners responded to the google form survey, hence unable to trace the learning experience of remaining 245 (87%) learners.

(i) Around 9 emails bounced back. It is also observed during the interaction with the lerners in online meetings that, education institution emails were going to spam folder, hence not able to track.

(ii) It is also observed that, among the 37 learners responded, only 25 learners said that, they are interested to join online learning system and remaining replied that, by mistake joined. It is also observed, many rural and backward area learners depends on private computer centres to submit the application, as a result wrong admission taking place.

(iii) For a question about basic knowledge of computer like typing, MS office, internet operations, only 27 responded that, they have basic computer knowledge. Without basic knowledge, it is highly difficult to study and complete the online programme.

Analysis 2: Another survey is conducted on 895 computer science master degree, bachelor degree and PG diploma learners studying online in a distance education institution. Among them only 209 i.e. 23% responded for online questionnaire.

(i) During online interactions, it is understood that, majority are working professionals, hence unable to check emails. Some also reported that, education institution emails are going to spam folder.

(ii) It is observed that, among 209 learners, only 118 (56%) are using computer/laptop for learning purpose and remaining 91 are using mobile phones for learning purposes. But, practically it is not convenient to study effectively and prepare assignments over mobile phones.

(iii) For another question related to data usage limit of internet, 51 learners (24.4%) using 1 GB data, 99 learners (47.4%) using between1GB to 2GB data, 17 learners (8.1%) using between 2GB to 3 GB and remaining 42 (20.1%) using more than 3 GB data. For an online programme, minimum 2 GB data is required, hence 150 learners may not be complete the programme successfully within stipulated time.

Alumni Experiences:

The educational experiences of alumni also one of the factors influence the preference of education by the prospective learners. It is observed that alumni participation in events, contribution to organisation and sharing of experiences etc., are more effective in regular education system rather than distance education system. In distance education, very less alumni come forward to provide the support as resource persons for academic activities virtually and do not show much interest in alumni meetings either offline or online. Anyhow, the educational institutions are using the social media for showcasing the alumni, hence the sharing of educational experience is published now a days.

CONCLUSION:

So, the individual preference for regular or distance or online or international education is influenced by a mix of personal, social, economic and intuitional factors. In overall, the various aspects like career goals, cost & affordability, flexibility, technological access to education, accessibility and location, family requirements, educational institutions reputation, employment opportunities, government policies and schemes etc., influence the individual preference for any type of education.

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UNLOCKING POWER OF BEHAVIOURAL SCIENCE IMPORTANCE OF MENTAL HEALTH & BEHAVIOURAL RESPONSES IN THE OVERALL DEVELOPMENT OF A CHILD

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ABSTRACT

*Mental Health and Behavioural Health is extremely important for the well-being and overall development of a child-it has to be a TOGETHER journey for parents and the child. According to researchers One in six children aged 6-10 years has a mental, behavioural or developmental disorder. It is extremely important that children have strong bonding with their parents and family members-this boosts the self-esteem of a child and helps a child and the parents to identify and handle difficult situations with ease. A well-known research from behavioural science and behavioural economics indicates importance and effect of the person carrying the message which shows that the weightage we give to the information depends heavily on who is delivering that information – research suggests that if we respect the messenger, we pay more attention to what and why they are saying. In this case the messenger is the parents-which means the child will feel reassured of their safety and will be able to have open communication with ease if the parents practise mindfulness with their child. Also it is important for parents to understand in the first place why the Mental Fitness of their child must be their focus and priority. Practising open communication with your child, building trust and reciprocity can help parents integrate and lower their child's stress levels. Neuroscience reveals that two chemical messengers, corticotropin and neuropeptide-work in a synchronised opposition to each other to rewire neurons in part of the brain responsible for emotions called amygdala-which is part of the body's natural response to stress. The research has answers to the why and how the changes occur in the amygdala and also about the process by which it can be manually reversed and help deal with Anxiety disorders. Therefore today we have answers to the treatment of these mental health conditions-the only need is to be more pro-active in sharing the condition and reaching out for treatment. **The biggest asset in the world is your Mindset.** The theory of the Mindset does not just apply on garnering mental abilities. Those with a positive mindset see not just talent but also the effort that goes in to achieve success. A child with a growth mindset will embrace struggles so as to develop the skills to the fullest potential.*

This research paper aims to explore and analyse the crucial role of parents and teachers in promoting positive behavioural health outcomes in children. It investigates the hypothesis that the involvement and support of parents and teachers significantly influence children's behavioural development, emotional well-being, and overall mental health. By examining a wide range of empirical evidence, this paper provides insights into effective strategies and interventions employed by parents and teachers to enhance children's behavioural health outcomes. The sample analysis, provides insights into effective strategies and interventions employed by parents and teachers can boost the emotional and mental well-being of the child.

INTRODUCTION:

Understanding that behavioural and mental health issues which can be addressed for positive outcomes is important for parents so that they can support the child for early treatment. In order to effectively deal with the behavioural and mental health of their child, Parents must regularly monitor the changes in the thinking patterns, feelings, responses, behaviour of their child--this will help in early diagnosis for mental conditions like ADHD, anxiety, autism spectrum disorder, eating disorder(binge eating), learning disabilities, substance abuse, confidence levels, emotions, responses etc, render early treatment and recovery. Parents practising this monitoring mechanism can help evade higher risks of the adverse effects on the child's health and development and also reach out for appropriate treatment.

Children's behavioural and mental health plays a pivotal role in their overall well-being and future success. Today we are fraught with mental health challenges amongst children and this is on the rise not only in INDIA but across the globe. We cannot blame the competitive world alone for the rise in mental health challenges amongst children—it is also important to analyse the upbringing of the children-the lone time they spend and the activities they are involved during their lone time. Are these activities participatory, collaborative or not? Such conditions not only restrict the mental growth but also the overall personality development of the children gets thwarted. Parents and teachers are primary influencers in a child's life, and their involvement and support has a profound impact on children's behavioural and mental development. This paper delves into the hypothesis that parents and teachers significantly contribute to children's mental and behavioural health outcomes and examines existing evidence to support this claim. The paper also delves deep and provides remedies to combat

the mental health illnesses and the future scope of research to model behavioural responses of children and interventions to help combat social anxiety and mental health illnesses. The research paper focuses on building non-cognitive skills that can help children mobilise their goals.

OBJECTIVE

Behavioural Science has made major developments in recent decade, enabling us to understand how by initiating small changes in what parents and teachers do can lead to major differences in the learning process of a child. It is important to build "non-cognitive skills" which are also labelled as soft skills-resilience, emotional intelligence, which will help children at a tender age to adapt and learn how to achieve their goals. Parents play a pivotal role in fostering growth mindset patterns as early as childhood so that they can seek answers, be comfortable in asking questions and reasoning, develop the ability to understand their abilities, are able to forward think post setbacks and revive themselves post uncertain and challenging times. Parents should not encourage children to work on things they neither value nor enjoy. Pressure tactics on children to attempt things which do not interest them can be detrimental to the mental health of the children. At the same time it is extremely important for parents to build strategies which help their children succeed and increase their self-esteem. It is important for parents to build self-control, confidence and grit in their children in order for them to deal with challenging situations with confidence. Parents are the best teachers as they can keep their children intrigued, enjoy making efforts for achieving embrace change and be continuous learners.

METACOGNITION means understanding one's own thought processes, or 'thinking about thinking'.[1] It is important to develop METACOGNITIVE SKILLS in children for them to be able to reflect on their knowledge, behaviour and to be able to alter, change the course of their action to achieve their goals. Parents and teachers can help children develop these metacognitive skills by prompts, cues to trigger their thought process formally and informally through everyday conversations during meal time, classrooms activities.

Making use of the Mindsets and how and why a broad set of beliefs forms the framework of our decisions is very important in understanding the behavioural responses of the children. The key to progressive thinking and mindset relates to how we interpret the struggles we face. Does this mean we as individuals do not have the talent to be successful and competitive, and should therefore move on to choose other options, or can these challenges be tackled with consistent effort and informed decisions. According to Professor Dweck, a fixed mindset is when people believe that because they are born with a set of skills therefore they have limited talent and that practise will not make much difference. In such cases, for example if a student is struggling with reading, arithmetic-may conclude that they do not have the natural ability to comprehend and they may shift their attention to other things and change their course to choosing other options. Contrary to this a student with "growth mindset" will believe that learning to read or do arithmetic is part of the process and continuous practise will help develop expertise. A fixed or a growth mindset is not just limited to one particular field-academics, it is beyond that and relevant to all fields professional and personal. We reveal our mindsets when we converse, talk about success, make decisions. Parents and Teachers with a Growth Mindset are able to better shape the mindsets of their children because they encourage, applaud talent, and effort. There are potential benefits of having a growth mindset and Neuroscience has answers that help explain why having a growth mindset is helpful and how it can shape the future for effective and better decision making.

Many prominent researchers have researched that most of the students give up when they struggle-they believe they do not have the right talent to be successful. Mindset theory explains learning and struggling go hand in hand and challenges hone our skills. Growth Mindset looks through the lens with a positive frame of mind for oneself and others. A research activity was undertaken to change the Mindsets of children at various schools which involved distinguishing between fixed and growth mindset and supporting the exercise with neuroscience theory-each time we learn newer concepts, or anything new-newer connections or "synapses" form in the brain and as we work hard-these connections get strengthened. Post this exercise it was found that students who had completed this training were more motivated, keen to learn, gave better responses to learning, had better mental health and were able to overcome their fears as compared to the set of students who were yet to take this training. Talent influences expertise we acquire overtime. Therefore parents and teachers should encourage children to work continuously on concepts and things they enjoy and find purpose with. The Mindset Theory shares the message not to make children learn everything but rather to encourage them to do the right thing at the right moment. As Professor Dweck says, *If parents want to give their children a gift, the best thing they can do is to teach their children to love challenges, be intrigued by mistakes, enjoy effort, and keep on learning."* [2]

1. The Influence of Parenting on Behavioural Health:

1.1 Parental Warmth and Nurturing: The impact of parental warmth on emotional regulation and resilience in children impacts their mindset and responses to the challenges and also helps parents identify any signs of mental ill health. At the same time Discipline and Behavioural Management promotes positive behaviour and reduces behavioural problems. It is important to create a disciplinary environment at home to help the children practise, healthy meal habits, appropriate sleeping patterns, self-control, self-distancing and engaging with groups of their age. It is important to help children develop strategies to succeed for better behaviour health which will in return help them with better abilities to overcome challenges and be successful. SELF-CONTROL is the ability to control one's actions, behaviour and thoughts in a way that helps us achieve our goals.[3]

Parents and teachers help to build Self-Control-which helps to focus, avoid distractions, plan our own actions and avoid distractions. A study for school children at K12 level was conducted and it was found that higher Self-control is linked with higher success at school, children with more self-control are more attentive in classrooms and focus on doing homework, are healthier, participate in teamwork, are more collaborative and more responsive. Self-control is linked to success at school – children with better self-control attend class more and spend more time doing homework.[4]

Walter Smith and colleagues conducted The Marshmallow experiment where four and five year old children were given the choice to eat marshmallow immediately or wait for 15 minutes to receive two marshmallows. The experiment was used to test self-control to resist instant gratification for a larger reward in the future.

