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JHARKHAND
Rai University
UGC RECOGNISED UNIVERSITY
ACCREDITED BY NAAC

INTERNATIONAL CONFERENCE

ON

"VISION 2022-THE WAY FORWARD TOWARDS SUSTAINABLE DEVELOPMENT"

(ICSD-2019)

Organized by

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Special Volume Editor

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About Jharkhand Rai University (JRU)

Jharkhand Rai University (JRU) has been established under "Jharkhand Rai University Act, 2011" by Jharkhand State Legislature as per section 2(f) of UGC Act 1956. JRU is also a member of Association of Indian Universities (AIU), Association of Commonwealth Universities – London and an ISO certified University, (ISO 9001:2015). University aims to create a knowledge pool for the State of Jharkhand by serving the needs of diverse communities. JRU continuously strives to provide quality education to its students through dynamic research, rigorous training and efficient mentorship. The University offers Diplomas, Undergraduate Degrees, Postgraduate Degrees and Doctoral programs in different disciplines. JRU is the only private University in the state of Jharkhand accredited from NAAC.

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About IARA

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About The Conference

ICSD will be held on 1st & 2nd June, 2019 wherein we would be inviting Academicians from different Institutes/ Colleges/ Universities, Industry Professionals, Research Scholars, Students, Entrepreneurs, Government Experts and Bureaucrats to participate in Invited Talks and paper Presentation. Selected abstracts will be published in the Souvenir of the conference and accepted papers will be published in UGC approved Journals. All paper submission will be reviewed by group of peers for assurance of technical merits and quality content.

This conference is sponsored by Govt. bodies, Institutes of technical and international repute & industries. The Conference is the premier interdisciplinary forum for social scientists, life scientists, engineers, and practitioners to present their latest research results, ideas, developments, and applications in all related areas of sustainable development.

- The aim of the Conference is to provide a platform to the researchers and practitioners from both academia as well as industry to share the ideas and research findings relevant to the sustainable development.

- To achieve sustainability in all aspects of the environment in order to overcome and control environmental disasters and to make sure the world in which we live progresses towards sustainable development.

- To explore the transformation potential of new technologies and will address concrete national and international steps required to ensure that innovation & technological change do not leave countries, communities or people behind will lead towards inclusive growth.

Preface

Jharkhand Rai University, Ranchi organized an International Conference on the theme **"Vision-2022- The way forward towards Sustainable Development." (ICSD-2019)** on 1-2 June, 2019. With a focus on the 17 Sustainable Development Goals set by the United Nations to be achieved by the year, 2030, the Conference was designed with great openness and modularity in order to include diverse perspectives providing a platform to researchers to present their experiences and insights.

The Conference attracted academicians from different Universities/Institutions/Colleges, Industry Professionals, Research Scholars, Entrepreneurs, Bureaucrats, Government Officials and over 100 research papers were presented and discussed in different sessions. Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is crucial to harmonize the three core elements- economic growth, social inclusion and environmental protection to achieve sustainable development.

Among topics discussed in the Sessions include Veganism, Green Technology, Cloud computing, Machine Learning, Bionic vision etc. **Veganism** is a way of living which seeks to exclude, as far as is possible and practicable, all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose. There are many ways to embrace *vegan* living. The use of **green technology and renewable energy** is an integral part of the government's agenda. Green technology is intended to mitigate or reverse the effects of human activity on the environment. **Cloud computing** is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. **Machine Learning** is the field of study that gives computers the capability to learn without being explicitly programmed. It is one of the most exciting technologies that one would have ever come across. Machine learning is actively being used today, perhaps in many more places than one would expect. **Bionic vision** through Artificial Intelligence brings hope for the blind in the near future. Further, The Delegates from Industries and Academic Institutions discussed **Smart cities** for the future generations.

A Conference special issue of '**International Journal of Advance and Innovative Research'** will include some of the Research Papers presented and discussed in the Conference. I hope and believe that this special issue will highlight various activities towards achieving the global goals of sustainable Development.

University Management, all my colleagues have put in their best efforts to ensure realization of the potential of the Conference. As Convener, I congratulate and sincerely thank all of them.

In addition, I would like to thank editors of IJAIR for their sparkling efforts and their belief in the excellence of ICSD 2019.

Dr. Shraddha Prasad
Editor- Special Volume
Faculty of Science & Engineering
Jharkhand Rai University, Ranchi, Jharkhand

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Tarkeshwar Paswan

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CONSTRUCTION OF NORMS OF COMBINED MOTOR FITNESS TEST

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ABSTRACT
In sports and physical education, as in life, teachers and coaches are constantly measuring and evaluating. They measure their students, players, associates, opponents, programme, teachings, strategies, coaching, techniques and many other facts of the educational aspects.

Measurement techniques can be applied in both the product and the process. Evaluation occurs when special techniques are used to measure the process of the physical education directly.

A norm is a scale that permits conversion from a raw score to a score capable of comparisons and interpretations. If a test is accompanied by Norms, its utility is enhanced. The students (n =1816) were selected from male (n = 1012) and female (n= 804) hailing from different area of North 24 Parganas of West Bengal to participate in combined Motor Fitness Test whose age ranged between 17 to 21 years.

The purpose of the present study was to find out the performance of the subjects. Norm based on the quantitative data was obtained through the test. The test scores ranged from 12.00 to 31.14 seconds in the case of male subjects while it was 12.20 to 37.69 seconds for the female subjects.

The giving score at 2nd extreme of both ends of the scale for the performance considered as excellent and low and 3rd extreme of both ends taken as good and below average and middle position of score always considered average. The percentile scale was prepared to find out the status of the subject.

Keywords: Performances, Norms, Percentile Scale

INTRODUCTION
Motor Fitness is an individual's proud possession, as it cannot be purchased rather it has to be earned through a daily routine as a set of motor exercises. It is evident that physically fit citizens are an asset and weak individuals are a liability to the nation. It is a responsibility of every nation to promote fitness among its citizens as physical fitness is a basic requirement. In case if the physique is either under developed or stiff and active with lack of in sports and physical education.

Measurement in physical education can be applied for two basic purposes. It may be used to measure status and programme. However, when this same measurement is repeated on the groups several times, the programme or achievement may be noted.

A norm is a scale that permits conversion from a new score to score capable of comparisons and interpretations, if a test is accompanied by norms. The norms are not appropriate and should not be used for interpretative purpose.

STATEMENT OF THE PROBLEM
The study was undertaken for the construction of norms of Combined Motor Fitness Test as formulated by the Teachers working in undergraduate colleges of North 24 Parganas district of West Bengal.

DELIMITATION
The study was confined to the boys and girls of 17-21 years age group. The study was restricted to the following components of Combined Motor Fitness, strength, agility, power, arm, shoulder coordination, hand eye coordination and rapid movement for balancing on beam during movement.

LIMITATIONS
During the course of the study the scholar could not take into account of dietary habits, climatic conditions and environmental factors. The unaccounted factors were considered limitation of the test.

PURPOSE OF THE STUDY
The purpose of the study was to determine the performance of the subjects to construct a norm based on the quantitative data as obtained through the test.

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SIGNIFICANCE OF THE STUDY

The result of the study might be helpful for determining the level of motor fitness of students studying in various Institutions. The obtained result might be helpful for Physical Educators and Coaches for selecting a group of individual for training and competition. The results might be used for comparing groups in respect of motor fitness. Further, the study might help individuals irrespective of sex difference to be fitness aware.

REVIEW OF THE RELATED LITERATURE

Bhatia[1] (2001) constructed norms on selected motor fitness components for ages between 13 to 17 years, studying in school of Greater Gwalior. School children between the ages of 13-17 years were selected as subjects. The test items were selected at subjects. The test items were 50 meter Dash, standing Broad jump, and Sit ups, Stroke Stands for balance and 600 meter Run / Walk. The raw scores were standardized into T-scale, Hull Scale and Percentile Scale.

Singh et. al.[2] (2010) compared the anthropometric measurements and body composition of field hockey teams of India, Pakistan and Sri Lanka. It was found that there were no significant differences in height and weight among the three teams, with the Pakistani players recording a slightly higher weight. The Pakistan team had a significant higher upper arm length ($P< 0.05$) and bi-hammers diameter ($P <0 < 0.05$) as compared to the Sri Lanka and India teams. The teams had significantly less wrist circumference ($P < 0.05$) , hand width ($P < 0.05$) and lean body mass ($P < 0.05$) as compared to the India and Pakistan teams. The Indian team had significantly less percentage body fat than the other two teams. Body composition depends during the season and out of season also to attempt analysis of features specific to field position.

Singh et. Al.[3] (2011) finds out the difference in selected anthropometric variables in volleyball players in different levels of performances. The results revealed that loser players were inferior in block jump and spike jump along with the height and weight. This showed that the team with better height and weight along with good jumping ability had better performance in the tournament.

Karkare (2011) compared the anthropometric measurements and body composition of hockey players with respect to their playing positions. 210 Junior National Hockey players, 70 each from half line, back line and forward line were selected from di8fferent states of India. The significant difference statistical method one way Ankova was performed. The Hockey players playing in different positions found to be different on some anthropometric measurements and body composition.

METHODOLOGY

The selection of subject orientation measures procedure for administering tests, collection of data reliability of the instrument and statistical model used for analysis of data were described.

SELECTION OF SUBJECTS

One thousand eight hundred sixteen (n= 1816) students were selected from male (n= 1012) and female (n=804) candidates belonging to different areas of North 24 Parganas district of West Bengal. Only those students had been considered under this study who could perform the task assigned to them at Netaji Satabarshiki Mahavidyalaya, Haripur, North 24 Parganas district of West Bengal.

CRITERION MEASURES

The criterion measures combined motor fitness means –

- Moving balancing beam as fast as possible
- Dodging past the eight flags indicating the agility
- Jumping over the hurdles (on both legs) indicating the leg strength
- Passing underneath the hurdles indicating agility as well as co-ordination
- Running at brisk pace indicating speed of the subject
- The time elapsed to complete measured as test score.

TEST ADMINISTRATION

The objective of the Combined Motor Fitness test is to ascertain the motor fitness of the subjects. Reliability and validity of the test has been measured in the following way: 66 students were chosen randomly and were asked to go through Indiana Motor Fitness test as well as Combined Motor Fitness test and a high relativeness of 0.70 was obtained.

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Reliability of the test was established by correlating the test scores with the Indiana Motor Fitness test and it was found to be high (0.70). The test was formulated by the teacher working in an undergraduate College of West Bengal where Physical Education subject is a general discipline.

Equipment used for this study includes Table, balancing beam, hurdles, stopwatch, signal flag and measuring tape.

The performer was instructed to stand on the balancing beam (width 10 cm and depth 15 cm) with the height of 90 cm for males and 75 cm for females. On the signal the performer started moving fast on the balancing beam and dodged passed eight flags (height 150 cm) and at a distance of 1.43 meters. The first flag was set at a distance of 4 meters from beam.

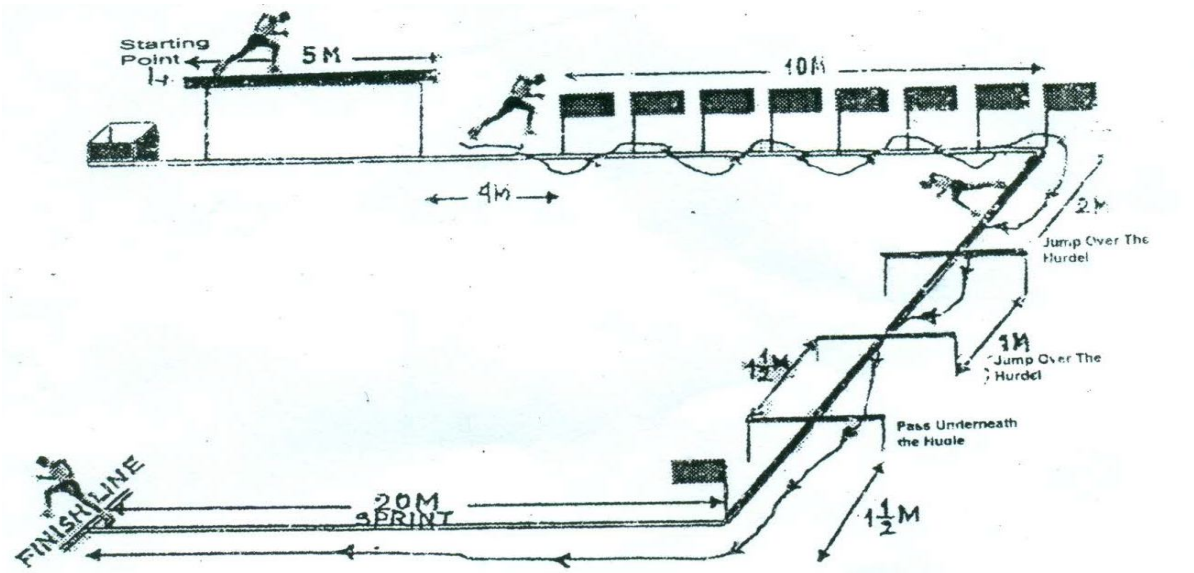

DIAGRAM NO - 1

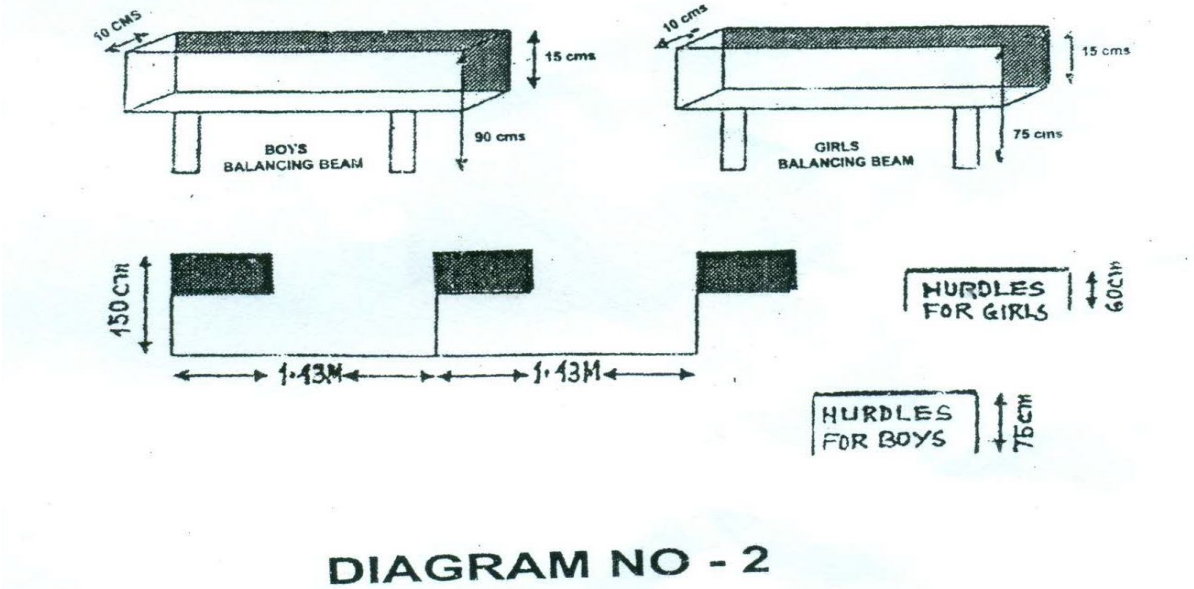

DIAGRAM NO - 2

DIAGRAM OF COMBINED MOTOR FITNESS TEST

Double leg jump over each of the two hurdles for candidates of height 75 cm for men and 60 cm for women. Third hurdles height was same and 1.5 meters distance and turning to the right, sprinted distance of 20 meters was set.