'Self-distancing' involves thinking about our situation in the third person so as to help us think more objectively about a goal.[5] For example, take Julie, who is trying to give up smoking. If she feels tempted to have a quick cigarette after lunch, she could practice reflecting on her situation in the third person. She might think to herself; 'Julie would really like to smoke now but knows that if she does, it will just make it harder to resist a cigarette the next time round.' Asking someone to refer to themselves as if they were a different person may feel strange for both of you at first, but it has been proven to be effective for some.

Parents can use exercises with their children to help them understand the obstacles they face in pursuing their goals and to develop a plan of action to overcome the obstacles. For example, parents can think about how they might praise the effort and not just the output the next time their child succeeds in studies or in extracurricular exercise, or is disappointed. Parents can plan the small and simple but effective steps which can be taken by the child to reach the ultimate goals. This help from the parents goes a long way in strengthening the behavioural health of the child and prepares for a more confident child. Inclusion of children at home in discussions and participation with parents helps model the behaviour of a child. This also builds up and garners capacity in children to be more resilient, active and participate in activities in their schools, neighbourhood and also with their kin.

Motivation helps children to learn and respond. Learning and motivation go hand in hand resulting in applying the learning for effective use of information. Learning and valuing information helps in making behavioural choices and action. Learning is supported by peers, parents and teachers. Therefore, an intrinsic learning environment in school and at home helps children make and value their decisions. Learning and demonstrating activities can refine the relationships between their social network. It further curbs social anxiety, aggression, defiance and reduces stress.

It is also important to identify and address challenging behaviour in children so that they grow out of their behavioural problems of angry outbursts, regularly shouting, swearing, hitting, biting and kicking else these can become habits and unmanageable emotions. Beginning a conversation with the child by a parent and a teacher while engaging in an activity can help the child relax and respond. It is equally important that parents and teachers' network together while finding solutions to the challenging behaviour of the child. Reaching out to other parents is helpful in providing alternatives and other possibilities to enhance the parental abilities while dealing with a challenging behaviour situation of the child. It is also important to remember that sometimes outbursts are also positive. Many children harbour anger which can lead to destructive behaviour when it surfaces. Most important is to understand what is the outburst all about. Why is it stemming so frequently? Are there some behavioural issues which are triggering these outbursts, is it situational or triggered by some past experiences? Unaddressed these triggers can develop in to serious problems and lead to stress, depression, and violent behaviour which can even lead to self-harming behaviour. Always remember-the most important part is to address these triggers with the help of professionals and behavioural science has answers to these questions. Parental modelling helps improve performance of the children and makes their learning more effective.

Responsive parents and teachers provide social security to the children. Socially secure children are more adaptive, fast learners, have high emotional intelligence and exude warmth in their nature. They are collaborative, will value team spirit and high tolerance towards others. They also respond well to challenging situations. On the other hand socially insecure children are nervous, will avoid discussions, are not socially alive and are slow learners.

When children are finding it extremely difficult to embrace change in a habitual behaviour or a particular thought pattern, it is because the perceived drawbacks of that change are as strong as the perceived benefits from that change. The most significant drawbacks are emotional and mental, for example, fear or anxiety what will be the outcome of the change? Will it be possible to cope up with the change? Will it hamper your identity or pride if you make a change? What will the other people think about the change you make? Does the change effect your lifestyle? It is important for parents and teachers to sensitize the children from early age to be comfortable with the usual and be aware that change is the process of life. Parents and teachers should assist children with early-stage changes in order to become aware of the hesitations in children and then assist them to decide how to deal with those hesitations and drawbacks if any to enable them to accept change. Actionable coaching and mentoring helps children to cope up with self-esteem and pride and also makes them confident individuals. They develop growth mindset and will weigh the pros and cons of changes rationally. Early childhood mentoring goes a long way in forming positive thinking patterns and quality decision making habits. Rationalizing decisions and valuing them becomes a habit and weighing probabilities becomes a norm. It also helps them be more empathetic, adept and looking outwards. Children mentored at early stages for change are socially conscious and do not suffer from social anxiety issues. They are more participative, helpful, open to criticism and feedback.

1.2 Parental Modelling and Social Learning: - Observational Learning: An extremely important role of parents in moulding the behavioural responses of their child are their own behaviour and response to socialization. Children are reflection the of their parents and in many ways emote them. How the parents cope up with feelings like frustration, anger, distress influences how the child will regulate their own emotions. Talking to the child about the difference between right and wrong can help the child in controlling their behaviour and emotions and be able to distinguish between right and wrong.

The influence of parental behaviour on children's socialization and the acquisition of behavioural patterns. - Parental Role Modelling: How parents' behaviour and values shape children's attitudes, beliefs, and social interactions helps develop positive and negative behavioural patterns in a child which can be a lifetime imprint on the way they make decisions. The importance of parental involvement in monitoring and guiding children's social activities especially in the formative years helps children develop positive habits and security.

Involving the child in family discussions and allowing them to speak helps in positive role modelling by parents. Keeping the talk positive and using problem solving skills to help the child deal with conflicts in a calm and balanced way will help the child emote the behaviour. Respectful behaviour towards the child by role modelling respectful behaviour in your own relationships at home and elsewhere helps the child role model for respectful behaviour. Similarly healthy food choices and activities for physical development and brain development can be fostered by parents if they involve the child in taking healthy meals together, involving the child in a sports activity together with parents like biking, walking. The decision of the parents to make education interesting can build a positive mindset for the child to attend studies and encourage participation. Parents encouraging child participation helps in identifying any signs of mental and or behavioural disturbance- which could hinder the social-emotional participation by a child in daily activities.

2. The Role of Teachers in Behavioural Health:

2.1 Classroom Environment and Social Emotional Learning: - Positive Classroom Climate: Creating a nurturing and supportive environment that fosters positive behaviour and emotional and mental well-being. Classrooms are diverse places. Students have different cultures, backgrounds, abilities, and other characteristics too. Teachers may have strategies that really help their students to feel like they belong and others which don't work so well. Here, we describe the evidence on why some approaches might be more successful than others.

Belonging

Feeling of Belonging goes a long way in creating beliefs, values and learnings. That one belongs means having positive relationships and reciprocation. Many view belonging as the foundation of learning at school,[6] and research shows that school belonging is important for many elements of academic success including motivation and confidence.[7] Reflecting on how students are similar to one another can help them to feel a sense of

belonging. This could be something small like a shared interest or hobby, as well as a shared culture or some other source of identity.[8]

2.2 Teacher-Student Relationships: - Supportive Teacher-Student Relationships: Schools and Institutions are the second home for children. Stepping out of their comfort zone at home and embracing the new environment can be fraught with many challenges for children. Many children start feeling overwhelmed by the new environment, people and activities around them. This can be navigated by the help of teachers and mentors in Institutions. The correlation between positive teacher-student relationships helps in improved behavioural outcomes. The influence of teacher sensitivity and responsiveness on children's mental and emotional regulation and behavioural adjustment plays a vital role in behavioural response from children. A new environment, such as a new school, can be overwhelming. Students often feel the strain of trying to fit in at school. Uncovering seemingly trivial similarities between people could help to ease such worries.

It is often the members of minority groups who feel the strain of not belonging to the crowd the most. This can not only undermine academic performance, but also negatively impact mental health and wellbeing. Psychologists have developed a brief exercise to counteract the anxieties of new social contexts. Students first read about how older students had worried about not adapting in when they first arrived. They then write a brief essay on how their own experiences compare to those they have just read, before reading their essay aloud in front of a video camera. This exercise helped students to realise that their anxieties are normal and that with time, these emotions cease.

Fear of public speaking, non-participation in peer group activities, stammering, and loss of appetite are some of the initial symptoms of Social Anxiety which can lead to severe repercussions and mental ill health if not treated professionally. Many children do not divulge their apprehensions of not being able to speak in public and network. Therefore, a major behavioural concern goes unnoticed which surfaces as a setback in the professional and personal relationships. It is extremely important to nurture the minds of the children, develop curiosity and adaption. Parents play a pivotal role in fostering growth mindset patterns as early as childhood so that they can seek answers, be comfortable in asking questions and reasoning, develop the ability to understand their abilities, are able to forward think post setback and revive themselves post challenging and uncertain times.

The Red Flags: Many prominent researchers have researched that most of the students give up easily when they struggle-they believe they do not have the right talent to be successful. However, the Mindset theory explains learning and struggling go hand in hand and challenges hone our skills. Keeping the discussion positive with children and using problem solving skills to help the child deal with conflicts in a calm and balanced way which helps the child to emote the behaviour. The influence of parents and teachers sensitivity and responsiveness on children's mental and emotional regulation and behavioural adjustment plays a very integral role in positive behavioural response from children and helps them overcome social anxiety. Similarly healthy food choices and activities for physical development and brain development help children be more attentive and active in participation. It also boosts brain activity and reduces social anxiety. Prompting the children to think beyond what is known helps reduce social anxiety.

Analysis: Effective Strategies and Interventions:

3.1 Parental Involvement Programs: - Parent Education and Training: The effectiveness of parenting programs in enhancing parenting skills and fostering positive child behaviour, Home-School Collaboration: The benefits of collaborative efforts between parents and teachers helps in promoting children's behavioural health.

3.2 Teacher Training and Professional Development: - Classroom Management Strategies: Evidence-based techniques that promote positive behaviour and prevent disruptive behaviours. - Empathy and Emotional Support extended by teachers, the role of teacher in giving empathy and emotional support helps in fostering a positive classroom environment.

To support the hypothesis a sample study was conducted using personally administered questionnaires involving 200 children between ages 6 and 10, their parents and teachers. The following aspects were analysed Parenting styles and Behaviour Outcome of Children. The parents and children were assessed through questionnaires which helped children understand their own Mindsets on a continuum scale of 1 to 5 with 1 as I strongly agree to 5 as I strongly disagree. Also questionnaires were used for developing self-control strategies by parents in their children to achieve their goals like resisting common temptations like binging, watching TV and developing healthy eating habits and avoiding distractions. Another questionnaire was administered wherein parents along with their child were asked to set realisable goals and form plan to mitigate obstacles. The following questionnaires were used for assessment:

1.   What is your Mindset?

2.   Self-Control Strategies for Parents and Children

The results showed a significant corelation in responses by children between the Mindset values cultivated by parents reflecting on the Mindsets of the parents. Also parents who nurtured their children with an authoritarian style exhibited children with lower levels of externalizing and internalizing behaviours compared to parents with other styles like permissive, and neglectful.

Similarly, Teachers were assessed in creating a safe, belonging atmosphere in the class. Teachers were assessed on their level of warmth, support, and responsiveness towards their students and affirmation of values - The parents and children's behavioural outcomes were evaluated using the Questionnaire on Self Control strategies and Understanding the Mindset, which measures emotional responses, perception, conduct problems, hyperactivity/inattention, and prosocial behaviour. - The analysis revealed a strong positive correlation between positive teacher-student relationships and improved behavioural outcomes. Students who reported higher levels of warmth, support, and responsiveness from their teachers exhibited fewer behavioural difficulties, affirmation of values and more prosocial behaviour which means good mental health. Following questionnaires were used for assessment:

1. Affirmation of Values

2. Helping Students to Belong in the Classroom

3. Being Curious

4. Respecting views of others

Intervention Programs for Affirmation of Values: - Children participated in Values Affirmation Program aimed at enhancing positive parenting skills and promoting healthy child behaviour. - Teachers received training in classroom management strategies and techniques to create a positive and supportive classroom environment. - The sample study measured the effectiveness of these intervention programs by comparing pre- and post-intervention behavioural outcomes of the children. - The analysis demonstrated significant improvements in children's behavioural outcomes after the implementation of parenting education programs and teacher training, supporting the notion that targeted interventions can positively impact children's mental and behavioural health.

CONCLUSION

The research presented in this paper provides strong evidence supporting the hypothesis that parents and teachers significantly influence children's behavioural and mental health outcomes. When children are presented with the opportunities to express their emotions they become resilient, emotionally aware and value Growth Mindset. Inculcating the feelings that one belongs deciphers having positive relationships with peer groups. This also promotes commitment and shared interests which in turn promotes inclusion, feeling of well-being, shared culture, recognition and belongingness. These elements promote good mental health and success. The findings highlight the importance of parental involvement, teachers involvement, nurturing relationships, and evidence-based strategies in promoting positive behavioural response and mental health in children. Inclusion can help children, teenagers to be more receptive towards physical and mental challenges. It is also important to counsel children at various stages of their life that anxieties are to be dealt with and to a certain level it is all right to feel anxious—that with time and situations these emotions will fade. That these situations are challenging but once dealt with they help develop resilience. It is also important to develop values in children and this can be effectively done by parents and teachers. A value is the core which makes you happy and well appreciated. It is a core which gives purpose to your life and contributes to the mental well-being. Your relationship with family and friends, being independent, enjoying hobbies, belonging to a social group, being able to reciprocate helps children build up stronger bonds with peers and practise resilience. The findings indicate that authoritative parenting styles, positive teacher-student relationships, and targeted intervention programs contribute to improved behavioural outcomes in children, reduce mental stress, level up confidence. By recognizing the pivotal roles of parents and teachers, policymakers and educators can implement effective interventions and support systems to enhance children's mental and behavioural health and overall well-being-both at home and in their professional spaces. Mental health and positive behavioural responses can be affected with interventions from parents and teachers-who can be their confidante'. Feeling secure and relaxed is the first step to sound mental health for lifetime and quality life. Children with a secure childhood are better decision makers than children who have been exposed to traumatic situations. It is important for parents and teachers to instil activities and practises during schooling which make the children rounded personalities. A nation with a healthy population, is sustainable in all spheres, will be more innovative, forward thinking and progressive.

FUTURE SCOPE OF RESEARCH:

Further research is needed to explore additional factors that contribute to children's mental and behavioural health and to develop comprehensive interventions that encompass multiple levels of influence. Also how Emotional Intelligence can make children, parents and teachers understand their own emotions in positive ways to communicate effectively, improve social skills and behaviour, overcome challenges to stay motivated. The research will also focus on how to increase the Emotional Intelligence of children to enable them to build relationships and defuse conflict. Emotional Intelligence is as important or even more important than IQ for success including academic, non-academic, interpersonal skills, and social aspects. An Emotionally Intelligent child will be self-aware and therefore will be more enabled to make informed and effective decisions not only today but for future years. Therefore the importance of EQ in the overall development of a child both mental and behavioural responses can a very important facet for future research.

Informed decisions and choices-help to improve our own skills and disposition and in turn help us make better decisions which are not only good for our living but act as catalyst for the larger goals. The aim is to examine the behavioural factors that lead children to make decisions-regarding how they make decisions, act on them, develop beliefs and attitudes and how small, subtle and counter intuitive changes to the way a message is farmed or a process is structured can have an outsized positive impact on the decisions we make and the actions we take. A high EQ can help improve the decision-making culture of our schools, families, and communities

To achieve this, the future research can focus on sparking and growing support for developing EQ skills amongst students in schools/institutions for better decision making. It is important to help students deep dive into problems they are trying to solve, work collaboratively and be their creative self, do not feel overwhelmed by failures due to growth mindset and die-hard inspiration to succeed. Behavioural Science can help students see the relevance of what they are doing-the application of their knowledge not only to their own life but also to the lives of others helps them define purpose in their lives. This acts as a trigger not only for themselves but also imbibes a sense of being able to help others leading to growth mindset and positive intelligence. Leading life with positive intelligence helps children address social anxiety and become well rounded adults having fulfilling careers and lives. It is also important to inculcate and practise curiosity in the minds of children right from early childhood and school stages. Curious minds develop the habit of making enabled decisions, respecting core values and concerns. Inclusion is the key to positive behavioural responses and good mental health.

The research can actively build:

- innovative pilot programs

- pitch frameworks for curricula and pedagogy

- pitch developing of EQ skills in students towards decision education to be administered as policy commitment at schools, institutions

- mindfulness exercises for principals/teachers

- an ongoing commitment to identifying, coordinating, and amplifying all of those related efforts.

- Camps in schools for children to deal with social anxiety

- Healthcare sector to develop departments in hospitals for social anxiety counselling for children

- The research can actively build upon and become a global movement helping healthcare sector deal with growing numbers of people in depression, anxiety and stress. Changing thinking patterns which can be harmful for yourself and others can help build a better world and a liveable planet-aligned with the United Nations SDG Goal 3.

- Sound mental health goes a long way in building good humanity, Nations and Universe-therefore it is important to focus on mental health issues from early childhood. The research and interventions can also be enhanced with AI technology and applications to help children and adults deal with personal and professional challenges due to mental health issues. However, we should not forget that human interaction and intervention is the best remedy for providing solutions to humans be it through coaching, mentoring, medical and medicinal and most important addressing them at early stages. Mental health should not be considered a stigma-the research can further focus on building Nudges where people consider discussion and counselling as a remedy for improving their mental health-they do not fear the "talk".

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INDIAN SMART CITIES AND AI-BASED TRANSPORTATION NETWORKS: INTEGRATION OF AI IN URBAN MOBILITY PLANNING

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ABSTRACT

India's Smart Cities Mission aims to enhance urban living through technology-driven infrastructure and services. Artificial Intelligence (AI) plays a pivotal role in transforming transportation systems within these smart cities. This paper explores the integration of AI in urban mobility planning, examining its potential to improve efficiency, reduce congestion, and promote sustainability. The study highlights key applications, challenges, and future prospects of AI in India's transportation networks.

INTRODUCTION

Urbanization in India has led to an unprecedented demand for efficient transportation systems. The Smart Cities Mission, launched in 2015, envisions technology-driven urban development to address these challenges. AI, with its capabilities in data analysis, predictive modelling, and automation, offers innovative solutions for urban mobility planning. This paper investigates the role of AI in achieving the goals of smart transportation in Indian cities.

Current Landscape of Transportation in Indian Smart Cities

Indian cities face issues such as traffic congestion, air pollution, and inadequate public transportation. Smart cities like Pune, Bengaluru, and Ahmedabad are implementing AI to address these challenges. Initiatives include smart traffic management systems, AI-powered public transit optimization, and real-time data analytics for urban mobility.

Pune City:

Pune, one of India's fastest-growing cities, faces severe traffic congestion due to rapid urbanization, increasing vehicle density, and inadequate infrastructure. The city's roads, often narrow and poorly maintained, struggle to accommodate the rising number of private vehicles, leading to frequent bottlenecks and long commuting hours. Encroachments, haphazard parking, and the lack of an efficient public transportation system further aggravate the situation. Peak hours witness heavy congestion, especially in areas like Hinjewadi, Kothrud, and FC Road. While metro expansion and road-widening projects aim to ease traffic woes, poor traffic discipline and insufficient law enforcement remain persistent challenges, making daily travel a frustrating experience for Pune's residents.

Pune's traffic congestion has significantly worsened, positioning it among the most congested cities globally. According to the TomTom Traffic Index Report 2024, Pune ranks fourth worldwide and third in India for traffic congestion.