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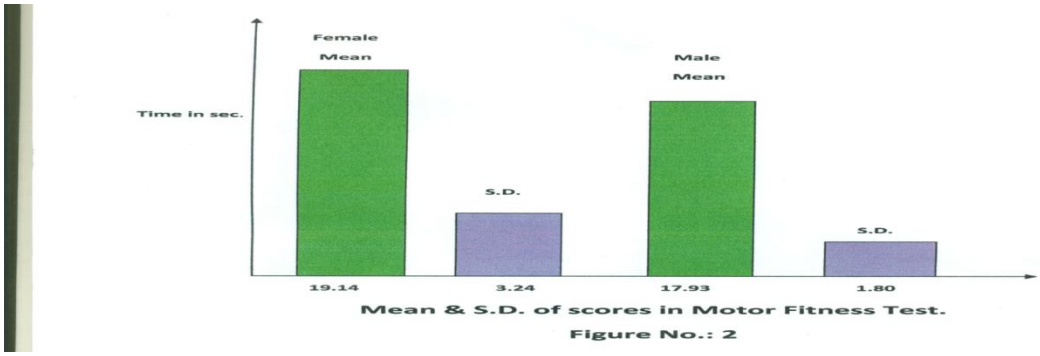

Mean & S.D. of scores in Motor Fitness Test.
Figure No.: 2


Subject performing Chin up of Indiana Motor Fitness Test: Figure 3


Subject performing Chin up of Indiana Motor Fitness Test: Figure 4


Subject performing Push up of Indiana Motor Fitness Test: Figure 5

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Subject performing Broad Jump of Indiana Motor Fitness Test: Figure 6

Measurement Taking during Standing Broad Jump: Figure 7

ADDITIONAL MEASURES TAKEN

The additional measures are warming up, motivation to give their best and to be attentive.

RELIABILITY OF THE DATA

The data were collected by more than two experts and the reliability of the data established by the split half method.

RELIABILITY OF INSTRUMENTS

The reliability of instruments had been considered based on the reputation, acceptability and standard of the company manufacturing the instruments used in this study. Thus balancing beam, stopwatch and measuring tape used in the study were manufactured by a reputed concern following standard products. All the instruments used were available at the Netaji Satabarshiki Mahavidyalaya, Haripur.

COMPETENCY OF THE TESTERS

Competency of the testers is the investigator himself with the help of his Ph.D scholars of various Institutions of West Bengal. They conducted the test and collected the data. They had been also engaged in their profession for years together. Thus they were regarded as competent enough for the purpose of the present study.

STATISTICAL PROCEDURE: ANALYSIS OF DATA AND RESULTS OF THE STUDY

The obtained data were processed and percentile scores were calculated for preparing the norms. On the basis of the percentile scores 7-Point Scale was prepared to categorize the performances of the subjects on motor fitness test as the find out, male motor fitness, their mean, Standard Deviation, female motor fitness, their mean and standard deviation. The obtained data were presented in the following table:

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Variable	**Scores**			
Motor Fitness	***Male***		***Female***	
	Mean	***SD***	***Mean***	***SD***
	17.93	1.80	19.14	3.24

The percentile scores were calculated and on the basis of those norms for males and females were prepared which is applicable to those seeking Physical Education Examination at the BA (undergraduate course) , Ist , 2nd and 3rd year General only. On the basis of the norms the performances were categorized in a 7-Point scale – superlative, excellent, good, average, below average, low and worst performance.

NORMS CATEGORIZED ON 7-POINT SCALE FOR MALE and FEMALES with PERCENTILE SCORES:

Category	Superlative	Excellent	Good	Average	Below Average	Low	Worse
Male	Less than 14.69	14.70-15.12	15.13-15.49	15.50-16.01	16.02-16.66	16.67-17.75	17.76 +
Female	Less than 15.70	15.71-17.00	17.01-17.95	17.96-19.65	19.66-20.95	20.96- 21.95	21.96 +

The norms for motor fitness test on combined motor fitness test were constructed in terms of percentile scores. The test scores ranged from 12.00 to 31.14 seconds for male subjects while it was 12.20 to 37.69 seconds in regard to female subjects.

Such a scale was prepared due to the limited range of performance as subjects were categorized in the two parts- namely Male and Female. That happened because of the nature of the test. The giving score at 2nd extreme of both ends of the scale for the performance were excellent and low and 3rd extreme of both ends were good and below average and middle position of scores were always average.

Keeping the drawbacks of the percentile, it was thought appropriate to categorize subjects into 7 categories like superlative, excellent, good, average, below average, low and worst performance.

Keeping the educational reforms in mind, there is a trend to award grades rather than the score in order to reduce stress and anxiety among the performer. Thus grading under normal distribution yielded a suitable scale.

NORMS (MALE)

	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec
	1.13.11	11.14.13	21. 14.70	31.15.26	41.15.81	51. 16.45	61.17.20	71.18.03	81.19.05	91.20.50
	2.13.21	12. 14.19	22. 14.76	32.15.32	42.15.86	52.16.52	62.17.28	72.18.12	82.19.16	92.20.70
	3.13.32	1314.24	23.14.82	33.15.37	43.15.92	53.16.59	63.17.37	73.18.22	83.19.30	93.20.90
	4.13.42	14. 14.30	24.14.87	34.15.43	4415.97	54.16.67	6417.45	74.18.32	84.19.43	94.21.11
	5.13.53	1514.36	25.14.93	35.15.48	45.16.03	55.16.74	65.17.53	75.18.43	85.19.56	95.20.40
	6.13.63	1614.41	26.14.99	36.15.54	4616.08	56.16.82	66.17.61	76.18.53	86.19.70	96.21.70
	7.13.74	1714.47	27.15.04	37.15.59	47.16.15	57.16.89	67.17.70	77.18.63	87.19.83	97.22.00
	8.13.84	18. 14.53	28.15.10	38.15.65	48.16.22	58.16.97	68.17.78	78.18.74	88.19.96	98.22.94
	9.13.95	19.14.59	29. 15.16	39.15.70	49.16.30	59.17.04	69.17.86	79.18.84	89.20.09	99.24.78
	10.14.05	20.14.64	30.15.21	40.15.75	50.16.37	60.17.12	70.17.95	80.18.94	90. 20.30	100.30.10

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NORMS (Female)

Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec	Per Sec
1.14.18	1.16.16	2.17.29	3.18.23	4.19.00	5.19.93	6.20.91	7.21.71	8.22.81	9.24.63
2.14.50	1.16.28	2.17.39	3.18.31	4.19.08	5.20.03	6.21.00	7.21.79	8.22.96	9.24.86
3.14.82	1.16.40	2.17.49	3.18.39	4.19.17	5.20.12	6.21.10	7.21.86	8.23.11	9.25.09
4.15.12	1.16.51	2.17.59	3.18.46	4.19.26	5.20.22	6.21.18	7.21.94	8.23.28	9.25.65
5.15.27	1.16.63	2.17.68	3.18.54	4.19.36	5.20.32	6.21.26	7.22.01	8.23.46	9.26.22
6.15.47	1.16.75	2.17.78	3.18.62	4.19.45	5.20.42	6.21.33	7.22.10	8.23.63	9.26.76
7.15.58	1.16.86	2.17.88	3.18.69	4.19.55	5.20.52	6.21.41	7.22.23	8.23.81	9.27.34
8.15.73	1.16.98	2.17.98	3.18.77	4.19.65	5.20.62	6.21.48	7.22.37	8.23.98	9.28.41
9.15.88	1.17.10	2.18.08	3.18.85	4.19.74	5.20.71	6.21.56	7.22.52	8.24.17	9.30.58
10.16.03	1.17.19	3.18.16	4.18.92	5.19.84	6.20.81	7.21.63	8.22.67	9.24.40	10.37.10

CONCLUSIONS

1. Range of performance time on the motor fitness test in regard to male subject was 12.00 seconds to 31.14 seconds and with regard to female it ranged from 12.20 seconds to 37.69 seconds.
2. Calculated the Mean and Standard Deviation of the scores of Male and Female respectively.
3. The Percentile scale was prepared to find out the status of the subject.
4. Due to some drawbacks in percentile score , the performance were categorized in a 7-Point Scale , i.e.

Category	Superlative	Excellent	Good	Average	Below Average	Low	Worse
Percentile Score	76+	66-75	56-65	46-55	36-45	26-35	25 and less

REFERENCES

1. Barrow, Harold.M, “Man and Movement: Principle of Physical Education”. (Philadelphia: Lea and Febiger, 1983)
2. Barrow, Harold.M, and MC.Gee.Rosemary, “Practical Measurement in Physical Education and Sports”. (Philadelphia: Lea and Febiger, 1983)
3. Debnath, Manika, “Construction of Norms for Specific Physical Fitness of Females Gymnastics at Various Levels”, Proceedings of National Seminar of application of Statistics and Computers in Physical Education and Sports; LNIPE; Deemed University, Gwalior; March 2005.
4. Singh. J, “Norms Profile of Specific Skills of Male Indian Handball Players” in Proceedings of The International Congress on Sports Medicine; Exercise Science, Physical Education and Yogic Science, LNIPE, Deemed University, Gwalior, February 12-15, 2008.
5. Chaniyara N.J., “ Constructions of Norms of Physical Fitness Test for the admission in Certificate Course of Physical Education for women in Gujrat State “, in Proceedings of the International Congress on Sports Medicine; Exercise Science, Physical Education and Yogic Science, LNIPE, Deemed University, Gwalior, February 12-15,2008.
6. Verma.J.P ,” A Statistical Approach for Developing weighted Norm based and Difficulty Rating on Selected Fitness Parameters for Boys in the age group 13-16 years” in Proceedings of the International Congress on Sports Medicine; Exercise Science, Physical Education and Yogic Science, LNIPE, Deemed University, Gwalior, February 12-15,2008.

ISSN 2394 - 7780

7. Madhuri Waghchaine M.S," Development of Norms for Selection of Women Volleyball Players of Pune University, Pune" in Proceedings of the International Congress on Sports Medicine; Exercise Science, Physical Education and Yogic Science, LNIPE, Deemed University, Gwalior, February 12-15,2008.
8. Canadian Commission for UNESCO," International Charter of Physical Education and Sports". (Paris Canadian Commission for UNESCO; 1979)
9. Merjorie Phillips and Dean Summers," Bowing, Norms and Learning Curve for College Women" ; Research Quarterly 21, No.4 (December 1950)
10. Johnson, Berry L. and Nelson Jack.K, " Practical Measurement for Evaluation in Physical Education" , (Delhi, Surjeet Publishers, 1982)

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AN EMPIRICAL STUDY ON VEBLENIAN FACTORS AND LOW-INCOME CONSUMER BEHAVIOUR: SPECIAL REFERENCE TO KHURDA DISTRICT, ODISHA

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ABSTRACT
Consumer behaviour is a component of the economic behaviour, which in its turn is a manifestation of human behaviour. As a consequence of the social and economic development of modern societies, the study of consumer behaviour has undergone a strong development process, during the past years. However scientists concern with the study of consumer behaviour covers a time span of many decades. Due to the multiple interdependences and parameters emerged from the coalescence among consumer behaviour, economic and human behaviour in general, there have been several approaches related to consumer behaviour concretized in fundamental theories and models. The Veblenian social-psychological model or the Freudian psychoanalytical model is one among them. This present study focuses on to investigate the motivational factors from Veblenian factors and to find out the factors those are influencing the behavior of consumers while making a purchase decision. Chi-Square analysis and Factor Analysis are taken for the study. This empirical paper describes the findings from a survey of 200 consumers in Odisha, India.

Keywords: Consumer, Behavior, Veblenian, Factors

INTRODUCTION
Thrust on rural development since 1950 eventually made India into an attractive rural market (Ali et al., 2012). Increased awareness along with rise in income levels influenced the rural marketing environment in the country (Velayudhan, 2002). Other factors that contributed to the growth of rural markets are access of media, rising aspiration of rural people and good packaging of products (Bijapurkar, Rama, 2000; Kotler et al., 2009). Rural market is not all about low price point and PR building. With penetration of TV advertisement and other informative media, the awareness level of rural people is increasing gradually. The urban markets got saturated with products and brands which forced marketers to turn towards rural markets (Nain and Kumar, 2009). According to Mckinsey survey 2007, rural India, with population of 627 million would become larger than the total population of consumer markets in countries like South Korea or Canada in coming 20 years. Many experts and organizations have differing views on what constitutes the term, 'rural'. Collins Cobuild Dictionary (2001) describes the word 'rural' as 'place far away from towns and cities'. According to Velayudhan (2002), rural marketing includes all those activities of assessing, stimulating and converting the rural purchasing power into an effective demand for specific products and with the aim of raising the standard of living. Rural marketing is any marketing activity in which one dominant participant is from rural area (Kotler, et al., 2009).

LITERATURE REVIEW
Veblenian socio–psychological model
In reality, the personality variables are governed by the social and cultural norms which the society has and in which consumer is living. Therefore social influences exert great pressure to mould and direct individual behaviour.

Thorstein Veblen saw man as primarily a social animal conforming to the general forms and norms of his larger culture and to the more specific standards of the sub cultures and face to face group to which his life is bound. His wants and behaviour are largely moulded by his present group memberships and the group memberships to which he aspires. The basic theme is that man's attitudes and behaviour are influenced by several levels of society, culture, subculture, social classes, reference groups, face to face groups and family. The challenge to the marketer is to determine which of these social levels is most important in influencing the demand for his product.

(i) Reference groups: The key concept is that the reference group or social body with which an individual identifies himself and whose standards of behaviour he/she accepts and adheres to, exerts a significant influence on the individual behaviour. Most people have several reference groups like family, friends and church. Civic groups are groups in which the individual has no membership but with which he wants to identify himself. These reference groups may serve as points of comparison and as sources of information for a person. Consumers may change their behaviour to be more in time with the action and beliefs of group members.

(ii) Culture: This concept includes a set of learned beliefs, values, attitudes, habits and forms of behaviour that are shared by society and are transmitted from generation to generation within that society. Each society

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develops a union culture or learned way of life, which it hands down to future generations. Culture is maintained by society's transmission of customs followed and moves through the process of accumulation and socialization. These processes are similar to those employed by small groups in ensuring normative behaviour of members, how we act towards others, what is important to us, what we wear, eat and otherwise buy and consumers are greatly influenced by our culture.

Since culture greatly affects buyer behaviour pattern, it is of obvious importance to marketers. If the behaviour pattern of cultures is stable and unchanging, the net effect for marketers will also be stable. However, the behaviour of culture tends to be dynamic rather than static, especially in fast pace modern societies. In addition, the marketer's job is made more difficult because numerous sub-culture and contra cultures are part of most modern societies.

(iii) Sub-culture: Sub-Culture is a distinct cultural group existing within a larger culture. The members of a sub-culture tend to adhere to many of the cultural moves of overall society, yet they also profess beliefs, values and customs which set them apart. An understanding of sub-culture is important to marketing managers because the members of each sub culture tend to show different purchases behaviour pattern.