Key statistics from the report include:

- Average Travel Time: It takes approximately 33 minutes and 22 seconds to travel 10 kilometers in Pune.

- Congestion Level: The city experiences a congestion level of 34%, indicating that travel times are 34% longer than during baseline non-congested conditions.

- Annual Time Lost: Residents lose about 108 hours per year during rush hours due to traffic delays.

- Average Speed: During rush hours, the average speed is recorded at 20 km/h in the morning and 17 km/h in the evening.

These statistics highlight the pressing need for effective traffic management and infrastructure development in Pune to alleviate congestion and improve urban mobility.

Bengaluru City:

"Bengaluru's traffic congestion has been a long term challenge, which impacts daily passengers and the city's overall functioning. According to the TomTom Traffic Index - 2024, Bengaluru is ranked as the world's third slowest city for traffic, with an average travel time of 30 minutes and 10 seconds to cover a 10-kilometer distance. This marks an increase of 50 seconds from the previous year." (Thadhagath, P. V. (2025b, January

12). Bengaluru ranked as India's 2nd slowest city in terms of traffic in 2024, Kolkata takes lead. *Hindustan Times*.)

In terms of congestion levels, Bengaluru stands at 63%, indicating that travel times are 63% longer than during baseline non-congested conditions. Commuters in the city lose approximately 132 hours annually due to traffic delays, with average speeds during rush hours recorded at 19 km/h in the morning and 17 km/h in the evening. (*Bengaluru traffic report | TomTom Traffic Index*. (n.d.).)

A significant contributor to this congestion is the Silk Board junction, one of the busiest intersections in India. Studies have shown that during peak hours, the average speed of vehicles at this junction is as low as 4.48 km/h, highlighting the severity of traffic bottlenecks in the area.

Efforts to mitigate traffic congestion in Bengaluru include infrastructure projects such as the construction of flyovers and the expansion of the Namma Metro network. However, the rapid pace of urbanization and increasing vehicle ownership continue to pose significant challenges to improving traffic conditions in the city.

Ahmedabad City:

Ahmedabad, one of Gujarat's largest and most populous cities, faces significant traffic congestion due to rapid urbanization, increasing vehicle ownership, and inadequate road infrastructure. The city's expanding commercial and residential hubs have led to a surge in private vehicles, often resulting in long traffic jams, especially during peak hours. Key areas such as SG Highway, Ashram Road, and Maninagar experience frequent bottlenecks due to poor traffic management, encroachments, and unregulated parking. The rising number of two-wheelers and auto-rickshaws, along with a lack of lane discipline, further worsens the situation, making daily commutes time-consuming and stressful for residents.

Despite efforts to improve traffic flow through flyovers, widened roads, and the Ahmedabad Metro project, challenges persist due to insufficient public transportation options and ineffective traffic rule enforcement. Many commuters still rely on private vehicles due to the limited reach and efficiency of the city's bus network. Additionally, heavy traffic near marketplaces and industrial areas creates pollution and safety hazards. Addressing these issues requires stricter traffic regulations, better urban planning, and a well-integrated public transport system to reduce dependency on private vehicles and improve mobility in the city

Case Study: Pune's Smart Traffic Management

Pune has deployed AI-driven traffic signal systems to reduce congestion. These systems use real-time data from sensors and cameras to optimize signal timings, resulting in a significant reduction in travel time and emissions.

Applications of AI in Urban Mobility Planning

1. **Traffic Management**: AI-driven traffic control systems analyze real-time data to manage congestion efficiently. For instance, adaptive traffic signals powered by AI can adjust signal timings based on traffic flow.

2. **Public Transit Optimization**: AI enhances route planning and scheduling for buses and metros, ensuring timely and efficient services. Predictive analytics helps in anticipating peak demand and deploying additional resources.

3. **Shared Mobility Services**: AI enables ride-sharing platforms to optimize routes and reduce travel costs. Integration with public transport networks enhances last-mile connectivity.

4. **Autonomous Vehicles**: Although in its nascent stage in India, autonomous vehicle research is gaining momentum. AI facilitates navigation, obstacle detection, and real-time decision-making.

5. **Sustainability Initiatives**: AI assists in reducing emissions through efficient route planning and promoting electric vehicle (EV) adoption. AI-driven systems analyze energy consumption patterns to optimize EV charging infrastructure.

Challenges in AI Integration

1. **Data Availability and Quality**: AI systems require large volumes of high-quality data, which is often unavailable or fragmented in Indian cities.

2. **Infrastructure Gaps**: Limited digital infrastructure hampers the implementation of AI-driven solutions. Ensuring connectivity and sensor deployment is crucial.

3. **Cost and Funding**: The high cost of AI technology and its integration poses financial challenges for municipal bodies.

4. **Privacy Concerns**: The use of surveillance systems and data analytics raises concerns about citizen privacy and data security.

Policy Recommendations
1. **Data Governance**: Establish frameworks for data collection, sharing, and security to support AI applications.

2. **Public-Private Partnerships**: Encourage collaborations between government agencies and technology providers to fund and implement AI solutions.

3. **Capacity Building**: Train urban planners and engineers in AI technologies to enhance implementation capabilities.

4. **Regulatory Frameworks**: Develop policies to address ethical and safety concerns associated with AI in transportation.

FUTURE PROSPECTS
AI is poised to revolutionize urban mobility in India. Advancements in machine learning, Internet of Things (IoT), and 5G connectivity will further enhance AI applications. The integration of AI with emerging technologies like blockchain can improve transparency and efficiency in transportation networks.

CONCLUSION
AI-based transportation networks hold immense potential for addressing urban mobility challenges in India's smart cities. By leveraging AI, cities can achieve efficient traffic management, optimized public transit, and sustainable development. However, overcoming challenges such as data gaps and infrastructure limitations is essential for successful integration. With strategic planning and investment, AI can transform India's urban mobility landscape, aligning with the broader goals of the Smart Cities Mission.

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THE CONFLICT BETWEEN MAN AND NATURE IN ROBERT FROST: A STUDY OF SELECTED POEMS

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ABSTRACT

Robert Frost, one of America's most renowned poets, often centers his work on the intricate relationship between humans and the natural world. Though widely known for his rich depictions of nature, a closer look reveals a recurring tension between human desires and the impersonal, often indifferent aspects of nature. Many critics of Robert Frost continue to interpret his nature poetry through the traditional lens of earlier philosophical and religious conceptions of nature. However, with the arrival of the twentieth century and significant scientific advancements, this conventional perspective on nature underwent a substantial shift. The earlier viewpoint regarded nature as part of a grand, all-encompassing cosmic order, with the physical world representing just one aspect of this broader design. In contrast, the modern understanding of the universe is marked by uncertainty, disorder, and adversity. Frost's portrayal of nature reflects this shift; he presents it as a distant, indifferent force, detached from human emotions and suffering. He identifies a deterministic pattern within the universe that often leads to existential negation. For Frost, both humanity and nature exist within a neutral, impersonal framework that lacks any divine or spiritual essence. This paper explores the recurring theme of conflict between man and nature as depicted in selected poems by Robert Frost.

Keywords: Nature, Philosophy, Religious Interpretations, Determinism, Divine Absence, Modernism, Psychological Conflict

Robert Frost: A Nature Poet beyond Romantic Traditions

Critics hold varied opinions regarding Robert Frost's status as a nature poet, shaped largely by their personal experiences and critical perspectives. Some, for instance, offer high praise. One critic even hails Frost as "our best nature poet since Wordsworth," while Barry D. Bort regards him as "the only major contemporary poet writing convincingly about nature." Such accolades recognize Frost's ability to vividly portray natural scenes and elements with a striking immediacy and authenticity.

However, not all critics agree with labeling Frost primarily as a nature poet. Figures like Joseph Warren Beach and Carlos Baker argue that Frost should not be classified under the traditional banner of nature poets, suggesting that he focuses more on rural life, practical human concerns, and "country things" rather than nature itself in the abstract. John Freeman adds to this view by emphasizing the stark difference between Frost and Wordsworth. Freeman notes that Frost's work lacks the spiritual radiance and idealistic optimism often found in Wordsworth's poetry, and is instead characterized by a "steady grey light"—a muted, somber depiction of the world.

Many early critics interpreted Frost's nature poetry through older, Romantic lenses, molded by the philosophical and religious ideals of the eighteenth and nineteenth centuries. According to the traditional Romantic outlook, nature was perceived as a divine creation, filled with purpose and inherently harmonious. Nature was seen as a spiritual guide, a source of moral lessons, and an embodiment of the sublime. However, the twentieth century introduced a profound shift in how nature was understood, influenced heavily by scientific developments and the disillusionment brought about by world wars. The modern view replaced the harmonious and purposeful vision of nature with one that recognized nature's indifference, randomness, and capacity for cruelty.

Frost's poetry reflects this modern, more skeptical outlook. He presents nature as a detached, impersonal force, indifferent to human struggles and aspirations. Nature, in Frost's vision, is neither benevolent nor hostile by intent; it simply exists, following its own unknowable and often brutal laws. In this universe, Man and Nature are separate entities, coexisting within a vast, impersonal cosmos devoid of divine purpose or sacred significance.

Although Romantic nature poetry significantly influenced the poets of the transitional period, they ultimately diverged from their Romantic predecessors in a crucial way. Unlike the Romantics, the transitional poets believed that no spiritual presence resided in nature. For them, spiritual forces were either beyond human understanding or entirely absent—neither existing as an external deity nor dwelling within nature itself. As a

result, the divide between humanity and the natural world appeared dark, impenetrable, and almost impossible to bridge.

Despite this somber view, transitional poets sought to impose some sense of order upon the seeming chaos of nature. They yearned for a glimpse of inherent kindness within the natural world and for the strength and resilience in human beings to overcome the barriers separating them from nature's unity. In contrast to the sensuousness and aesthetic admiration found in the works of Keats and Wordsworth, transitional poets abandoned such romanticized portrayals. Robert Frost, in particular, developed a distinct style to address the feelings of discomfort, hopelessness, and despair he perceived in the natural world.