(iv) Social class: One important social group is social class. Every society stratifies its members into social classes according to their values to the society. The members of social class share common values and ways of thinking, speaking and behaving. Their influence on the individual is often so broad and subtle that he is hardly aware of it. Yet social class has much to do with his behaviour as to show where he fits into society and the way he feels about them all reflect the influence of his social class characteristics and how they influence consumer behaviour. Armed with this knowledge, the marketer can create marketing mixes designed to appeal to social classes differences.

(v) Family: The family influences affect individual's personality characteristics. As a primary group the family is perhaps the ultimate face to face interaction and from the individual consumer's point of view, it differs from larger Reference groups, in that family members must satisfy their unique and joint consumption needs from a common and relatively fixed amount of financial resources. Then, the family influences individual personality characteristics, attitudes and values as well as the decision processes utilised in the purchase of goods and services. Family structure or behaviour of nuclear family members at each stage in the decision making process is of fundamental importance to marketers.

One person in the family acts as a family purchasing agent. But the purchasing agent is not necessarily the family decision maker. Decisions on what to buy often result from complex social interactions among several family members. The shops for the children and home, for more experience items both wife and husband are involved in the buying decision. The roles may vary considerably depending on the type of purchases. Although each family behaves differently, marketers can learn how families typically decide and shop for different products, so that they can tailor their marketing to fit the general pattern. Thus, the model views consumer as a social man trying to adopt the social norms and culture. Therefore, marketers may aim at understanding these social phenomena as it would make their marketing strategy more logically meaningful.

OBJECTIVE

To investigate the motivational factors from V.B. factors those are influencing the behavior of consumers while making a purchase decision.

METHODOLOGY

Convenience sampling and multi-stage stratified disproportionate random sampling techniques are adopted in sample selection. Accordingly Khurda district was selected as the sample district. The total sample consists of 200 families. Chi-square analysis, factor analysis were taken as tools for data analysis.

EMPIRICAL ANALYSIS OF THE DATA

The actual survey with regard to the opinions derived from the respondent families' membering 200 respondents from Khurda district of Odisha. The opinions elicited from them through the execution of a questionnaire with a set of close ended questions that are targeted at respondents to get answers and opinions with regard to their cultural, sub-cultural, social and economic behaviour in their purchases of both durable and non-durable products and services.

OCCUPATION AND REFERENCE GROUP

H_0: There is no association between occupation and influencing reference group while making a purchase decision.

H_1: There is association between occupation and influencing reference group while making a purchase decision.

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Table-1: Distribution of respondents according to their occupation and reference groups

Sl. No.			No. of respondents influenced by					
	Occupation	**No of respondents**	**Family**	**Friends**	**Coworkers**	**Religious groups**	**Trade union**	**Others**
1	Govt. Employee	40	8	9	8	6	5	4
2	Private Employee	42	11	10	7	5	6	3
3	Farmers	58	25	14	10	3	6	0
4	Business	32	6	9	8	2	5	2
5	Professionals	20	4	4	6	2	3	1
6	Others	8	3	0	0	0	0	5
	Total	200	57	46	39	18	25	15

Source: Field Data

($\chi^2 = 83.443$, p = 0.000)

Table 1 clearly reveals that there is association between occupation and influencing reference group while making a purchase decision. The probability of the chi-square test statistic (chi-square=83.443) was p=0.000, less than the 0.05. Therefore null hypothesis is rejected with 95% confidence level and conclude that is association between occupation and influencing group.

It is clear that out of 200 respondents, 57 respondents said that the 'family' was the first influencer as a reference group. Around 46 respondents indicated 'friends', 39 respondents 'coworkers', 15 respondents cited 'others', 18 respondents 'religious groups' and 25 respondents 'trade union' as the influencers while making a purchase decision.

Income and Cultural Factors

H_0: There is no association between income per year and cultural factors while making a purchase decision.

H_1: There is association between income per year and cultural factors while making a purchase decision.

Table-2: Distribution of respondents as per their income per year and cultural factors

Sl. No.			No. of respondents influenced by			
	Income per annum	**No of respondents**	**Values**	**Beliefs**	**Customs and Practices**	**Others**
1	0 – Rs 15000	46	13	24	7	2
2	Rs 15000 – Rs 30000	46	18	13	15	0
3	Rs 30000 – Rs 45000	46	12	12	21	1
4	Rs 45000 – Rs 60000	42	13	13	13	3
5	Over Rs 60000	20	6	3	7	4
	Total	200	62	65	63	10

Source: Field Data

($\chi^2 = 15.718$, p = 0.204)

Table 2 clearly reveals that there is no association between income per year and cultural factors while making a purchase decision. The probability of the chi-square test statistic (chi-square=15.718) was p=0.204, more than 0.05 and thus the null hypothesis is accepted.

It may be drawn from the above analysis, out of 200 respondents, majority of it i.e., 65 respondents gave first priority to 'beliefs', 63 respondents to 'customs and practices', 62 respondents to 'values', and 10 respondents to 'others'.

Education and Sub-Cultural Factors

H_0: There is no association between education level and sub-cultural factors while making a purchase decision

H_1: There is association between education level and sub-cultural factors while making a purchase decision

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Table-3: Distribution of respondents according to their education and influencing sub cultural factors while making a purchase decision

Sl. No.			No. of respondents influenced by			
	Education	No of respondents	Religious	Geographical	National	Others
1	Illiterate	34	13	17	3	1
2	10^{th}	38	11	11	11	5
3	12^{th}	33	14	6	13	0
4	Graduate	34	16	15	3	0
5	Post Graduate	28	2	25	0	1
6	Diploma	33	26	2	5	0
	Total	200	82	76	35	7

Source: Field Data

(χ^2 = 21.694, p = 0.116)

Since, the calculated value is greater than the critical value, it is found that there is no significant association between the two variables. Table 3 clearly reveals that there is no association between education level and sub-cultural factors while making a purchase decision. The probability of the chi-square test statistic (chi-square=21.694) was p=0.116, more than 0.05 and thus null hypothesis is accepted.

It is learnt irrespective of their education level that most of the respondents, i.e., 82 respondents to 'religious factors', 7 respondents to 'others', 76 respondents to 'geographical factors' and lastly 35 respondents to 'national factors'. 38 respondents have 10^{th} degree. Only 28 respondents out of 200 are post graduate holders.

Family Consumption Expenditure And Influencing Family Member Factors

H_0: There is no association between family consumption expenditure and their influencing family members during the purchase decision.

H_1: There is association between family consumption expenditure and their influencing family members during the purchase decision.

Table-4: Distribution of respondents according to the family consumption expenditure and influencing family member while making a purchase decision

Sl. No.			No. of respondents influenced by					
	Family consumption expenditure per year	No of respondents	Father	Mother	Both	Children	Others	All
1	Below Rs 15000	40	8	9	11	8	1	3
2	Rs 15000 – Rs 30000	54	6	10	22	6	0	10
3	Rs 30000 – Rs 45000	56	11	12	10	10	7	6
4	Rs 45000 – Rs 60000	50	10	10	10	8	2	10
	Total	200	35	41	53	32	10	29

Source: Field Data

(χ^2 = 13.649, p = 0.552)

Table 4 clearly reveals that there is no association between family consumption expenditure and their influencing family members during the purchase decision, and hence, the null hypothesis is accepted).

It is learnt that, majority of the respondents cited 'both' as their family's' influencing factor, 53 respondents cited 'mother', 35 respondents cited 'father', 29 respondents 'all', and 32 respondents each mentioned 'children' and 10 respondents as 'others' as their reference groups.

Age and Social Class Factors

H_0: There is no association between age and influencing social class factors while making a purchase decision.

H_1: There is association between age and influencing social class factors while making a purchase decision.

Table-5: Distribution of respondents as per their age and influencing social class factors while making a purchase decision

Sl. No.			No. of respondents influenced by				
	Age	No of respondents	Income	Occupation	Education	Networth	Others
1	15-30	46	13	12	11	9	1
2	30-45	64	14	15	14	11	10
3	45-60	54	10	11	11	12	10

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4	60-75	26	6	6	6	6	2
5	>75	10	3	3	2	2	0
	Total	200	46	47	44	40	23

Source: Field Data

(χ^2 = 20.184, p = 0.212)

There is no association between age and their influencing social class factors during the purchase decision, and hence, the hypothesis is accepted as p value of 0.212 is more than 0.05.

On the overall observation it can be concluded that most of the respondents, i.e. 47 out of 200 are influenced by 'occupation' factor followed by 'income' and 'education' with 46 and 44 respondents. 40 respondents chose network and surprisingly 23 respondents chose others as influencing factor.

Table-6: Veblenian socio-cultural factors and their association while making a purchase decision

Sl. No.	Veblenian Factors	Initial	Extraction
1	Referencegroup	1.000	.908
2	Cultural	1.000	.813
3	Subcultural	1.000	.737
4	Socialclass	1.000	.870
5	Influencingfamilymembers	1.000	.900
	Extraction Method: Principal Component Analysis.		

Sources: Field data

The five Veblenian socio-cultural factors include 'reference group', 'cultural factors', 'sub-cultural factors', 'social class', and 'influencing family members' with high communalities of 0.908, 0.813, 0.737, 0.870, and 0.900 respectively. This indicates that the factors have high degree of association among themselves. It may be concluded that the consumers who were influenced by any of these factors were also influenced more or less by the remaining factors.

Table-7: Veblenian socio-cultural factors and their relative importance in the purchase decision

Sl. No.	Veblenian factors	Initial Eigenvalues		
		Total	% of Variance	Cumulative %
1	Income Level	1.950	32.507	32.507
2	Reference Group	1.169	19.476	51.983
3	Influencing Family Members	1.030	17.167	69.150
4	Social Class	.994	16.568	85.718
5	Cultural Factors	.717	11.956	97.674
6	Sub-Cultural Factors	.140	2.326	100.000

Sources: Field data

From Table 7, it is clear that 'income level' has high relative importance of 32.507% variance out of 6 variables of the underlying factors. It is the most influencing factor while making a purchase decision, followed by reference group, influencing family members, social class, cultural factors and sub-cultural factors with 19.476%, 17.167%, 16.568%, 11.956% and 2.326% of variances respectively.

FINDINGS AND SUGGESTIONS

1. Association between reference groups and occupational categories of sample buyers

Finding

There is variation in the influencing reference groups of Government employees, private employees and agricultural laborers when compared to that of cultivators, business people, and others. The reason is that the cultivators, business people and others have got more interaction with the society when compared to other occupations. It is clear that the 'family' (42.35%), 'co-workers' (19.21%), 'friends' (14.50%), and 'others' (10.58%) were the main influencing reference groups among various occupational categories during their purchase decision.

Reason

Low-income consumers of scheduled castes take into account the suggestions of 'family members', 'upper castes people', 'co-workers', 'friends' and 'others' as mentioned in the table.

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Suggestion
While producing and selling the goods and services the producers and marketers should consider the nature and views of 'families', their 'co-workers', 'friends' and 'others' in the society, since they act as reference groups of consumers for lower level income consumers while making a purchasing decision.

2. Association between the respondents' income and their influencing cultural factors while purchasing goods and services

Finding
The order of influencing cultural factors were: 'beliefs' (32.5%), 'customs and practices' (31.5%), 'values' (31%) and 'others' (5%), consecutively. That means, according to the income level of the families their cultural factor is also changing.

Reason
Low-income people believe in the sayings of their elders and traditional beliefs like wearing new dress and purchasing new goods during traditional festivals and other ceremonies etc,

Suggestion
It is suggested that the marketers and producers should consider the 'beliefs', 'customs and practices' and 'other factors' of all income groups in marketing their goods and services to the rural people.

3. Educational distribution of respondents according to their influencing sub-cultural factors while making a purchase decision

Finding
It is clear that most of the respondents gave maximum priority to 'religious factors' (41%), 'geographical factors' (38%) followed by 'national factors' (17.5%) as sub-cultural factors influencing their purchases. Hence, there was variation in sub-cultural factors of below respondents above graduation.

Reason
It is found that the respondents have given maximum priority to religious factors which has got its impact on their behaviour.

Suggestion
It is suggested the marketers and producers consider the 'religious' sub-cultural factors in appealing their buyers with appropriate models. Also they should focus more on 10^{th} and graduate respondents.

4. Distribution of respondents according to the family consumption expenditure and influencing family member while making a purchase decision

Finding
Irrespective of their consumption expenditure, most of the respondents were primarily influenced by 'both' (26%), followed by 'mother' (20.5%), and 'father' (17.5%). As the income increases, this preferences got dissipated towards 'all'.

Reason
Since, the respondents are dependent financially; they did depend on their elders.

Suggestion
It is suggested the producers and marketers concentrate on the differences in the suppositions of the respondents whose consumption expenditure is more than Rs.30000 while producing and marketing goods and services for low level income of consumers.

5. Distribution of respondents as per their age and influencing social class factors while making a purchase decision

Finding
It is found that most of the respondents responded in favor of 'occupation' (23.5%), 'income' (23%), 'education' (22%), 'networth' (20%) and 'others' (11.5%) irrespective of their age.

Reason
Most of the householders fell in the age group of 30-45 years, other groups followed their reason.

Suggestion
It is suggested the producers and marketers take the opinions of the people, whose age is between 30-45 years and 45-60 years.

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6. Veblenian socio-cultural factors and their relative importance in their purchase decision Finding

It is found that the 'income level' of the low-income consumers influenced their purchase decision. But among the Veblenian Socio-cultural factors; 'social class factors', 'cultural factors' and 'sub-cultural factors' were the least influencing factors when compared to 'income level', 'reference groups', and 'family'.

Reason
As most of the consumers were low- income people, factors other than income did not influence them considerably.

Suggestion
In order to capture the new markets it is suggested that the producers and marketers produce and market the goods and services to them based on their preference for 'income level'.

BIBLIOGRAPHY

- Leon G. Schiffman, Laslie Lazar Kanuk, (2003) 'Consumer Behaviour', Pearson India Pvt. Ltd. New Delhi.
- By Michael R. Solemon,(2001) 'Consumer behaviour', Prentice hall of India Pvt. Ltd. New Delhi.
- William L. Wilke, 'Consumer behaviour', John Wiley & Sons, New York.
- James F. Engell, David T. Kottat and Roger D. Blackwell, (1977)'Consumer behaviour', Holt, Rinehard and Winston.
- Cunninghum and Cunninghum, (1981) 'Marketing: 'A managerial approach', South Western Publishing Company, Cincinnati.
- Philip Kotler, 'Marketing management – Analysis, Planning and Control', Prentice – Hall of India Pvt., Ltd., New Delhi, III.
- Ramuswamy. V.S. and Namakumari: (1999) 'Marketing management', Macmillian, New Delhi.
- Web sites
- http://www.findarticle.com
- http://www.media.wiley.com/product-data/excerpt/95
- http://www.faculty.chass.ncsu.edu
- http://faculty.chass.ncsu.ethno.hmt
- http://www.en.wikipedia.org/wiki/consumer.behaviour
- http://www.management-hub.com
- http://www.springerlink.com

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STUDY OF BIODIVERSITY OF AVIAN SPECIES IN DALMA SANCTUARY

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ABSTRACT
Due to the diversified geo-morphological patterns, soil patternsand varying climatic conditions, Jharkhand is blessed with wide varieties of faunal species. The important varieties of forests present in Jharkhand are Moist Deciduous, Tropical Dry Deciduous, Dry mixed Deciduous and Dry Peninsular . The forests of Dalma Sanctuary belong to 5B/C1c (Northern Tropical Dry Peninsular Sal forest) and 5B/C2 (Northern Tropical Dry Mixed Deciduous type). The man made huge Dimna lake and various large water holes constructed by the Government has added to the nature's blessings for supporting a huge avian fauna in this sanctuary. Avian species are vertebrate warm blooded animals with high senses of sight and magnetic bearing capacities. Careful and intelligent bird watching widens the scope for procuring data related to their numbers, lives and behavioural patterns. The chosen method of transact survey have revealed ninety three varieties of avian species which enormously contribute to the natural ecosystem conservation of the Dalma sanctuary.