Frost's Unique Treatment of Nature and Humanity
For Frost, the central focus remained firmly on human experience. Nature served both as a mirror and a contrast to human concerns, hopes, and fears. His depiction of nature is stark and often somber, highlighting the human struggle against the unknowable and indifferent forces surrounding them. Yet, Frost maintained a careful balance: while recognizing nature's vitality and beauty, he emphasized man's fragile engagement with it. His poetry embraces a dualism that acknowledges both wonder and terror.

This perspective surfaces in several of Frost's poems. In "Birches," for instance, he meditates on the possibility of transcending the earthly world and achieving spiritual unity. Yet, bound by earthly attachments, Frost hesitates. The moment he imagines escaping into the unknown, he experiences anxiety—not envisioning a union with God, but fearing an encounter with "fate" and the finality of death. Fearing that he might depart from the earth never to return, he ultimately rejects the unknown and reaffirms his connection to the tangible world, declaring that "Earth's the right place for love." He says:

May no fate willfully misunderstand me

And half grant what I wish and snatch me away

Not to return. Earth's the right place for love:

I don't know where it's likely to go better.

As the poet contemplates the powerful allure of the infinite, he experiences a sense of fear and is brought back to the awareness of his earthly responsibilities. This fear of being "taken away, never to return" is similarly reflected in the poem "After Apple-Picking," where he intentionally compares his sleep to that of a woodchuck. Through this comparison, the poet seeks to eliminate any misunderstanding by emphasizing that his drowsiness is merely a temporary condition—a brief period of rest in which he remains mindful of his duties in the world. He says:

The woodchuck could say whether it's like his

Long sleep, as I describe its coming on,

Or just some human sleep.

At times, Robert Frost perceives nature as cold and hostile. The cosmic design often appears frightening to him. In a letter to Lincoln MacVeagh, Frost remarks that "something hates us and likes to spoil our fair beginning." He portrays nature as a vast, impersonal force determined to obstruct human progress. This immense and dynamic power can be wildly destructive and annihilating. As Lionel Trilling notes, Frost is not simply a poet who comforts us with affirmations of traditional values and emotions; rather, he instills a sense of fear by revealing the terrifying aspects of the universe. Frost's anxiety about nature's threatening side is vividly captured in his poem 'The Onset'. The paralyzing response of a dazed persona at the sudden sight of an ice storm finds expression in the lines:

I almost stumble looking up and round,

As one who overtaken by the end

Gives up his errand, and lets death descend

Upon him where he is, with nothing done

To evil, no important triumph won,

More than if life had never been begun.

Similarly, "Storm Fear" paints the chilling image of human vulnerability against nature's mighty forces. In "Once by the Pacific," the crashing waves symbolize a violent, approaching apocalypse, warning humanity to brace for inevitable destruction.

The same profound sense of cosmic indifference appears in "Stars," where a lonely traveler is swallowed by the relentless, featureless snow, and in "Desert Places," where the emptiness of the snowy landscape mirrors the void within the human soul. Frost deepens this meditation in "Design," where even the minute, seemingly random encounter between a spider and its prey suggests a grim pattern of destruction at the heart of existence.

Nature's Ambivalence and Human Resilience
Yet Frost's treatment of nature is not wholly pessimistic. He often portrays humanity's resilience—its capacity for endurance, creativity, and moral responsibility—as the counterpoint to nature's indifference. In "Mending Wall," for example, nature's force is depicted as something that "doesn't love a wall," subtly working to dismantle human-made barriers. While the persona jokes about attributing this mischief to elves, he acknowledges a larger, enigmatic force at work—a force not malevolent but indifferent to human divisions and constructs.

The same overwhelming, impersonal power of nature is presented in "Stars," where a solitary traveler loses his way amid icy winds and snow that blankets and erases all signs of life. In "Desert Places," Frost portrays a scene of utter emptiness, describing the snow as "a blind whiteness of benighted snows with no expression, nothing to express." Here, human despair deepens with the realization of the universe's indifference. This bleak sense of void and cosmic meaninglessness also appears in "Design" and "Neither Out Far nor In Deep." Finally, in "Mending Wall," Frost explores the ongoing struggle between humanity and nature, highlighting their unending and inexplicable conflict. When the persona finds the repaired wall repeatedly broken at 'the spring mending time', he says with astounding astonishment:

> **Something there is that doesn't love a wall,**
>
> **That wants it down." I could say "Elves" to him,**
>
> **But it's not elves exactly….**

Frost envisions a deliberate pattern in the universe's design. In his poem "Design," he reflects on the inevitable chain of cause and effect, finding dark and unsettling meanings in the chance encounter of a white heal-all flower, a moth, and an albino spider. Through this imagery, Frost confronts a natural order that seems indifferent to human emotions and appeals. Nature, to him, remains an unfathomable and enigmatic force, difficult to fully understand. In Frost's poetry, there is often a tension between the straightforward reality and the profound mystery that envelops it. This mysterious element emerges when the visible world collides with the invisible. For instance, in "Stopping by Woods on a Snowy Evening," the clear and tangible event is the speaker pausing by the woods, while the surrounding mystery lies in the unseen, deeper significance of the woods themselves. The persona says:

> **My little horse must think it queer**
>
> **To stop without a farmhouse near**
>
> **Between the woods and frozen lake**
>
> **The darkest evening of the year**

The persona is deeply enchanted not only by the outward beauty of nature but also by the profound mystery and complexity that lie beneath its surface. However, despite feeling a strong pull toward the spiritual realm, he remains firmly rooted to the earth and bound by human fears. Whenever he senses himself drifting toward a higher, spiritual experience, he is quickly brought back to the reality of his moral responsibilities and the duties he must fulfill. Though he experiences a brief longing for eternal rest and surrender to nature's alluring call, he restrains himself, remembering that he belongs to the human world, with obligations and a life path he must continue to follow. So, he says:

> **The woods are lovely, dark and deep,**
>
> **But I have promises to keep,**
>
> **And miles to go before I sleep,**
>
> **And miles to go before I sleep**

The theme of nature's dual character is a constant thread in Frost's poetry. Nature can seem either nurturing or hostile, largely depending on the perspective of the observer. However, Frost does not attach any spiritual or mystical meaning to the relationship between man and nature. Instead, he acknowledges the inherent limitations and maintains a clear boundary between the two. Although the universe may be governed by a dark and chaotic design, Frost strives to uncover a sense of order within this apparent disorder. As Reginald Cook aptly notes, Frost neither fully embraces Hardy's vision of a hostile universe nor Emerson's idea of a benevolent one. Frost dismisses the notion of nature as a kindly, divinely ordered system. His vision of nature is shaped by human emotions such as isolation, alienation, and longing. The recurring sense of estrangement, combined with a quiet acceptance, contributes to the unique artistic quality of his work.

In conclusion, Robert Frost redefined nature poetry for the modern age. He abandoned the Romantic idealization of nature and presented a more nuanced, often unsettling vision that reflected the complexities of the twentieth-century worldview. His poems, infused with existential awareness, reveal nature's beauty, terror, and indifference, while affirming humanity's fragile but persistent quest for meaning in a vast, mysterious universe.

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MOTIVATIONS BEHIND STOCK SPLIT AND ITS SEVERAL ASPECTS

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ABSTRACT

Nowadays, the corporate action of stock split is a frequent phenomenon undertaken by many companies in India and abroad. In fact, investors get very excited to hear that the stocks in which they have invested are going to be split. There are many reasons why the management of a company is motivated to do a stock split. Based on the review of many earlier studies, the present study focuses on specifying the motivations behind stock split and its various aspects. The study describes many aspects regarding stock split, such as the aspect of liquidity and optimal trading range, signalling aspect, the aspect of getting more recognition by the neglected firm, the aspect of getting more benefits by organising multiple events just after the stock split, tax-option, and volatility aspect, etc. Before making an investment decision, an investor should analyse these aspects of stock split and the motive of the company behind it.

Keywords: *Stock split, Motivations, Liquidity hypothesis, Signalling hypothesis, Neglected firm hypothesis*

1. INTRODUCTION

U.S. Securities and Exchange Commission defines stock split as "a declaration that has no effect on the value of what shareholders own. When a company declares a stock split, the share price will shrink, but the number of shares will increase proportionately".

Accordingly, a stock split is a decision by the company's board of directors to multiply the number of outstanding shares by dividing them into numerous shares. Although the number of outstanding shares rises by a certain multiple, the total money value of shares stays the same compared to pre-split amounts because the split did not add any book value. By stock split, every stockholder gets additional stock without paying the issuer company (Fama et al., 1969). For example, in a 2-for-1 split, a new share is issued against every share held. This means that if there were 10 lakh outstanding shares before the split, there would now be 20 lakh shares. There has been no increase in the market capitalization of the company. Hence, post-split, the stock price decreases in the reverse split ratio. Split can occur at any ratio. The most usual ratios are 2:1, 3:2, 5:4, 4:3, etc. (Dhar & Chhaochharia, 2008). The number of additional shares issued per old share is called the split factor (Lin et al., 2009). Due to stock splits, investors now have more shares than before. However, the proportion of holding the shares after the split remains the same as before the split, i.e., there is no impact on the ownership interest of the existing shareholders.

Thus, as per earlier studies, a stock split is often argued as a purely cosmetic event or is just like an event of cutting a pie into small pieces that should neither create nor destroy any value. Rather, the process incurs real costs. Indeed, a substantial number of companies continue to do this financial manipulation, and investors get very excited to hear that the stocks in which they have invested are going to be split. It reveals that the investors' behaviour and the companies' actions do not necessarily agree with the concepts of Finance Theory. Instead, it comes under the purview of a new study area called Behavioural Finance, which precisely describes the motivations behind stock splits.

2. REVIEW OF LITERATURE

The survey of Baker and Gallagher (1980) and Baker and Powel (1993) reveal that corporate managers undertake stock split decisions mainly to bring the stock prices into a better trading range and enhance liquidity. Many research studies like Muscarella and Vetsupens(1996), Angel (1997), Mishra(2006), Mohanty and Moon (2007), Das and Gouda (2007), Rajesh (2013), Thirunellai(2014), Mistri (2016), etc., have found the evidence of enhancement in liquidity and marketability of stocks due to the stock split.