Keywords: Avian fauna; Ecosystem; Deciduous; Habitat.

INTRODUCTION
In Bihar and Jharkhand 465 varieties of birds have been identified, out of which 317 are resident and 148 are migratory (Dutta et al.,2004). Survey of literatures reveal that the avi-fauna of Jharkhand is least studied (Ara, 1996; Ghose et al. 1993; Islam and Rahman, 2004). Verma (2011) studied the avian community of Dalma Wildlife Sanctuary and reported 71 varieties of species. Chatterjee et al.(2013) reported that biodiversity of Jharkhand is under serious threat from factors like industrialization, urbanization, mining, unrestricted grazing etc. Information on factors affecting avian population dynamics, interactions and their contribution to the ecosystem can be obtained by seasonal monitoring (Ornelas et al. 1993).

Karr (1981) observed that regional activity of birds is consistent for each season between years. Variation between seasons in capture rates of birds also has been documented by him. He further found that insectivores – nectarivores were more common during dry season. Similarly, ant eaters and frugivores were more common during dry season. Similarly ant eaters and frugivores show distinct seasonal changes. Habitat destruction and fragmentation due to various developmental activities have resulted in the decline of the avian population. In birds the sense of sight and hearing are highly developed and that sense of taste is relatively poor, while smell is practically absent. Everyone enjoys birds and the beauty of their songs. It is amazing to know the tricks of disciplined observation of birds. One may find very few birds during their first two or three site visits. But the subsequent visits makes one more adept in knowing exactly their timings of emergence. Mostly, birds are viewed early in the morning in the forest areas, and late afternoon is also good to view birds in the agricultural fields. The resident water birds are viewed in the banks of lakes, dams and waterholes. In the winter season, the migrant birds can be viewed during late morning hours. Amazing gathering of birds have been encountered during early morning hours on the Bunyan and Peepal trees during the season of ripe figs. Birds whose major attraction are earthworms and insects, can be seen in good numbers in forest areas having appreciable humus content. Generally fruiting occur in different varieties of herbs and grasses in late winters and early summers. During these seasons, the birds which mainly depend on these feed, can easily be seen. In summer season, when *Ceiba pentendra* and *Butea monosperma* flowers, different varieties of birds can be observed. The other favourable season for bird watching is after the few showers of rain when the winged termites emerge for their momentous nuptial flights. These insects are chased and captured on the ground as well as in the air. Due to excessive hunting and destruction of natural habitats of birds by the humans, the number and variety of avifauna species have reduced to alarming levels.

IMPORTANCE OF BIRDS IN ECOSYSTEM
Birds play a vital role in maintaining the ecosystem. They vary from mid level consumers to tertiary level predators. Major role of birds is to help maintain sustainable population levels of their prey and predator species. After death, they provide food for scavengers and decomposers. They provide services as pollinators and also as seed dispensers. They also provide habitats for many other species e.g. wood peckers create cavities in the stems of trees that provide living space for other animals. They ingest fruits and in their intestines the seed coat becomes soft so as to accelerate the process of germination. Many times through the legs of fish eating birds, the fish eggs get transported to other aquatic habitats. Birds also contain the rodent population.

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MATERIALS AND METHODS

Study Area

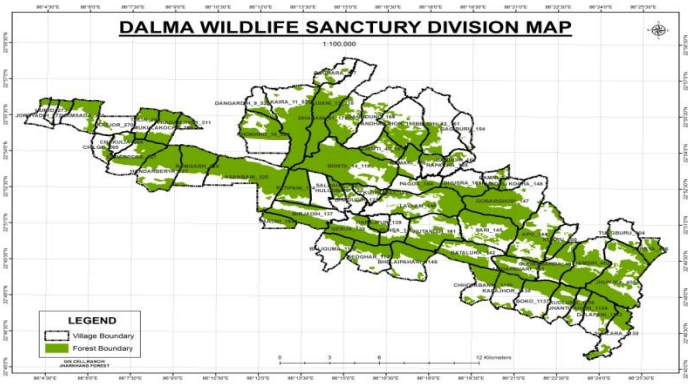

Fig-1: Dalma wildlife sanctuary map

The avian species found in a particular forest zone characterizes the habitat. The types of habitat, in turn, determines the varieties of birds. The type of forest and the floral species abundantly found in the area, determines the food and nesting sites. According to Champion and Seth's revised classification, the forest of the Dalma sanctuary confirms to Sub group- 5B- Northern Tropical Dry Deciduous forest, 5B/C1- Dry Peninsular sal and 5B/C2- Northern Dry Mixed Deciduous forest. Upper hills of core area consist of mainly dry mixed deciduous forests with small patches of moist mixed forests near water streams and in the northern aspects. The miscellaneous crop consists of mainly *Terminalia tomentosa, Oogenia oogenensis, Anogeissus latifolia, Diospyros melanoxylon, Adina cordifolia, Albizzia lebbeck, Pterocarpus marsupium, Terminalia belerica, Bombax ceiba, Mangifera indica, Sterculia urens and Emblica officinalis.* The dense mixed forests of Dalma inhabits large varieties of herbs and shrubs. The humus layer in these areas goes up to a depth of 45cms. The particular type of flowering and fruiting of trees, the seeding of grasses and the abundance of invertebrates govern the type of resident birds. Two major dams Dimna lake (Southern side) and Chandil dam (South-western side) provides magnificent habitat for winter birds. The 85 villages inside the sanctuary also serve as a good habitat for such resident birds, those who mostly depend on agricultural products, earthworms and varieties of insects.

Selection of Sites

Mainly five sites were chosen for the survey of birds at Dalma Sanctuary .i) The Dimna lake and the Chandil dam ii) Artificial waterholes in the sanctuary iii) Dense mixed deciduous forests iv) Areas where Sal is prominent v) Along agricultural fields in villages inside sanctuary area.

Methods

Actual sighting and data collection from villagers by showing photographs of birds are the two methods which were adopted for this study.Since study area was mostly hilly regions, so forest roads and walk paths of villagers were used as transects. For seasonal migrations Dimna lake and Chandil dam was used. For this study, Salim Ali's "Book of Indian Birds" and "Photographic guide to the Birds of India" by Grewal, Harvey, Pfister were used.

Equipments

Mostly Binoculars are used for identification of birds. Camera was sparsely used.

RESULTS AND DISCUSSION

List of birds sighted:

Sl. No.	Common Name	Scientific Name	Family	Occurrence
1	Sand Grouse	*Pterocles indicus*	Pteroclidae	Near Konkadasa
2	Blue Fly Catcher	*Cyornistic kelliae*	Musicapidae	Near Konkadasa
3	Rose ringed Parakeet	*Psittacula krameri*	Psittacidae	Near Khokhro
4	Barred Button Quail	*Turnix susciator*	Turnicidae	Near Dhobani
5	Greyheaded Flycatcher	*Culicicapa ceylonensis*	Muscicapidae	Near Pardih
6	Eurasianmarsh Harrier	*Circus aeruginosus*	Accipitridae	Near Chandil dam
7	Baybacked Shrike	*Lanius vittatus*	Laniidae	Near Khokhro

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8	Chestnut bellied Nuthatch	*Sitta castanea*	Sittidae	Near Makulacocha
9	Indian Jungle Nightjars	*Caprimulgus asiaticus*	Caprimulgidae	Near Mirzadih
10	Red Jungle Fowl	*Gallus gallus*	Phasianidae	Near Bijlighati
11	Indian Pea Fowl	*Pavo cristatus*	Phasianidae	Near Asanbani
12	Yellow footed Green Pigeon	*Treron phoenicoptera*	Columbidae	Near MGM hospital
13	Tufted Pochard	*Aythya fuligula*	Anatidae	Dimna lake
14	Common Teal	*Anas crecca*	Anatidae	Chandil dam in winter
15	Brahminy Duck	*Tadorna ferruginea*	Anatidae	Dimna lake in winter
16	Grey legged Geese	*Anser anser*	Anatidae	Dimna lake in winter
17	Bar headed Geese	*Anser indicus*	Anatidae	Dimna lake in winter
18	Common Crane	*Grus grus*	Gruidae	Banks of Chandil dam
19	Brahminy Kite	*Haliastur indus*	Accipitridae	Dimna lake
20	Blue throated Flycatcher	*Cyornis rubeculoides*	Muscicapidae	Near Majhlabandh
21	Small minivet	*Pericrocotus cinnamomeus*	Corvidae	Near Bhadudih
22	Common Quail	*Coturnix coturnix*	Phasianidae	Near Konkadasa
23	Jungle Bush Quail	*Perdicula asiatica*	Phasianidae	Near Konkadasa
24	Grey Francolin	*Francolinus pondicerianus*	Phasianidae	Near Chakulia
25	Small Button Quail	*Turnix sylvatica*	Phasianidae	Near Asanbani
26	Comb Duck(Nukta)	*Sarkidiornis melantos*	Anatidae	Near Badkabandh
27	Lesser Whistling Duck	*Dendrocygna javanica*	Dendrocygnidae	Near DimnaBhelpahari
28	Ruddy Shelduck	*Tadorna ferruginea*	Anatidae	Chandil dam in winter
29	Indian Spot billed Duck	*Anas poecilorhyncha*	Anatidae	Near Dimna
30	Northern Pintail	*Anas acuta*	Anatidae	Near Dimna
31	Eurasian Wigeon	*Anas penelope*	Anatidae	Dimna in winter
32	Garganey	*Anas querquedla*	Anatidae	Chandil dam
33	Little Grebe	*Tachybaptus ruficollis*	Podicipedidae	Dimna in winter
34	White breasted waterhen	*Amaurornis phoenicurus*	Rallidae	Near Bonta
35	Asian Openbill	*Anastomus oscitans*	Ciconiidae	Chandil dam
36	Wolly necked Stork	*Ciconia episcopus*	Ciconiidae	Dimna area
37	Black crowned Night Heron	*Nycticorax nycticorax*	Ardeidae	Northern side of Dimna
38	Striated Heron	*Butorides striatus*	Ardeidae	Northern side of Dimna
39	Indian Pond Heron	*Ardeola grayii*	Ardeidae	Northern side of Dimna
40	Grey Heron	*Ardea cinerea*	Ardeidae	Northern side of Dimna
41	Great Egret	*Ardea alba*	Ardeidae	Northern side of Dimna
42	Cattle Egret	*Bubulcus ibis*	Ardeidae	Northern side of Dimna
43	Little cormorant	*Microcarbo niger*	Phalacrocoracidae	Chandil dam
44	Red-wattled lapwing	*Vanellus indicus*	Charadriidae	Near Kadamjhor
45	Common Snipe	*Gallinago gallinago*	Scolopecidae	Southern side of Dimna
46	Common Sand Piper	*Actitis hypoleucos*	Scolopecidae	Western side of Chandil dam
47	Wood Sand Piper	*Tringa glareola*	Scolopecidae	Kadamjhor
48	Jerdon'sBaza	*Aviceta jerdoni*	Accipitridae	Near Majhlabandh
49	Egyptian Vulture	*Neophron percnopterus*	Accipitridae	Near MGM area
50	Crested Serpent Eagle	*Spilornis cheela*	Accipitridae	Near Pindrabera

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51	Crested Hawk Eagle	*Spizaetus cirrhatus*	Accipitridae	Near Tisco Guest house, Dalma top
52	White eyed Buzzard	*Butastur teesa*	Accipitridae	Near Mirzadih
53	Jungle Owlet	*Glaucidium radiatum*	Strigidae	On way from Pindrabera to Nichlabandh
54	Indian Night Jar	*Caprimulgus asiaticus*	Caprimulgidae	Near Haldibani
55	Spotted Dove	*Streptopelia chinensis*	Columbidae	Near Konkadasa
56	Greater Coucal	*Centropus sinensis*	Centropodidae	Near Chakulia
57	Asian Koel	*Eudynamys scolopacea*	Cuculidae	Near MGM
58	Common Hoopoe	*Upupa epops*	Upupidae	Near Asanbani
59	Lesser Golden backed Wood pecker	*Dinopium benghalense*	Picidae	Near Khokhro
60	Brown-headed Barbet	*Megalaima zeylanica*	Megalaimidae	Near Khokhro
61	Green Bee Eater	*Merop sorientalis*	Meropidae	Near Majhlabandh
62	Common Kingfisher	*Alcedo atthis*	Alcedinidae	North-east of Dimna
63	Pied King Fisher	*Ceryl erudis*	Cerylidae	Dimna lake
64	Indian Pitta	*Pitta brachyura*	Pittidae	Near Bijlighati
65	Coppersmith Barbet	*Megalaima haemacephala*	Megalaimidae	Near Daubera
66	Northern Shovelor	*Anas clypeata*	Anatidae	Dimna in winter
67	Brown Shrike	*Lanius cristatus*	Laniidae	Near Kadamjhor
68	Longtailed Shrike	*Lanius schach*	Laniidae	Near Kendrabera
69	Jungle crow	*Corvus macrorhynchos*	Corvidae	Near Chimti
70	Black Drongo	*Dicrurus macrocercus*	Corvidae	Near Chimti
71	White bellied Drongo	*Dicrurus caerulescens*	Corvidae	Near Mirzadih
72	Yellow eyed Babbler	*Chrysom asinense*	Sylviidae	Near Mirzadih
73	Puff-throated Babbler	*Pellorneum ruficeps*	Sylviidae	Majhlabandh
74	Large grey Babbler	*Turdoidesm alcomi*	Sylviidae	Nichlabandh
75	Common Babbler	*Turdoides caudatus*	Sylviidae	Bijlighati
76	Jungle Babbler	*Turdoides striatus*	Sylviidae	Nichlabandh
77	Baya Weaver	*Ploceus phillipinus*	Passeridae	Near Pagda
78	House Sparrow	*Passer domesticus*	Passeridae	Near Saldah
79	Barn Swallow	*Hirundo rustica*	Hirundinidae	Near Mirzadih
80	Grey Wagtail	*Motacilla cinerea*	Passeridae	Near Dimna
81	Common tailor Bird	*Orthotomus sutorius*	Sylviidae	Near Palasbani
82	Richard's Pipit	*Anthus richardi*	Passeridae	Near Barajpur
83	Indian Bushlark	*Mirafra erythroptera*	Alaudidae	In Katasini top
84	Greenish leaf Warbler	*Phylloscopus trochiloides*	Sylviidae	Near Pindrabera
85	Pied Bushchat	*Saxicola caprata*	Muscicapidae	Near Tisco guest house, Dalma top
86	Indian Robin	*Saxicoloides fulicatus*	Muscicapidae	In Katasini
87	Common Myna	*Acridotheres tristis*	Sturnidae	Near MGM
88	Brown Fish Owl	*Ketupa zeylonensis*	Strigidae	Near Mahajal
89	Gadwall	*Anas streptera*	Anatidae	Dimna lake
90	Lesser Whistling Duck	*Dendrocygna javanica*	Dendrocygnidae	Southern side of Dimna
91	Common Pochard	*Aythya ferina*	Anatidae	Chandil dam
92	Brown capped Pygmy Wood Pecker	*Dendrocopos nanus*	Picidae	Near Konkadasa
93	Short- eared Owl	*Asio flammeus*	Strigidae	Near Chimti

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Number of particular varieties of birds sighted could not be counted systematically. But the bird population is very high in the peripheries of Dimna lake. Large number of resident birds are seen in the mixed dense forest areas and along villages in which mostly two or three crops are grown. However it seems that due to decline of forest density, the bird population which should inhabit the dense forest areas are less. Open forests have better number of birds. Bird hunting is practically absent. However the sanctuary needs to be better protected from wood cutters and particularly from fuel wood cutters. They cut the green trees or its branches and then after it is dried up, then they transport it, in order to avoid legal actions from Forest Department. Winter bird population is not very high due to continuous fishing activities.