Further, some studies such as Desai and Jain(1997), Conroy and Harris (1999), NINI (2001), Ariff, Khan, and Baker (2004), Dhar and Chhaochharia(2008), Chavali and Zahid (2011), Nguyen and Nguyen (2012), Chakrabarti et al. (2017), etc., have found positive market reaction and wealth creation around the stock split announcement and/or effective dates and therefore supported the signaling hypothesis.

Research studies like Conroy, Harris, and Benet (1990), Koski (1998), Wulff(2002), Das and Gouda (2007), etc., have evidenced increment in the volatility of returns surrounding the stock split. Whereas, according to Sen (2018), stock split causes an increment in volatility for cheap stocks but not for costly stocks.

On the other hand, Mistri (2016) has observed an improvement in the financial performance of stock-splitting companies in India. However, Bajaj and Arora (2017) have found no change in financial performance after the stock split.

Moreover, D'Mello, Tawatnuntachai, and Yaman(2003) found stock splits to reveal positive information before the Seasoned Equity Offering (SEO) obtained larger proceeds at the equity offering than other equity issuing firms. Whereas, Guo, Liu, and Song (2008) examined whether some firms use stock split as another tool to manipulate their stock prices before an acquisition to lower the acquisition announcement cost.

Further, studies like Gupta and Gupta (2007) and Choudhary and Choudhary (2009) opined on splitting stocks by the companies with low market prices that they announced stock split just with the aim of getting more recognition in the market.

By reviewing many earlier studies on the stock split, it is observed that there is a mixed finding about different aspects of stock split.

3. OBJECTIVE OF THE STUDY

The main objective of the study is to understand a company's motives for undertaking a stock split and to determine several aspects that an investor should know before making any investment decision regarding the stock-splitting company.

4. METHODOLOGY

The study is fully based on the review of the results and observations of earlier studies relating to the corporate action of stock split. This study attempts to derive the several aspects of stock split based on the thorough review of earlier literatures on this field.

5. FINDINGS OF THE STUDY

It is observed that the management of a company undertakes the decision of stock split mainly to bring the share prices into the optimum price range so that the marketability and liquidity of shares enhance and the ownership base of the company becomes wider. Simultaneously, the main motivation behind the stock split is also to provide positive signals regarding the pronounced performance of the company and its dazzling prospects.

Therefore, it can be said that the management of a company is motivated to do a stock split for many reasons, which may create confusion in the minds of investors. There should be a clear understanding of the different aspects of stock split.

Based on earlier studies, several aspects of stock splits can be discussed as follows:

i. **Optimal price range hypothesis:** There is an optimal price range for securities. Stocks traded in this range are supposed to have less brokerage fees as a percent of the value traded and, therefore, seem to be more liquid. This optimal range is said to represent a compromise between the wants of wealthy investors and institutions that will reduce brokerage costs if securities are high-priced and the desires of small investors who will lessen odd-lot brokerage costs if securities are low-priced. Implicitly, there is a trade-off between diversification benefits and the lower transaction costs of round lot trading (Copeland, 1979). Angel (1997) defined optimal share price as a price that represents a trade-off between the incentives that a lower price creates for intermediaries through commissions and wider spreads and the cost imposed by a lower price through higher bid-ask spreads. The stock split is mainly carried on by a company when its share price rises to a very high level and becomes out of the popular trading range. Stock split leads to a reduction in price and places the share in a more popular trading range.

ii. **Liquidity hypothesis and defused ownership:** Regarding liquidity, management generally announced a stock split to reverse stock illiquidity because of higher stock price than other companies in the same sector. The stock price is high; hence, there are fewer participants due to affordability issues leading to illiquidity. After the split, the stock price reduces to a certain extent, and the number of shares increases based on the split factor. This low price of stock attracts small and wealth-constrained investors and leads to a greater number of transactions. Due to this, the spread between the bid and ask prices of the stock reduces, and for that, the investors who are involved in frequently opening and closing their position in the stock can also be benefitted. In this way, a stock split increases the ownership base of the companies and provides better liquidity and a 'wider' market. An increase in ownership base or defused ownership also helps the management to retain control over the affairs of the companies in its own hands without any interference. Small investors have an insignificant shareholding in the company and cannot exercise much control. A company's management can also use a stock split as a defensive measure against a potential hostile takeover, as it results in a greater number of shares in circulation.

iii. **Signalling hypothesis:** Stock split is often used by the management of a company as a means to provide favourable signals for future prospects and to reduce the information asymmetry between the managers and the shareholders. There is a psychological feeling that the stock is good now as the split is generally announced by the companies that are exceptional performers. The excellent performance is expected to continue post-split, too.

iv. **Neglected firm hypothesis:** It states that a company's shares trade at a discount if there is little information available about it. Thus, firms use the stock split to draw attention to ensure that information about the company is more widely recognized than before.

v. **Multiple event hypothesis:** Firms split their stock to reveal information and then issue stocks after a split, hoping the share price will be higher. Such firms intend to use the positive impact of the higher prices to raise more funds by issuing stock after the split.

vi. **Tax-option hypothesis:** The expression "tax option" merely expresses the notion that the investors have more possible tax alternatives, the more volatile the stock price, ceteris paribus (Lamoureux & Poon, 1987). Constantinides (1984) argued that security volatility is desirable, given the number of the US tax code. In particular, preferential treatment is given to long-term capital gains. Short-term capital losses may be used to counterbalance short-term gains. A security with a price that fluctuates wildly presents its holders with the opportunity to realise losses short terms or gains long term to re-establish short-term status. He argued that investors are willing to pay for a "tax-option" component of security. Thus, securities with higher volatility will have higher values, ceteris paribus.

Thus, from the above-specified aspects it is clear that the motive of stock split is not just to bring liquidity and widening ownership base, but there are several aspects of stock split that an investor should understand before making investment decision for any stock splitting company.

6. CONCLUSION

Companies are motivated to do stock splits for several reasons, as investigated in earlier studies. Those may be to enhance liquidity and ownership base, to bring the share into a better trading range, to minimise the information asymmetry between the management and investors, to provide favourable information regarding the prospect of the company, to get more recognition in the market, to make the share price more volatile, to undertake multiple events after stock split by using its positive impact, etc. There should be a critical and in-depth evaluation of all these aspects of stock splits before making any investment decision so that small and retail investors can go on the right path and save their hard-earned money.

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MOTIVATIONS BEHIND STOCK SPLIT AND ITS SEVERAL ASPECTS

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ABSTRACT
Nowadays, the corporate action of stock split is a frequent phenomenon undertaken by many companies in India and abroad. In fact, investors get very excited to hear that the stocks in which they have invested are going to be split. There are many reasons why the management of a company is motivated to do a stock split. Based on the review of many earlier studies, the present study focuses on specifying the motivations behind stock split and its various aspects. The study describes many aspects regarding stock split, such as the aspect of liquidity and optimal trading range, signalling aspect, the aspect of getting more recognition by the neglected firm, the aspect of getting more benefits by organising multiple events just after the stock split, tax-option, and volatility aspect, etc. Before making an investment decision, an investor should analyse these aspects of stock split and the motive of the company behind it.

Keywords: Stock split, Motivations, Liquidity hypothesis, Signalling hypothesis, Neglected firm hypothesis

1. INTRODUCTION
U.S. Securities and Exchange Commission defines stock split as "a declaration that has no effect on the value of what shareholders own. When a company declares a stock split, the share price will shrink, but the number of shares will increase proportionately".

Accordingly, a stock split is a decision by the company's board of directors to multiply the number of outstanding shares by dividing them into numerous shares. Although the number of outstanding shares rises by a certain multiple, the total money value of shares stays the same compared to pre-split amounts because the split did not add any book value. By stock split, every stockholder gets additional stock without paying the issuer company (Fama et al., 1969). For example, in a 2-for-1 split, a new share is issued against every share held. This means that if there were 10 lakh outstanding shares before the split, there would now be 20 lakh shares. There has been no increase in the market capitalization of the company. Hence, post-split, the stock price decreases in the reverse split ratio. Split can occur at any ratio. The most usual ratios are 2:1, 3:2, 5:4, 4:3, etc. (Dhar & Chhaochharia, 2008). The number of additional shares issued per old share is called the split factor (Lin et al., 2009). Due to stock splits, investors now have more shares than before. However, the proportion of holding the shares after the split remains the same as before the split, i.e., there is no impact on the ownership interest of the existing shareholders.

Thus, as per earlier studies, a stock split is often argued as a purely cosmetic event or is just like an event of cutting a pie into small pieces that should neither create nor destroy any value. Rather, the process incurs real costs. Indeed, a substantial number of companies continue to do this financial manipulation, and investors get very excited to hear that the stocks in which they have invested are going to be split. It reveals that the investors' behaviour and the companies' actions do not necessarily agree with the concepts of Finance Theory. Instead, it comes under the purview of a new study area called Behavioural Finance, which precisely describes the motivations behind stock splits.

2. REVIEW OF LITERATURE
The survey of Baker and Gallagher (1980) and Baker and Powel (1993) reveal that corporate managers undertake stock split decisions mainly to bring the stock prices into a better trading range and enhance liquidity. Many research studies like Muscarella and Vetsupens(1996), Angel (1997), Mishra(2006), Mohanty and Moon (2007), Das and Gouda (2007), Rajesh (2013), Thirunellai(2014), Mistri (2016), etc., have found the evidence of enhancement in liquidity and marketability of stocks due to the stock split.

Further, some studies such as Desai and Jain(1997), Conroy and Harris (1999), NINI (2001), Ariff, Khan, and Baker (2004), Dhar and Chhaochharia(2008), Chavali and Zahid (2011), Nguyen and Nguyen (2012), Chakrabarti et al. (2017), etc., have found positive market reaction and wealth creation around the stock split announcement and/or effective dates and therefore supported the signaling hypothesis.

Research studies like Conroy, Harris, and Benet (1990), Koski (1998), Wulff(2002), Das and Gouda (2007), etc., have evidenced increment in the volatility of returns surrounding the stock split. Whereas, according to Sen (2018), stock split causes an increment in volatility for cheap stocks but not for costly stocks.

On the other hand, Mistri (2016) has observed an improvement in the financial performance of stock-splitting companies in India. However, Bajaj and Arora (2017) have found no change in financial performance after the stock split.