CONCLUSIONS

This study was covered in one year time period in the months of June-July and September to January. Dalma sanctuary is inhabited by 85 villages, but during survey only 10 villages were taken up, choosing the villages in proximity to the forest area. Though nearby areas of villages show greater population level, but the varieties of birds are less. These villages have always been the source of forest degradation. It is urgently needed that the fuel wood requirements of Jamshedpur city and the villagers staying inside the sanctuary area and peripheral areas needs to be supplemented by alternative energy sources. Alternative income sources are to be provided to families those who depend on fishing for their survival.

REFERENCES

1. Ali, S. (2001).The Book of Indian Birds, BNHS.
2. Ara, J. (1966) Hazaribagh National park (Bihar) re-visited. Journal of Bombay natural history Society, 63:123-138 published 1996.
3. Chatterjee, R., Raha,D., Biano Frontier June,2013.
4. Dutta, B.B., Roy, S.B., Datta, B.K., Dasgupta, J.M.(2004). State Fauna series ii: fauna of Bihar (Including Jharkhand), Part 1: 73-142, Zoological Survey of India, pp. 249-253.
5. Ghose, T.K., Choudhary, S.K. and Mishra, A. (1993). A checklist of the Birds of Udhawa Lake Bird Sanctuary, Rajmahal (Bihar). Journal of Fresh Water Biology 5(1): 83-91.
6. Grewal, B., Harvey, B., Pfister, O., A Photographic Guide to the BIRDS of India.
7. Islam, M.Z. & Rahmani, A.R. 2004. Important Bird Areas in India: Priority sites for conservation. Indian Bird Conservation Network, Bombay Natural History Society & Bird Life International (UK). 1200 pp.
8. Karr, J.R.(1981). Seasonal Changes in detection of individual bird species, pp. 548-553.Ball, V. (1874). Avifauna of Chotanagpur. Stray Feathers 2: 1-355.
9. Ornelas, J.F., Arizmendi, M.d.C., Valdelamar, L.M., Berlanga, H.A. 1993. The Condor 95:422-441. The Cooper Ornithological Society, 1993.
10. Verma S.K. (2011), A preliminary survey on the avian community of Dalma Wild life sanctuary, Jharkhand, India.

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BIODYNAMIC RESPONSE OF HUMAN SUBJECT EXPOSED TO WHOLE BODY VIBRATION IN FORGING

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ABSTRACT
The present research was investigated for whole body vibration (WBV) among drop forging subjects. The two input parameters of 1440 rpm, 1900 rpm were considered for conducting drawing operation. The vibration dose value along x-axis, y-axis and z-axis was recorded at 1900 rpm that was 20.11 ± 2.13 $ms^{-1.75}$ and A(8) response were beyond the ISO 2631-1 (1997). This study found that dominant frequencies for 7-12 Hz and for 8-10 Hz were cause discomfort of different parts of human body because of existing natural frequencies of human body. The results show that these dominant frequencies could cause discomfort, chest pain, abdomen pain and muscular disorder among subjects.It was concluded that the subject required better environment in order to overcome whole body vibration exposure.

Keywords: WBV- Whole body vibration; VDV-Vibration dose value;Muscular Disorder- MSD

1. INTRODUCTION

The drop forging hammers used in manufacturing industry are of different material, shape and size such as an aeroplane, car and truck.It can manufactured precision components of complex shape and thickness with précised surface while maintain quality. Mostly 90% of subjects were working more than 8 hours per day, which may also contribute to high vibration exposure. The WBV exposure was measured among forging subjectswhich was beyond the recommended limits of ISO 2631-1997-1 (0.5 m/s^2). The high magnitude of vibration exposure causes MSD and spinal injury. The vibration exposure was depending upon type, material and thickness of jobs. There was no means which may reduce the vibrations. This study was aimed to study the vibrationexposure among forging subjects. The majority of studies conducted outside Indian terrainconditions but some researchers contributed in such issue in India also (singh et al, bedi et al).

LITERATURE VIEW

Griffin et al:The compared biodynamic of non-linearity in the vertical apparent masses and fore-and-aft cross axis apparent masses of seated people by developing an experimental setup. In results, both apparent masses and non-linearity are broadly similar with sinusoidal and random vibration. Hence, biodynamic response variability with increasing vibration magnitude depends on frequency of the vibration excitation, but similar with sinusoidal and random excitation.

Harazin and Grzesik identified the effects in standing subject the vibration to human body parts. The whole body vibration transmission from z- direction to head, knee and other body parts and measured during vibration exposure. Ten male subjects exposed the whole body vibration transmission from ground in z-axis while standing in one leg without support of other foot in ten postures. The transmissibility calculated at frequencies 4-250 Hz at different body parts.

Kim et al developed a model of the human body for measuring and recording the transmissibility and dynamic response to whole body vibration in sitting posture. The result shows that the 10 males subject effect due to high amplitude and low frequency.

Mansfield and Griffin investigate effect of vibration for twelve subjects while acceleration from 0.25 to 2.5 m/s^2 and frequency from 0 to 25 Hz. The transmissibility calculated at seat to upper and lower portion of abdomen for L3 position. The vertical motion of spine determined at resonance frequency range at 4 Hz to 8 Hz when exposed to vertical whole body vibration. The resonance frequencies decreases at abdomen while increase whole body vibration magnitude.

Matsumoto et al. investigate the comparison of sitting and standing position of human subject for vibration responses. The eight males' subjects were participated in the experimentation while exposed to the vibration. The resonance frequencies at range from 5 to 6 Hz for standing and seating position of subjects while transmission of vibration from ground to lower spine. The transmissibility decreases from the spine while standing than seating position of subjects.

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Lundstrom et al investigate the vibration exposure for fifteen males and fifteen females while position standing. In the lab setup the acceleration amplitude from 0.5 m/s^2, 1.0 m/s^2 and frequencies rang at 0-20 Hz while experimentation. The result show that the maximum vibration discomfort at 45 degree body position in y-directions more dominant than x-direction.

Singh, I et al. (2016) studied that the result of experimental investigations which were conducted to assess the subjective response of seated human subjects under vertical harmonic vibrations. 12 human males were subjected to amplitudes of excitation and frequencies of 5, 8, 2, 16 and 20 Hz. The responses from all the subjects' form of vibrations being felt by them at different body segments, their severity and significance and comfort level were recorded in subjective form. At high frequency excitations the lower portion of the body, which is close to the point of excitation responds significantly. The response at excitation of frequency closer to natural frequencies of different body segments is clearly evidenced in the form of vibratory effect on those segments. By and large with the increase in inclination of back rest, comfort level increases along with the shift of responding segments in certain cases.

2. METHODOLOGY

The objective of this study was to find WBV exposures and transmissibility (head and back)among Indian forging subjects.

Ten different subjects participated in this study having no muscle disorderand cardiovascular problem. The height of workers varies from 175 to 184 cm, Standard Deviation 5.02 and weight varied from 61 to 75 kg, Standard deviation 4.80. Anthropometric data of Indian subjects were shown in table 1, while position of subjects in standing erect posture as shown in figure 1.

The tri-accelerometer (SVAN 958A) was attached to bed of drop forging hammer with magnetto measure the WBV (show fig 3).The drop forging hammers were running at speed of 1440 and 1900 rpm while recorded the output weighted acceleration. The vibration measurements were recorded by using whole accelerometer (SV 38V, SVAN 958A) with piezoelectric sensor, which measures the vibration along z-axis of sensitivity 50 mv of range 0.01 to 100 Hz. An elastic wrap was utilized to attach the tri-accelerometer to the head and back of subject for recording WBV. The WBV, rms, VDV, daily dose vibration was recorded by vibration meter and measured vibrations were analysis by using Lab View 2014 software.

The present study was conducted at Guru Nanak forging unit, Kurali, Punjab (India). The positions of workers were in standing posture while recording WBV at floor, back, head and during experimentation the position of the body erect posture show in figure 1.

2.1.Importance of study

The India ranked 112 out 119 regarding health and safety. The steel industry was prime source of income which contributes 28 per cent of GDP. Theforging industry in which 25 percent population was directly and indirectly involved gets employment. The forging subjects were exposed to WBV which was exceeding theISO standard. Hence, there was need to study theWBV for improving the working condition of drop forging

Figure 2 and Figure 3 show schematic representation of whole body vibration during experimentation along x-axis, y axis and z axis and analysis the data by SVAN PC^{++}. The vibrations were further analyzed by Lab View software-2014. This allows us to obtained broad-band results such as VDV, Daily dose, RMS, peak together with 6 channel using octave band analyses.

2.2. Assumptions

1) The vibration was recorded at drop forging hammers at 1440 rpm and 1900 rpm.

2) The distance between two legs was 30 cm apart so that worker stands in comfortable condition due to the balance of his body.

2.3. Experimentation

A total of 10 male subjects participated in conducting experiments. The workers were asked to keep a distance of 30 cm apart between two legs and measured the vibration on z axis. Ten experiments were conducted to record vibrations as shown in figure 1. The seat pad sensor was mounted on back and accelerometer was mounted on head of workers with elastic wrap to record vibration at back and headas shown in figure 3.

Natural frequencies of human body and symptom related to them were mentioned in Table. 2. These frequencies causes the discomfort in subjects due to the natural frequencies of different parts of human body.

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2.4. RMS Vibration Exposure:

The rms vibration expose to determine for vertical vibration measured at floor, back and head of subjects.

$A_w = [1/T=\int a_w^2 (t)\, dt]^{½}$(1) Where a_w is weighted acceleration (m/s^2) and t is time in sec.

2.5.Vibration dose value

The vibration dose value is more sensitive than accelerated vibration and measured at floor, back and head of subjects.

$VDV= [1/T=\int a_w^4 (t)\, dt]$ (2)

2.6. Calculation of transmissibility

The transmissibility in all three directions is calculated by:

$T_r\text{head} = \frac{F_L - j}{H_L - j}$ j=X, Y, Z(3)

Where, Tr is the total transmissibility at head. F_L is floor vibration recorded by vibration meter. H_L is head vibration recorded by accelerometer.

3. RESULTS

3.1.WBV recorded at 1440 and 1900 rpm

R.M.S vibration was measured on drop forging hammers at floor, back and head of the subjects. The r.m.s vibration magnitude at 1440 rpm of drop forging hammer along x-axis, y-axis and z-axis was shownfigure3. In this study, the measured r.m.s at floor was 0.70 m/s^2, back was 0.58 m/s^2 and head was 0.65 m/s^2 during the drop forging hammer was running at 1440 rpm. The vibration magnitude measured at 1900 rpm at floor was 0.66m/s^2, back was 0.52 m/s^2 and head was 0.73 m/s^2. The vibration at 1900 rpm along head at z-axis was increasing with increase in rpm of hammers.

VDV signifies vibration exposure over the working day. Figure 4 shows the VDV along x-axis, y-axis, and z-axis at 1440 rpm w.r.t. weight of subjects, for subjects (S-1 to S-10). The VDV response of drop forginghammer increases at 1440 rpm along z-axis as compare to x-axis and y-axis during drawing operation at shop floor.The observed data shows that vibration dose value increases with the increase in the rpm levels of hammers, because the rpm of hammer indicates speed of hammer.

When rpm levels increase the vibration dose value also increases along z-axis at 1900 rpm. Therefore the vibration dose value effect on human body due low frequencies high amplitude show causes the discomfort in workers due to the natural frequencies of different parts of human body show fig 5.

The VDV value of each subjects (S1-S10) recorded at 1440 and 1900 rpm as per ISO 2631-1 (1997).The vibration dose value along x-axis, y-axis and z-axis were recorded at 1900 rpm were 20.11 ± 2.13 $ms^{-1.75}$ and A(8) response were beyond the ISO 2631-1 (1997). The VDV were above the recommended value of ISO 2631-1 1997.These frequencies could cause the MSD and other pain at different frequencies shown in table 2. There were number of studies which show similar trends that high VDV could cause MSD and joint fracture (Griffin, 2007, cutani, 2009, Matsumoto, 2014).

The Vibration transmission depends upon the characteristics of seat properties and the seat amplify the vibration to the back and head of subjects. The forging industrial subjects at drop forging hammer perform the daily task without any seat while they working, so due to that the vibration transmission to back and head of subjects as shown figure 3 was responsible for the discomfort to human body (Paddan, 2012, Meghrazi, 2012). The measured WBV, VDV and RMS exposure along z-axis at 1900 rpm of drop forging hammer above thanISO 2631-1 1997. Number of researchstated that high WBV exposure cause's discomfort and MSD if the subjects get exposed for longer time(Langer et al., 2015).

Therefore, increase dose of low frequency and high amplitude vibration effect back and head of industrial subjects while workingfor longer duration. The high amplitude vibrations were effect the safety of worker while working in specific hot environment when vibration levels were too high.

The table 3 show statistically the relationship between the rpm levels and weighted acceleration w.r.t weight of subjects.

3.2. Transmissibility at Back

It was observed from experimentation that the unexpected peak of vibration occurs at low frequency between 7 Hz to 9 Hz for transmission of WBV to back of subjects asshown in figure5. These frequencies were responsible for discomfort in human body.

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The transmissibility depends upon position of workers, types of floor, whether the operator used seat or not while they performed the daily task. The percentage of transmissibility from floor to back was calculated as 31.5-52.3% for ten subjects. The transmissibility was found 52.3 % and average 52% (approximately) vibration was transmitted from floor to back of subjects at speed 1900 rpm.

3.3. Transmissibility at Head

The 1/3 octave band analysis has been utilized to check the effect of low frequency high amplitude vibration on subjects at loaded jobs in drop forging hammers as shownin figure5. It was observed from experimentation that the unexpected peak of vibration occurs at low frequency between 15-60 Hz for transmission of WBV to head.Number of studies was performed to show that the natural frequencies near 15-60 Hz could cause discomfort, muscle disorder among industrial subjects (Griffin *et al*, 2007, Nawayseh*et al*, 2012, Paddan*et al*, 2012).

The percentage transmissibility from floor to head was 13.1-22.5% for ten males' subjects (From equation 3). The transmissibility was found 22.5 % from experimental data and the average 22 % vibrations were transmitted from floor to head of subjects at speed 1900 rpm.

4. CONCLUSIONS

The following conclusions have been drawn from the experimentation:

- The WBV exposure was beyond limits at 1900 rpm at drop forging hammer as per ISO-2631-1 (1997).
- The transmissibility found at floor to back was 52 % and the transmissibility found from floor to head 22 %.
- More than 90 % of industrial workers were affected due to high exposure of WBV which causes discomfort and health degradation.