Moreover, D'Mello, Tawatnuntachai, and Yaman(2003) found stock splits to reveal positive information before the Seasoned Equity Offering (SEO) obtained larger proceeds at the equity offering than other equity issuing firms. Whereas, Guo, Liu, and Song (2008) examined whether some firms use stock split as another tool to manipulate their stock prices before an acquisition to lower the acquisition announcement cost.

Further, studies like Gupta and Gupta (2007) and Choudhary and Choudhary (2009) opined on splitting stocks by the companies with low market prices that they announced stock split just with the aim of getting more recognition in the market.

By reviewing many earlier studies on the stock split, it is observed that there is a mixed finding about different aspects of stock split.

3. OBJECTIVE OF THE STUDY
The main objective of the study is to understand a company's motives for undertaking a stock split and to determine several aspects that an investor should know before making any investment decision regarding the stock-splitting company.

4. METHODOLOGY
The study is fully based on the review of the results and observations of earlier studies relating to the corporate action of stock split. This study attempts to derive the several aspects of stock split based on the thorough review of earlier literatures on this field.

5. FINDINGS OF THE STUDY
It is observed that the management of a company undertakes the decision of stock split mainly to bring the share prices into the optimum price range so that the marketability and liquidity of shares enhance and the ownership base of the company becomes wider. Simultaneously, the main motivation behind the stock split is also to provide positive signals regarding the pronounced performance of the company and its dazzling prospects.

Therefore, it can be said that the management of a company is motivated to do a stock split for many reasons, which may create confusion in the minds of investors. There should be a clear understanding of the different aspects of stock split.

Based on earlier studies, several aspects of stock splits can be discussed as follows:

i. **Optimal price range hypothesis:** There is an optimal price range for securities. Stocks traded in this range are supposed to have less brokerage fees as a percent of the value traded and, therefore, seem to be more liquid. This optimal range is said to represent a compromise between the wants of wealthy investors and institutions that will reduce brokerage costs if securities are high-priced and the desires of small investors who will lessen odd-lot brokerage costs if securities are low-priced. Implicitly, there is a trade-off between diversification benefits and the lower transaction costs of round lot trading (Copeland, 1979). Angel (1997) defined optimal share price as a price that represents a trade-off between the incentives that a lower price creates for intermediaries through commissions and wider spreads and the cost imposed by a lower price through higher bid-ask spreads. The stock split is mainly carried on by a company when its share price rises to a very high level and becomes out of the popular trading range. Stock split leads to a reduction in price and places the share in a more popular trading range.

ii. **Liquidity hypothesis and defused ownership:** Regarding liquidity, management generally announced a stock split to reverse stock illiquidity because of higher stock price than other companies in the same sector. The stock price is high; hence, there are fewer participants due to affordability issues leading to illiquidity. After the split, the stock price reduces to a certain extent, and the number of shares increases based on the split factor. This low price of stock attracts small and wealth-constrained investors and leads to a greater number of transactions. Due to this, the spread between the bid and ask prices of the stock reduces, and for that, the investors who are involved in frequently opening and closing their position in the stock can also be benefitted. In this way, a stock split increases the ownership base of the companies and provides better liquidity and a 'wider' market. An increase in ownership base or defused ownership also helps the management to retain control over the affairs of the companies in its own hands without any interference. Small investors have an insignificant shareholding in the company and cannot exercise much control. A company's management can also use a stock split as a defensive measure against a potential hostile takeover, as it results in a greater number of shares in circulation.

iii. **Signalling hypothesis:** Stock split is often used by the management of a company as a means to provide favourable signals for future prospects and to reduce the information asymmetry between the managers and the shareholders. There is a psychological feeling that the stock is good now as the split is generally announced by the companies that are exceptional performers. The excellent performance is expected to continue post-split, too.

iv. **Neglected firm hypothesis:** It states that a company's shares trade at a discount if there is little information available about it. Thus, firms use the stock split to draw attention to ensure that information about the company is more widely recognized than before.

v. **Multiple event hypothesis:** Firms split their stock to reveal information and then issue stocks after a split, hoping the share price will be higher. Such firms intend to use the positive impact of the higher prices to raise more funds by issuing stock after the split.

vi. **Tax-option hypothesis:** The expression "tax option" merely expresses the notion that the investors have more possible tax alternatives, the more volatile the stock price, ceteris paribus (Lamoureux & Poon, 1987). Constantinides (1984) argued that security volatility is desirable, given the number of the US tax code. In particular, preferential treatment is given to long-term capital gains. Short-term capital losses may be used to counterbalance short-term gains. A security with a price that fluctuates wildly presents its holders with the opportunity to realise losses short terms or gains long term to re-establish short-term status. He argued that investors are willing to pay for a "tax-option" component of security. Thus, securities with higher volatility will have higher values, ceteris paribus.

Thus, from the above-specified aspects it is clear that the motive of stock split is not just to bring liquidity and widening ownership base, but there are several aspects of stock split that an investor should understand before making investment decision for any stock splitting company.

6. CONCLUSION

Companies are motivated to do stock splits for several reasons, as investigated in earlier studies. Those may be to enhance liquidity and ownership base, to bring the share into a better trading range, to minimise the information asymmetry between the management and investors, to provide favourable information regarding the prospect of the company, to get more recognition in the market, to make the share price more volatile, to undertake multiple events after stock split by using its positive impact, etc. There should be a critical and in-depth evaluation of all these aspects of stock splits before making any investment decision so that small and retail investors can go on the right path and save their hard-earned money.