REFERENCES

1. Brazi, B and Griffin, M. J The vibration of inclined backrest perception and discomfort of vibration applied normal to the back in the X-axis of the body, International Journal of Sound and Vibration 2010; 330 : 4646-4659.
2. Dhanjee, K and Kumar, A Whole body vibration exposure of drill operators in iron ore mines and role of machine related, individual and rock related factors, International journal of occupational safe and health 2015; 6: 268-278.
3. Eadric B, Smith and Branscomb J Transmission of whole body vibration in children while standing, Clinical Biomechanics ; 2009: 25, 181–186.
4. Ishbir, S, Nigam, S.P and Saran, V, H, Effect of backrest inclination on sitting subjects exposed to WBV, 3rd International Conference on Innovations in Automation and Mechatronics Engineering 2016; 23: 76-83.
5. Lynn, M, Nigel, E, and Corlett A survey method for investigation of work related upper limb disorders, International Journal of Applied Ergonomics 1993; 24: 91-99.
6. Meghrazi, A, Masani, k, Whole-Body Vibration During Passive Standing in Individuals With Spinal Cord Injury 2012; 4: 963-975.
7. Nawayseh, N, and Michael, G, Tri axial forces at the seat and backrest during whole body vertical vibration, International Journal of Sound and Vibration 2004; 277: 309- 326.
8. Paddan, G. S and Griffin, M The transmission of translational floor vibration to the heads of standing subjects, Journal of sound and vibration 2009; 160: 503-521.
9. Rittweger, J., Beller, G., and Felsenberg, D, Acute physiological effects of exhaustive whole body vibration exercise in men ,Clinical Physiology 199; 20: 134-142.
10. Roberto D, Angela, C and Christian, P, Whole-body vibration measurement of horizontal and vertical transmissibility of an agricultural tractor seat, International Journal of Industrial Ergonomics 2017; 58: 69-72.
11. Paddan, G. S, Mansfield, N, J The influence of seat backrest angle on perceived discomfort during exposure to vertical whole body vibration, International Journal of Ergonomics 2012; 55: 923-936).

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FIGURE AND TABLES

Subjects	Age (Yr)	Height (mm)	Weight (Kg)
1	42	1750	75
2	45	1770	70
3	35	1800	65
4	31	1690	62
5	25	1740	71
6	27	1750	61
7	29	1780	67
8	33	1810	70
9	26	1840	74
10	29	1800	72
Mean	32.2	177.30	68.7
Standard Deviation	6.69	5.02	4.80

Table-1: Anthropometric data of Indian subjects

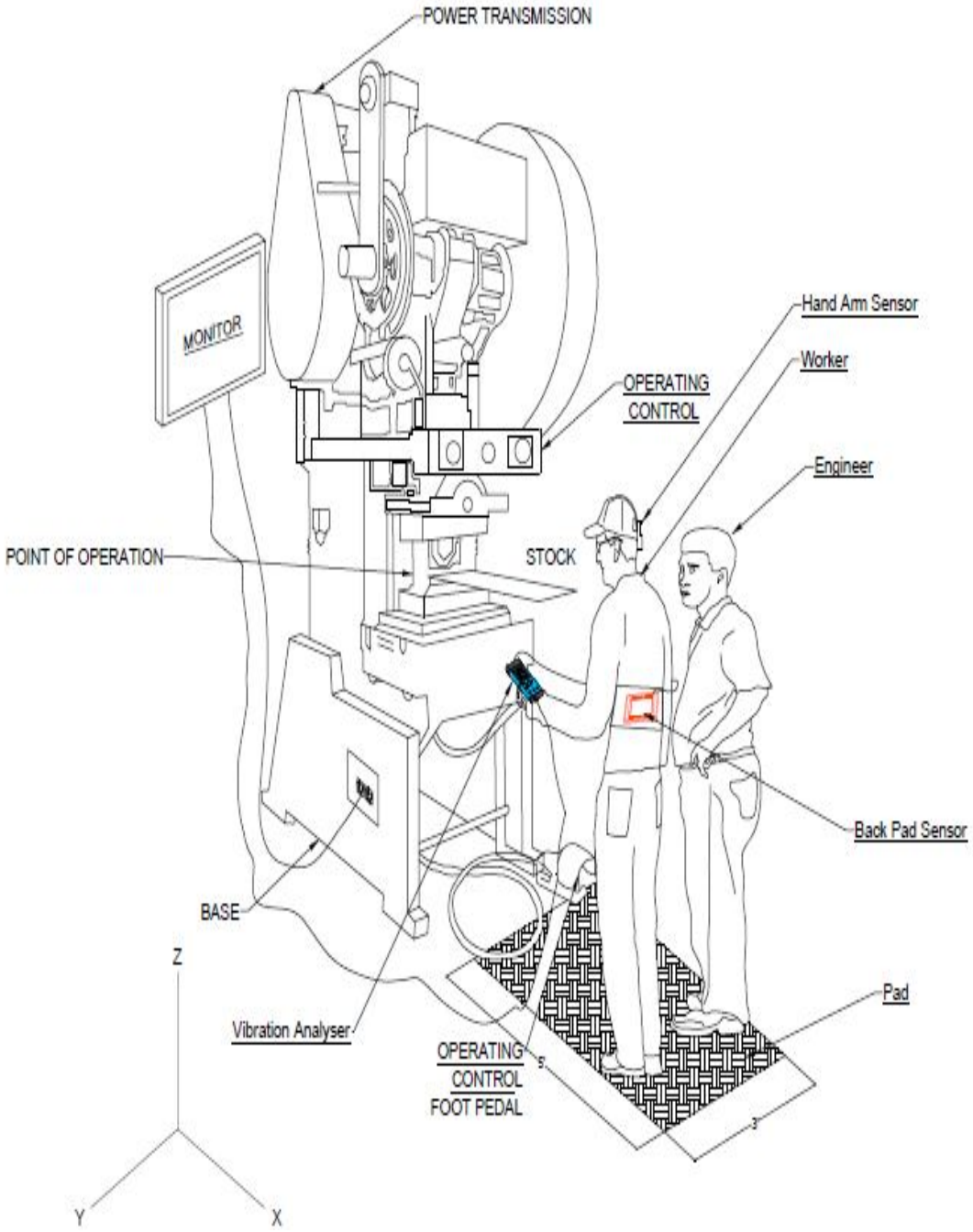

Figure-1: Experiment set up of Drop forging hammer

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Figure-2: Pictorial Representation of Drop Forging Hammer (Capacity 200 Ton)

Figure-3: Schematic representation of experiment set up to record vibration along z-axis

Direction	Frequency (Hz)	Effect
Vertical	0.45	Sweating, nausea, Motion sickness,
	2.5	Whole body changes
	4-10	Vibration transmitted to back, Lumbar, vertebrae resonate, Problems in writing letter or drinking different liquids.
	5-7	Resonance of gastrointestinal system.
	10-45	Vibration transmitted to head.
	11-70	View blurred (resonance of the eyeballs)
Horizontal	2-4	Body de-stabilized
	>9	Back-seat cause of vibration transmission to body

Table-2: Human respond to vibration at different dominant frequen

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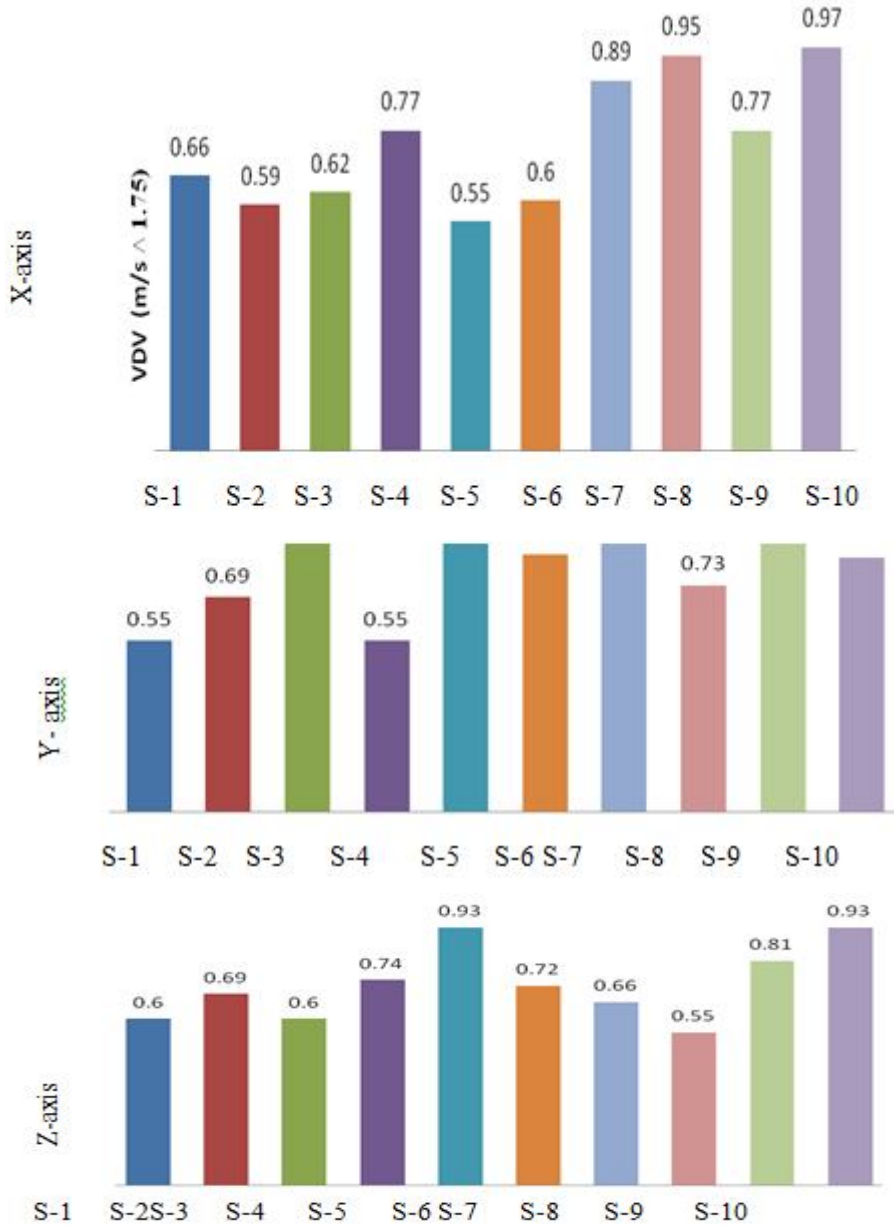

Figure-4: Vibration dose value along x, y and axis at 1900 RPM levels w.r.t. Subjects (S-1 to S-10)

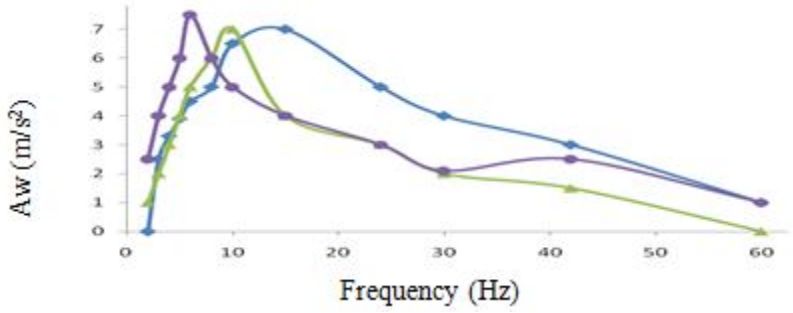

Figure-5: 1/3rd octave band analyses along x, y and z axis at 1440 rpm, 1900 rpm during drawing operation (S-1 to S-10)

RMS Weighting acceleration	RPM	Axis	DEGREE OF FREEDOM	MS	F-Ratio	5 % F Limit
Between Columns	1440	X	1	.037	.037	F = .0052*
Between Rows		Y	2	.01	.01	F = .0010*
Residual Error		Z	2	.095	.095	

Table-3: ANNOVA of Variance (ANNOVA) For Weighted RMS Acceleration and rpm of hammer

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COGNIZANCE OF GENDER GAP AND EQUITY IN INDIAN SCENARIO

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ABSTRACT
While there are lot of policies and movement all over the world promoting gender equality, there is also a sincere need to focus on the term gender equity which serves as the mean to achieve gender equality. While the gender equality is gaining popularity and many implications in India, the question is, are people in India are aware about the term gender equity? Do people understand the difference between gender equality and equity? The research paper is an attempt to understand the difference between gender equity and equality and how gender equity serves a mean to achieve the gender equality and how its awareness can be useful to give a huge boost towards growth of our country and how it can bridge the gender gap.

Keywords: Gender Equity, Gender Equality, Bridge Gender Gap.

INTRODUCTION
India is one of the largest and fastest growing economies in the world. It is projected to become the fifth largest economy overall by 2020. The growth of any economy depends on many factors, one of the important factors is labour. The labour force can be further segregated on the basis of sex i.e. male and female. There is lot of traditional belief that women cannot work or cannot give desired results like that of the male. But breaking the stereotypes, many women have come out with better results in the workplace and achieving the impossible by her dedication, hard work and smart work. Empowering women would give a huge boost to our country. India's economic growth is limited by widespread gender inequality, violence, and cultural norms that devalue women's roles in society and in the workforce. Gender inequality in India bars many women from entering the formal workforce, and fears of sexual violence are even driving women out of the workforce. According to reports, India is one of the countries in the world where the female employment rate has fallen in recent years, dropping from the already low rate of 35% in 2005 to only 26% today. A recent report by McKinsey Global Institute pointed out that women in the workforce could add 60% to our GDP.

Gender Equality
Gender equality "does not mean that women and men will become the same, but that women's and men's rights, responsibilities and opportunities will not depend on whether they are born male or female."

Gender Equity
Gender equity means fairness of treatment for women and men, according to their respective needs. This may include equal treatment or treatment that is different but which is considered equivalent in terms of rights, benefits, obligations and opportunities.

Gender Gap
Gender gap means the differences between women and men, especially as reflected in social, political, intellectual, cultural, or economic attainments or attitudes.

OBJECTIVE
The major objective of this research is to study how proper awareness of gender equity will help to achieve the gender equity and how it can bridge the gender gap.

RESEARCH METHODOLOGY
This research is done purely on the basis of secondary data collection method. The data is collected from newspaper articles, websites and references from other research paper.

FINDING
The Global Gender Gap Index was first introduced by the World Economic Forum in 2006 as a framework for capturing the magnitude of gender-based disparities and tracking their progress over time. The Global Gender Gap Report benchmarks 149 countries on their progress towards gender parity across four thematic dimensions: a. Economic participation and opportunity – outcomes on salaries, participation levels and access to high-skilled employment, b. Educational attainment – outcomes on access to basic and higher level education, c. Political empowerment – outcomes on representation in decision-making structures, d. Health and survival – outcomes on life expectancy and sex ratio. India ranks 108 out of 149 countries, whereas Iceland tops the chart.

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SCORE AT GLANCE

Economy

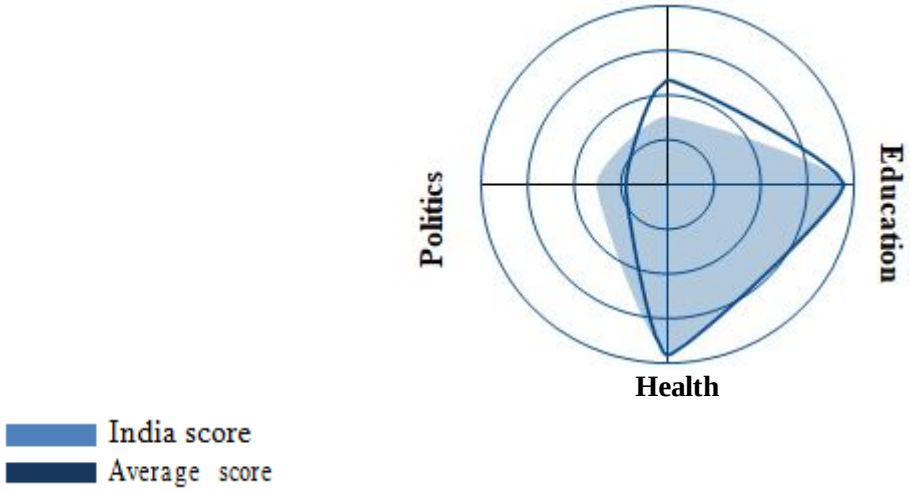

Table-1: Global Gender Gap Score across 4 thematic dimensions

Particulars	Rank	2006 Score	Rank	2018 score
Global Gender Gap Score	98	0.601	108	0.665
Economic participation and opportunity	110	0.397	142	0.385
Educational attainment	102	0.819	114	0.953
Health and survival	103	0.962	147	0.940
Political empowerment	20	0.227	19	0.382
rank out of	114		149	

Table-2: Country Score Card of 2018

Particulars	Rank	Score	Average	Female	Male	F/M
Economic participation and opportunity	**142**	**0.385**	**0.586**			
Labour force participation	138	0.351	0.669	28.7	81.7	0.35
Wage equality for similar work (survey)	72	0.646	0.645			0.65
Estimated earned income (PPP, US$)	138	0.232	0.51	2,602	11,195	0.23
Legislators, senior officials and managers	130	0.148	0.329	12.9	87.1	0.15
Professional and technical workers	133	0.338	0.753	25.3	74.7	0.34
Educational attainment	**114**	**0.953**	**0.949**			
Literacy rate	121	0.752	0.882	59.3	78.9	0.75
Enrolment in primary education	1	1	0.978	92.9	91.7	1.01
Enrolment in secondary education	1	1	0.967	62.2	61.4	1.01
Enrolment in tertiary education	1	1	0.939	27	26.9	1
Health and survival	**147**	**0.94**	**0.955**			
Sex ratio at birth	146	0.904	0.921			0.9
Healthy life expectancy	130	1.02	1.034	59.9	58.7	1.02
Political empowerment	**19**	**0.382**	**0.223**			
Women in parliament	123	0.134	0.284	11.8	88.2	0.13
Women in ministerial positions	77	0.227	0.208	18.5	81.5	0.23
Years with female head of state (last 50)	4	0.642	0.189	19.5	30.5	0.64

It can be seen that women has shown improvements in their rankings in political area as compared to the base year with (refer table 1). During 2018, the most impressive dimension is education followed by politics in terms of ranking, where females have performed better than average (refer table 2). There is still a need for lot of improvements in all these areas to make India a place better for both females and males. The term Gender Equity is not popular and is often mixed with Gender Equality. Gender equity is as important as gender equality but the difference is the former focuses on developing support systems for women whereas the latter aims to create a level-playing field for men and women. India's economic growth is limited by widespread gender

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inequality, violence, and cultural norms that devalue women's roles in society and in the workforce. Gender inequality in India bars many women from entering the formal workforce, and fears of sexual violence are even driving women out of the workforce. Consequently, India is one of the only countries in the world where the female employment rate has fallen in recent years, dropping from the already low rate of 35% in 2005 to only 26% today. According to the latest Monster Salary Index (MSI), the current gender pay gap in India stood at 19 per cent where men earned Rs 46.19 more in comparison to women. The median gross hourly salary for men in India in 2018 stood at Rs 242.49, while for women it stood at around Rs 196.3. According to the survey, the gender pay gap spans across key industries. IT/ITES services showed a sharp pay gap of 26 per cent in favour of men, while in the manufacturing sector; men earn 24 per cent more than women. Surprisingly, even in sectors like healthcare, caring services, and social work, men earn 21 per cent more than women, even as notionally these sectors are more identified with women, the survey said. Financial services, banking and insurance is the only industry where men earn just 2 per cent more, it added. According to the report, gender pay gap widens with the years of experience. In the initial years, the gender pay gap is moderate but rises significantly as the tenure increases. For those with over 10 years of experience, the gender pay gap in favour of men reaches the peak, with men earning 15 per cent more than women. In 2018, the gap has narrowed only by one per cent from 20 per cent in 2017. According to survey conducted by Monster.com aimed at understanding the working women of India and their workplace concerns which noted that 71 per cent men and 66 per cent women feel that gender parity needs to be a top priority for their organisations; 60 per cent of the working women felt that they are discriminated at work. The most notable form of discrimination is perception that women are less serious about work once they are married; 46 per cent women feel that maternity leads to a perception that they will quit;. 46 per cent women also believe that there is a notion that women can't put the same number of hours as men. The survey witnessed maximum share of participation from Mumbai at (24%), followed by Bengaluru (23%) and Delhi/NCR at (18%). The participation from non-metros was only at about 29%. This all has led to gender gap and also the need for Gender Equity for achieving Gender Equality.

NEED FOR THE GENDER EQUITY

Since it can be observed that there is huge of gender gap in almost all the sectors, there is need to solve the issues forming a balance between the gender gap. The research has also shown that gender equity can also led to better economic growth. Now the entire scenario of the selection of the profession is changing and the new areas and there is requirement that a proper chance is given to both sexes (say, related to sports, technology, start-ups).

INITIATIVES TAKEN BY RECENT GOVERNMENT IN THIS DIRECTION

Government has come up with many schemes for bridging the gender gap and create awareness amongst people to this sensitive issue like *Beti Bachao Beti Padhao Scheme*: This social campaign was launched with the aim to generate awareness and improve the efficiency of welfare services intended for girls, *Sukanya Samridhi Yojana (Girl Child Prosperity Scheme)*: This is a small deposit scheme of the Government of India for a girl child. This scheme was launched as a part of *Beti Bachao Beti Padhao* Campaign. *Pradhan Mantri Mudra Yojana*: Pradhan Mantri Mudra Yojana is a loan scheme to support small scale business and to promote entrepreneurship among people. Not specific for the women but again can be termed as an opportunity equal to both sexes the basic objective of equity.

SUGGESTIONS

Education is the most powerful weapon which you can use to change the world. If you educate a man you educate an individual, but if you educate a woman you educate an entire family. These quotes which helps in forms suggestion. Education is the basic and most important measure to fill this gender gap and promote gender equity. Education is beyond the term basic book knowledge, understanding that everyone deserves fair chance is most important. Provide a curriculum which challenges unfair cultural practices and which recognises the contribution to society of the full range of women and men, encourage the development of positive attitudes and behaviours in male and female students which promote social responsibility, empathy, and sensitive. Financial Independence of women is another factor which will help them to break stereotypes and take decisions which otherwise keeps them behind. Educate male and female about the stronger and effective laws at workplace for their rights to personal respect and safety and provide an environment that is safe and free from all forms of harassment and violence against men and women. Policies for women to resume job post maternity and marriage which is most common reason for the gender gap. Performance based promotions rather than based on the gender. As part CSR activities, organisation should promote gender equity. Most importantly a positive approach is required by all, as gender equity is aimed at providing resources based on need which may or may not be equal and gender equity aims at being fair rather than equality which can be unfair.

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CONCLUSION

There is appropriate knowledge of Gender Gap but at the same time there is lack of awareness about the gender equity in India, how it can be achieved. There is a need to improve awareness in all these aspects. Gender equity puts the focus on fairness and justice regarding benefits and needs for women and men, girls and boys. Gender equity in this context refers to the fact that a gender analysis of these needs is necessary, as they in many respects may be different for women and men, boys and girls. It can be simply concluded that the biological difference between men and women cannot be ignored but we can always be scope for fair chances to bridge the gap between them.

REFERENCES

- https://www.forbes.com/sites/ellevate/2017/09/14/why-we-need-gender-equity-now/#78e71ba377a2
- http://www.forbesindia.com/blog/work-place-human-resources/gender-equity-is-as-important-as-gender-equality/
- https://www.phi.org/news-events/1487/the-economics-of-gender-equity-in-india
- https://www.weforum.org/reports/the-global-gender-gap-report-2018
- http://reports.weforum.org/global-gender-gap-report-2018/data-explorer/#economy=IND
- https://www.theatlantic.com/sexes/archive/2013/01/indias-gender-equity-problem/266788/
- https://www.businesstoday.in/current/economy-politics/gender-pay-gap-still-high-women-in-india-earn-19-per-cent-less-than-men-report/story/325378.html
- //economictimes.indiatimes.com/articleshow/68302223.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
- https://www.jstor.org/stable/3401385?read-now=1&seq=1#page_scan_tab_contents
- http://mdgs.un.org/unsd/Demographic/sconcerns/tuse/Country/India/sourceind99a.pdf
- https://www.tandfonline.com/doi/full/10.1080/02673843.2019.1590852
- https://researchintegrityjournal.biomedcentral.com/articles/10.1186/s41073-016-0007-6

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PREDICTION OF PERMEABILITY OF CLAY BONDED MOULDING SAND MIX: NEURO-FUZZY BASED APPROACH

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ABSTRACT
In order to produce quality castings, it is crucial for the foundry industries to have an accurate control over the sand properties. A foundry man can effectively control the sand by predicting the properties of moulding sand mix accurately. It has been observed that soft computing techniques perform sand control operations quite well than the conventional lab control tests. An attempt has been made to develop a Neuro-Fuzzy based model to predict the Permeability of moulding sand mix and analyzing the composition of sand mix. A number of experiments have been conducted in the laboratory to generate the data by varying the process parameters viz. clay content, moisture, coal dust and mulling time. The experimental data have been used to develop the Neuro-Fuzzy based models. The results obtained by predicting the Permeability are in good agreement with the experimental values. It has been observed that neuro-fuzzy model predicts the sand mix property accurately.

Keywords: Permeability, Moulding Sand Mix, Neuro-Fuzzy Based Model.

1. INTRODUCTION
Green sand moulding is an important method of producing castings over the years and covers more than 90% sand molded castings. Sand moulding system has been practiced over the past several years through the development of different laboratory tests, control graphs [1, 2] and computer programmes [3-6]. The developed moulding sand control techniques could not be able to meet the present day requirements with the development of high pressure moulding. Therefore there began a quest for the development of new techniques for the effective moulding sand mix control. In view of these observations, soft computing techniques seem to be quite useful tool for controlling the process parameters of moulding sand mix. Till date, a few researchers applied soft computing techniques for sand control. In 2003, Karunakaran and Datta [7] developed an Artificial Neural Network model for the optimum formulation of green sand mixture. Bartelt, Grady and Dibble [8] designed a neural network based control system to adjust the water and bond addition rates to muller based on the green compressive strength and compactibility of moulding sand mixture. In the present investigation an attempt has been made to develop intelligent models for modeling the properties of clay bonded moulding sand mix.

Fuzzy models have been studied in the recent years in the hope of achieving human like performance in the fields of engineering. Fuzzy based systems emulate human behavior in managing and solving problems that cannot entirely be formalized by the use of mathematical models and treated by the use of system theory approaches. Fuzzy models require experts and decision makers who are well conversant with the process states and the input/output relationships to generate the linguistic rules[10]. All the rules will be activated to a certain degree and produce output accordingly. The possible number of linguistic rules increases exponentially when the number of input variables increases. For some large complex systems it is almost impossible to establish such a relationship model due to large amount of prepositions and the highly complicated multi dimensional fuzzy relationships [9] and there exists a trade-off between precision and generalization requirements for the fuzzy models [10]. This can be effectively managed by neuro-fuzzy systems.

Neuro-Fuzzy systems which combines elements of both neural networks and fuzzy methodology, work in a similar way to back-propagation neural network systems.. In the neuro-fuzzy systems, the learning algorithm modifies the analytical expressions of the membership functions, so as to diminish the total error. In these systems practical heuristic approaches are designed and engineered [11]. Like fuzzy system experts do not require to generate the rules for a fuzzy neural network model, the model can automatically set up fuzzy variables and their membership functions as well as fuzzy rules with the numerical data collected from the past operations [12], thus avoiding the delicate and expensive codification phase. Infact, neural networks and fuzzy logic can be considered two complementary technologies. Neural network can learn from data and feedback. However, the internal structures are difficult to understand and inflexible once the network is established. In contrast, fuzzy rule-based models are easy to comprehend because of their linguistic terms and the structure of the if-then rule base. Neuro-Fuzzy systems combine elements of neural networks and fuzzy methodology to gain the advantages of both the systems.

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In the recent years, the neuro-fuzzy models have been applied in forging, machining, metallurgy, scheduling, inspection planning and fault diagnosis [13]. Miaoquan [14] developed a FNN model to correlate the relationship between the grain size of the forged materials and the technical process parameters of the forging process. Tarng and Wang [15] developed adaptive fuzzy control system to reduce the nonlinear cutting behavior of CNC turning machine. In 2000, Hancheng [16] proposed an adaptive Fuzzy Neural Network (FNN) for the modelling the properties of grey cast iron. On the basis of Kuo's statement, the application of fuzzy logic theory could be used to improve the intrinsic slow learning rate of neural network; Hsing-Chia Kuo [17] used fuzzy theory to improve the neural network learning rate in the fault diagnosis of a marine propulsion shaft system. In addition to the above many researchers developed fuzzy neural network models in scheduling [18] and inspection planning [12].

In this work, an attempt has been made to develop an ANFIS-type (Adaptive Neuro-Fuzzy Inference system) neuro-fuzzy system to predict the Permeability of the moulding sand mixture and to analyse the sand-mix composition. Further the results obtained from the neuro-fuzzy model are compared with the experimental results. It has been verified from the results that neuro-fuzzy systems have high learning precision and generalisation capability.

2. EXPERIMENTAL DETAILS

In order to develop artificial intelligent models to predict the Permeability of moulding sand mix, it requires sample data sets for training, testing and validation. By considering the features of green sand moulding process, the amounts of clay, water, coal dust and mulling time are chosen as the input process parameters, while green compressive strength is chosen as the output parameter for modelling. Standard experimental procedures have been followed to generate data for modelling. Sand mixes were prepared by mulling the dry ingredients for a minute in a Simpson high-speed muller followed by water addition and then muller was allowed to run for sufficient period of time depending on the requirement of mulling time. The sand mix properties were measured for the standard AFS samples.

144 sets of data were generated by varying the amounts of clay, water, coal dust and mulling time. The variations of these parameters are as follows: Clay (Sodium Based Bentonite) 4, 6 and 8 percent; Moisture in the ranges of 3 to 6 percent with four variations; Coal Dust in the proportions of 0, 2, 4 and 6 percent by weight of sand, and the tests were repeated for 4, 6 and 8 minutes of Mulling time. For each sand composition the Permeability was measured. The specified ranges of input parameters for experiments were selected based on the past investigations [19-25] and industrial practices.

Out of the total data generated from the experiments, 16 sets of data were selected randomly for testing the developed model. The remaining data of 128 sets were used for training the proposed network model.