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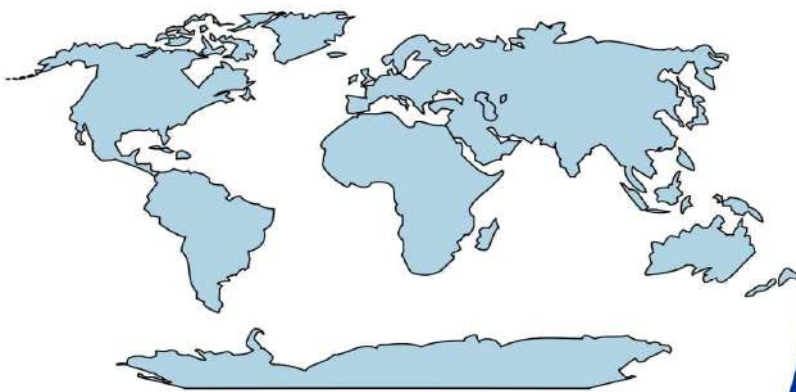
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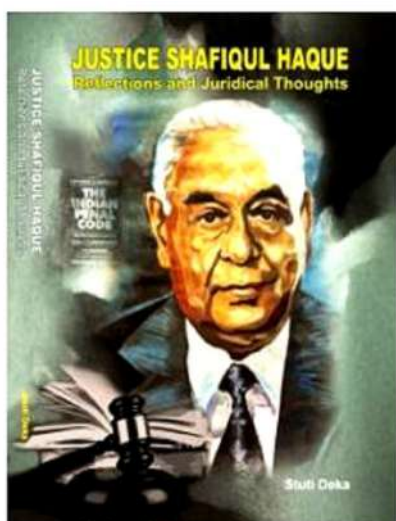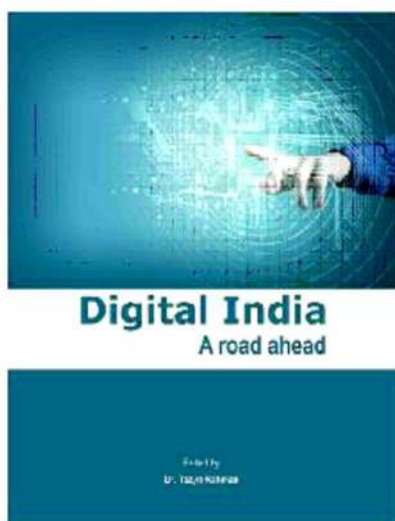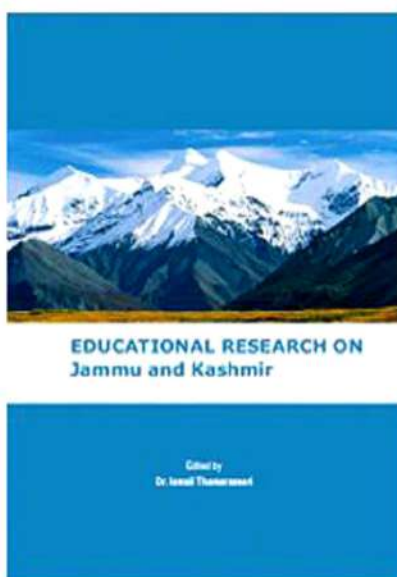
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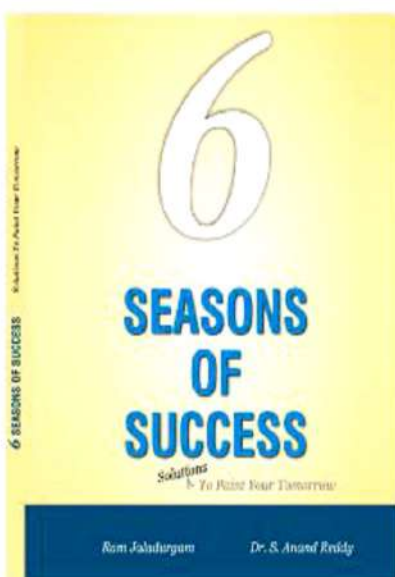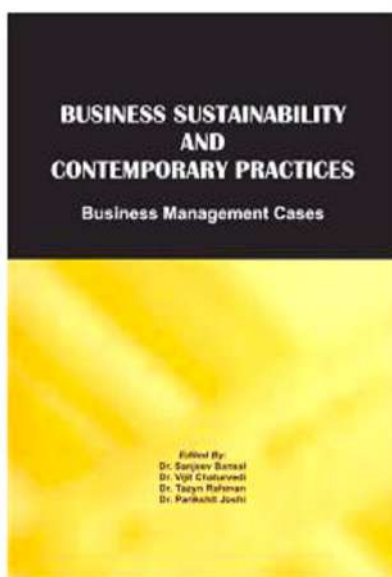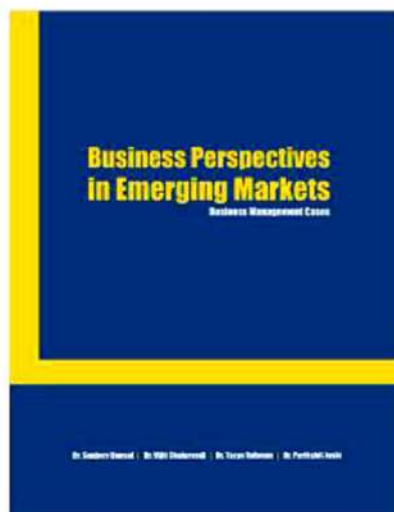
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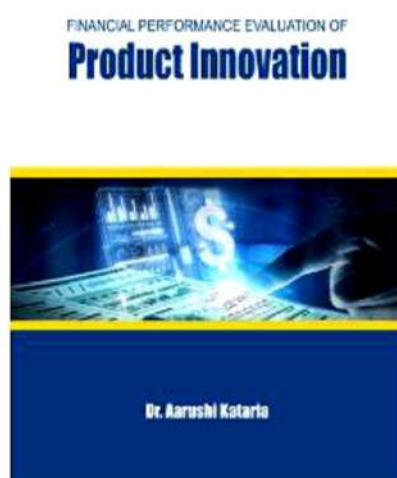
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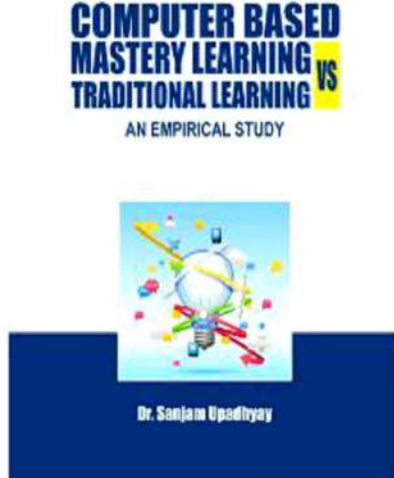
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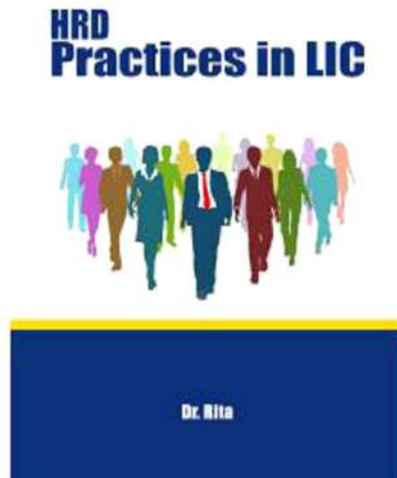
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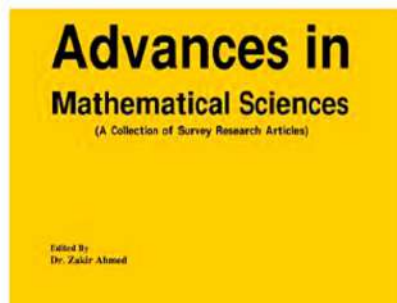
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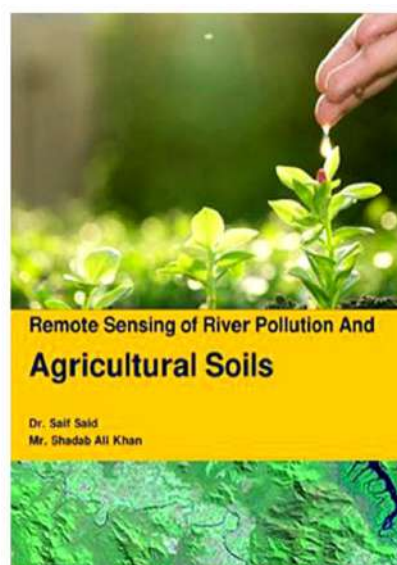
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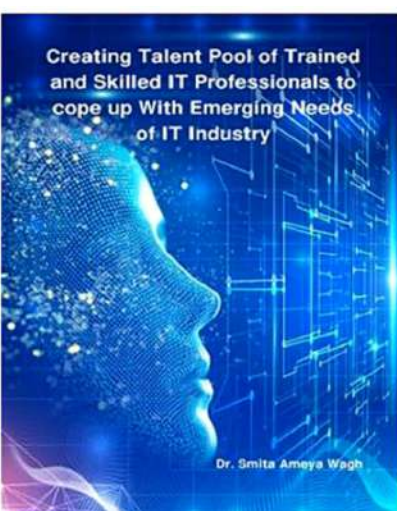
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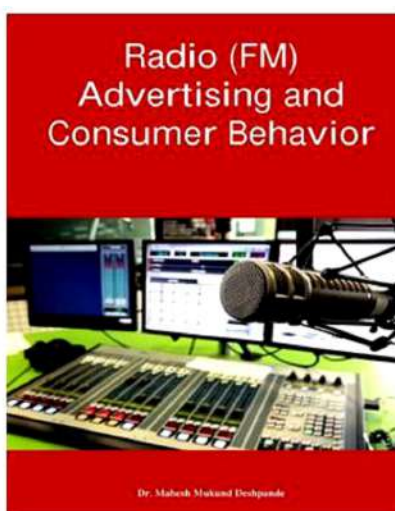
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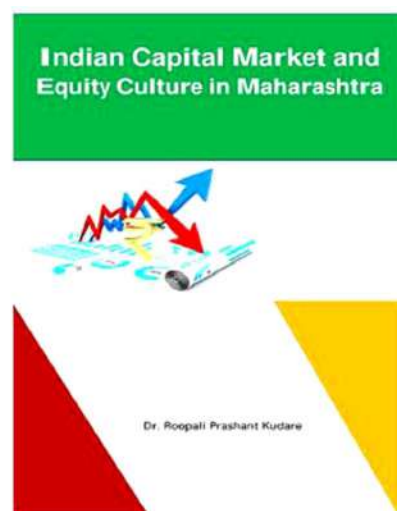
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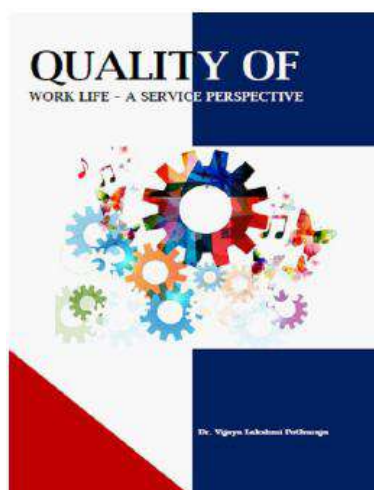
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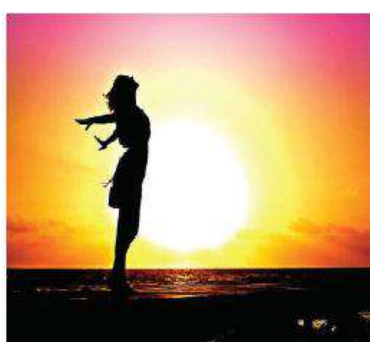
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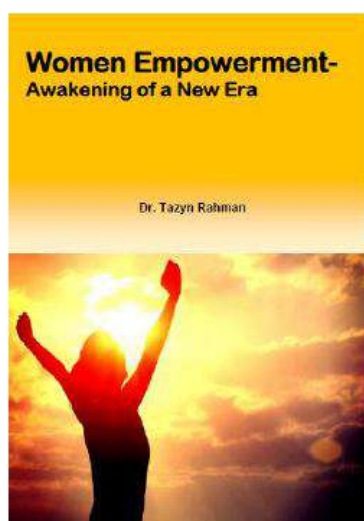
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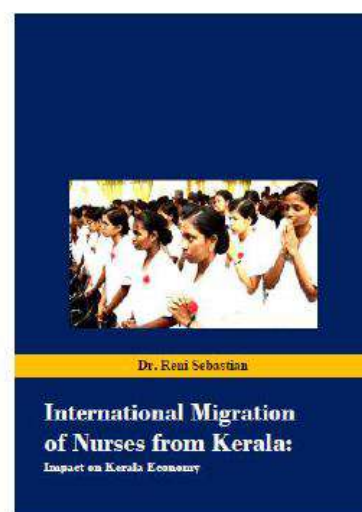
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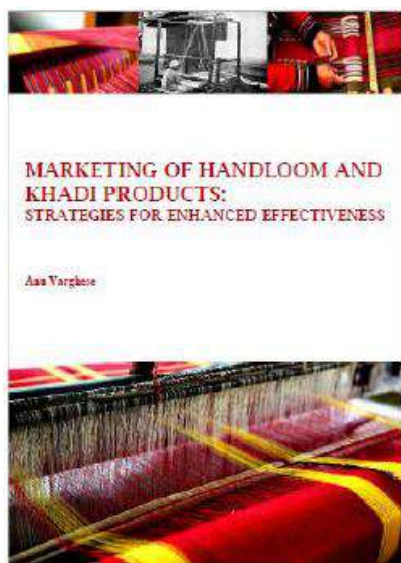Dr. Reni Sebastian
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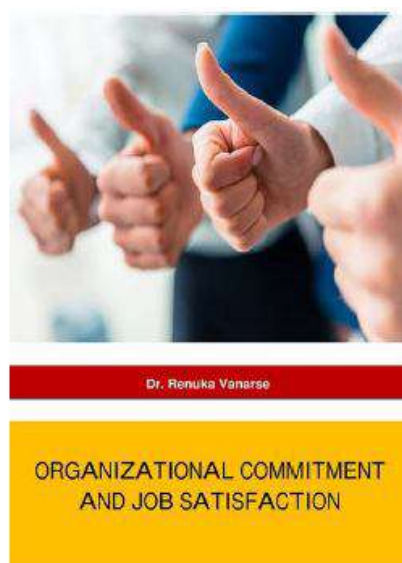ISBN : 978-81-944813-1-7

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