3. DEVELOPMENT OF NEURO-FUZZY MODEL

The designing and training the adaptive fuzzy model were performed using MATLAB 'Fuzzy Logic Toolbox'[26]. The learning algorithm that allows the system to learn dynamically from data is a combination of back-propagation and least square methods i.e. hybrid algorithm and the training stopping criterion was selected on the basis of error tolerance. When the training data is loaded, the adaptive fuzzy system automatically develops a Sugeno type Fuzzy Inference System (FIS) from input/output data for learning. The disjunction and defuzzification operators selected are prod (algebraic product) and wtaver (weighted average of the output distribution) respectively. The output of the various rules was aggregated according to a fuzzy 'weighted average', having as weights the matching degrees of the single rules. In the learning process of the developed Neuro-Fuzzy model, all the membership functions of variables are assigned to Gaussian type membership function and the parameter subspaces were determined by using C-means clustering of the training set.

3.1 The fuzzy rules generated by the learning process are as follows:

Rule 1: IF (CLAY is in1mf1) and (COALDUST is in2mf1) and (MOISTURE is in3mf1) and (MULLINGTIME is in4mf1) THEN (Permeability is out1mf1) (1)

Rule 2: IF (CLAY is in1mf2) and (COALDUST is in2mf2) and (MOISTURE is in3mf2) and (MULLINGTIME is in4mf2) THEN (Permeability is out1mf2) (1)

Rule 3: IF (CLAY is in1mf3) and (COALDUST is in2mf3) and (MOISTURE is in3mf3) and (MULLINGTIME is in4mf3) THEN (Permeability is out1mf3) (1)

Rule 65: IF (CLAY is in1mf65) and (COALDUST is in2mf65) and (MOISTURE is in3mf65) and (MULLINGTIME is in4mf65) THEN (Permeability is out1mf65) (1)

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Rule 66: IF (CLAY is in1mf66) and (COALDUST is in2mf66) and (MOISTURE is in3mf66) and (MULLINGTIME is in4mf66) THEN (Permeability is out1mf66) (1)

A schematic representation of neuro-fuzzy model structure can be seen in **Figure 1**.

< Include **Figure 1** about here >

i) The input layer: receives the input values and transmit them to the next layer without making changes.

ii) The membership function layer: computes the matching degrees between each single fuzzy condition (antecedents of the if-then rules) and each output.

iii) The rule layer: computes the matching degree of the conjunctive fuzzy conditions involving multiple variables.

iv) The inferential layer: propagates the matching degrees of the rules to the inferred condition.

v) The aggregation layer: contains the normalization node and the inferred conclusions are aggregated according to the fuzzy aggregation operator.

vi) The output layer: here the possibility distribution resulting from the aggregation of the inferred conclusions is finally defuzzified, producing the numerical output at the exit of the system.

4. RESULTS AND DISCUSSION

The fuzzy neural network model developed after training was tested against the test data and was further used to predict the green compressive strength of moulding sand mixture. The rule viewer of the developed adaptive fuzzy inference system has been given in **Figure 2**. In this Figure a set of input attributes for specific sand composition and their corresponding predicted Permeability value are presented. Similarly the Permeability for other sand mix composition could also be predicted with the rule viewer when the input variables selected are with in the best possible ranges of input process parameters. The **Figure 3** represents the output surfaces generated by the proposed neuro-fuzzy model. These surface graphs are helpful in analyzing the sand mix composition in terms of the input process parameters Clay, Coal Dust, Moisture and Mulling Time and the corresponding output parameter Permeability.

< Include **Figure 2-3** about here >

It can be viewed from the table that the maximum percentage error obtained from the neuro-fuzzy model is 9.9 and the coefficient of correlation (R^2) values are 0.945 and 0.87 respectively which is shown in **Figure 4-5**. It may be inferred from the Figures that neuro-fuzzy model can predict the properties of moulding sand accurately because of high learning precision and generalization.

< Include **Figure 4- 5** about here >

5. CONCLUSIONS

A Neuro-Fuzzy model is developed for predicting the Permeability of the moulding sand mixture and to analyze the relation between the clay content, coal dust content, moisture and mulling time with the Permeability of the moulding sand mix. The predicted values of Permeability of the neuro-fuzzy model is in good agreement with the experimental values. Two most important conclusions that can be drawn from the present work are:

i) Neuro-Fuzzy models have higher learning precision and generalization capability and can predict the Permeability of clay bonded moulding sand mix accurately.

ii) The application of neuro-fuzzy models can reduce the learning time by self adjusting the dynamic state learning parameters and can converge more rapidly.

REFERENCES

[1] **Wenniger CE,** and **Volkmar AP.** A new control tool: A graph for evaluating effectiveness of available bentonite within foundry system sands, AFS Transactions, 1970, 17-24.

[2] **Volkmar AP.** System sand control by Compression Vs Compactibility testing, AFS Transactions, 93-96.

[3] **Luckenbaugh JR,** and **Sharkus DP.** A computer controlled green sand system, AFS Transactions, 1987, 117-122.

[4] **Huskonen WD.** Computer program systematizes sand control, Foundry, 1970, 140-144.

[5] **Dietert HW, Graham AL,** and **Schumacher JS.** A sand control program that saves castings, AFS Transactions, 1974, 329-342.

ISSN 2394 - 7780

[6] **Bethke L,** and **Masarik J.** Trend analysis in green sand control – A computer program, AFS Transactions, 1984, 119-122.

[7] **Karunakar DB,** and **Datta GL.** Modelling of green sand mould parameters using artificial neural networks, Indian Foundry Journal 2003, 27-36.

[8] **Yao RB, Tang CX,** and **Sun GX.** Predicting grey cast iron properties with artificial neural network, AFS Transaction, 1996, 635-642.

[9] **Reddy DC,** and **Reddy CS.** Development of neural network methodology to predict TTT diagrams, AFS Transactions, 1996, 191-196.

[10] **Ohdar RK,** and **Ray PK**. Performance measurement and evaluation of suppliers in supply chain: an evolutionary fuzzy based approach, Journal of Manufacturing Technology Management, **15,** 2004, 723-734.

[11] **D'Errico GE.** Fuzzy control systems with application to machining processes, *Journal of Material Processing Technology*, 2001, 109, 38-43.

[12] **Nassimbeni G, Battain F.** Evaluation of supplier contribution to product development: fuzzy and neuro-fuzzy based approaches, IJPR, 2003, **41**, 2933-2956.

[13] **Hwang I, Lee H,** and **Ha S.** Hybrid neuro-fuzzy approach to the generation of measuring points for knowledge-based inspection planning, IJPR 2002, **40,** 2507-2520.

[14] **Miaoquan L, Dunjun C, Aiming X,** and **Li L.** An adaptive prediction model of grain size for the forging of Ti-6Al-4V alloy based on fuzzy neural networks, Journal of Material Processing Technology, 2002, 1-5.

[15] **Tang YS,** and **Wang YS.** Inst. J. Machine Tools Manufacture, 1993, **33/6**, 761.

[16] **Hancheng Q, Bocai X, Shangzheng L,** and **Fagen W.** Fuzzy neural network modelling of material properties, Journal of Material Processing Technology, 2002, 122, 196-200.

[17] **Kuo HC, Wu LJ,** and **Chen JH.** Neural-Fuzzy fault diagnosis in a marine propulsion shaft system, Journal of Material Processing Technology, 2002, 122, 12-22.

[18] **Cha Y,** and **Jung M,** Satisfaction assessment of multi-objective schedules using neural-fuzzy methodology, IJPR, 2003, 41, 1831-1849.

[19] **Shin TS, Green A,** and **Heine RW.** Evaluation of green sand properties and clay behaviour at 7 to 15 % Bentonite levels, AFS transactions, 1984, 467-474.

[20] **Shin TS, Green A,** and **Heine RW.** Evaluation of 8-15% Bentonite content green sand properties and behaviour: Part IV summary, AFS transactions, 1987, 467-474.

[21] **Moore A.** Coal dust in green sand – a new look at an old practice, Foundry Trade Journal, 1991, 589-592.

[22] **Wenninger E.** Some newly developed concepts of green sand moulding, AFS Transactions, 1962, 177-184.

[23] **Thambaih TR,** and **Sarkar AD.** Effect of mulling time on the properties of green sands, Foundry Trade Journal, 1973, 683-684.

[24] **Dieter HW, Graham AL,** and **Schumacher JS.** How mulling time affects sand properties, Foundry, 1971, 42-47.

[25] **Parkes WB.** Behaviour of sand bonded clays in a foundry, BCIRA, 1961.

[26] MATHWORKS INC., 2003, http://www.mathworks.com.

ISSN 2394 - 7780

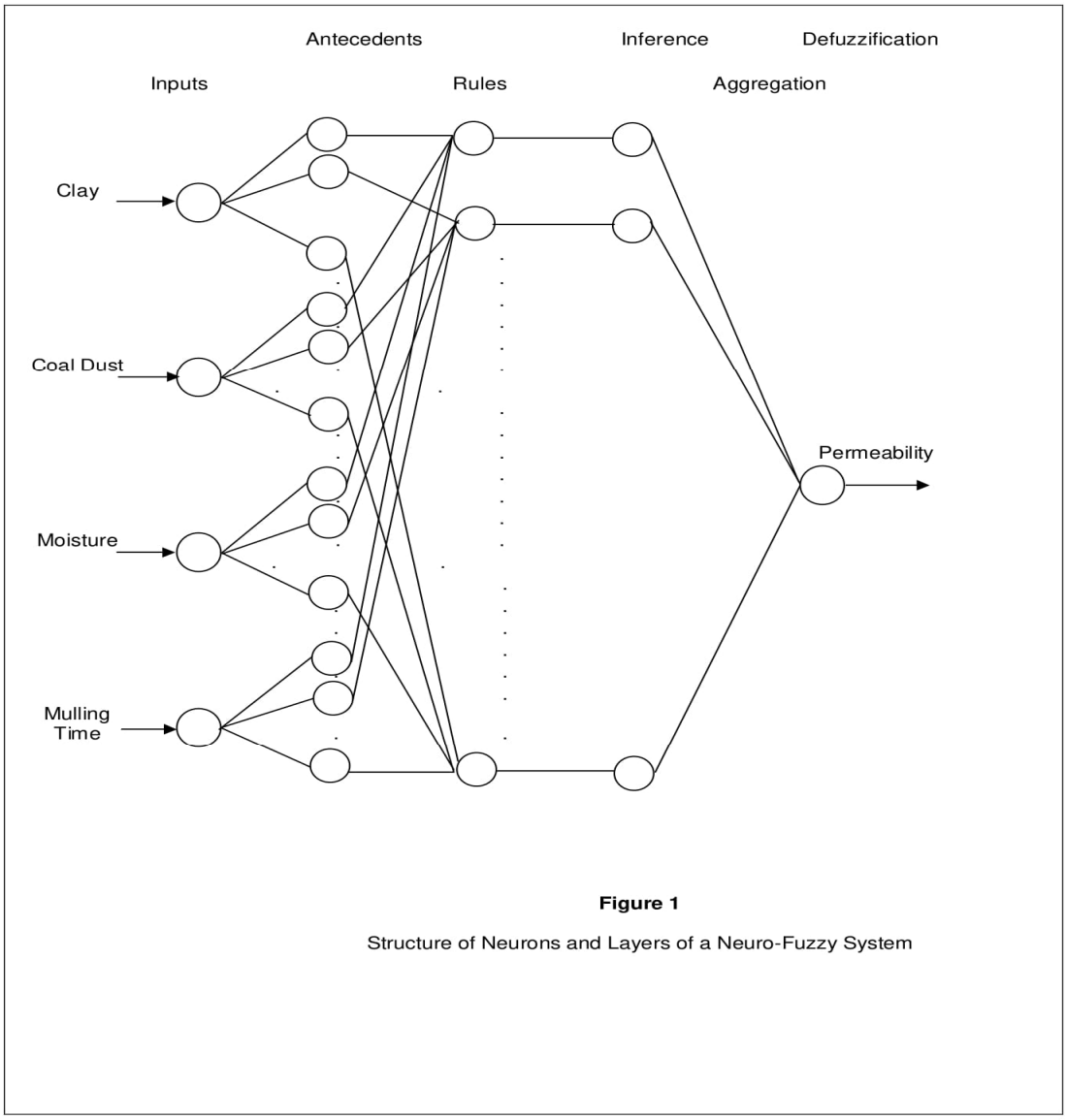

Figure 1

Structure of Neurons and Layers of a Neuro-Fuzzy System

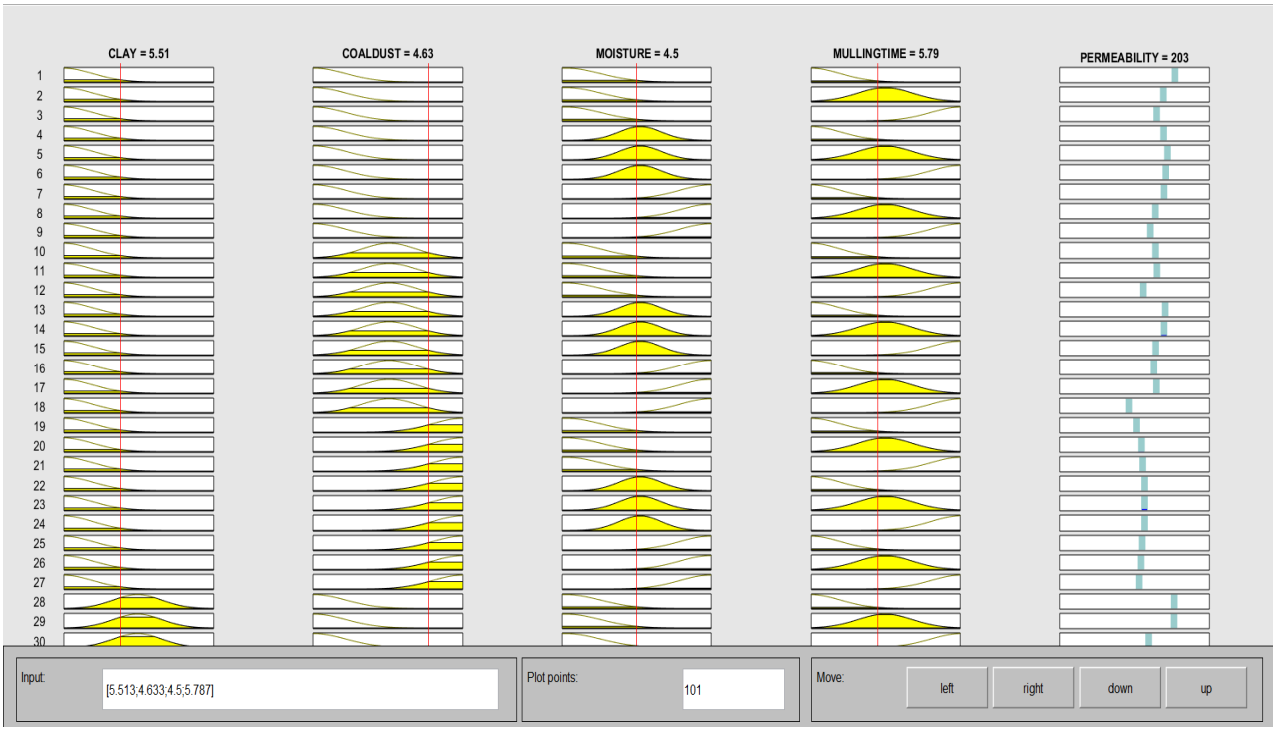

Figure-2: Rule Viewer of Generated Neuro-Fuzzy Model to Predict the Permeability of the Moulding Sand Mix

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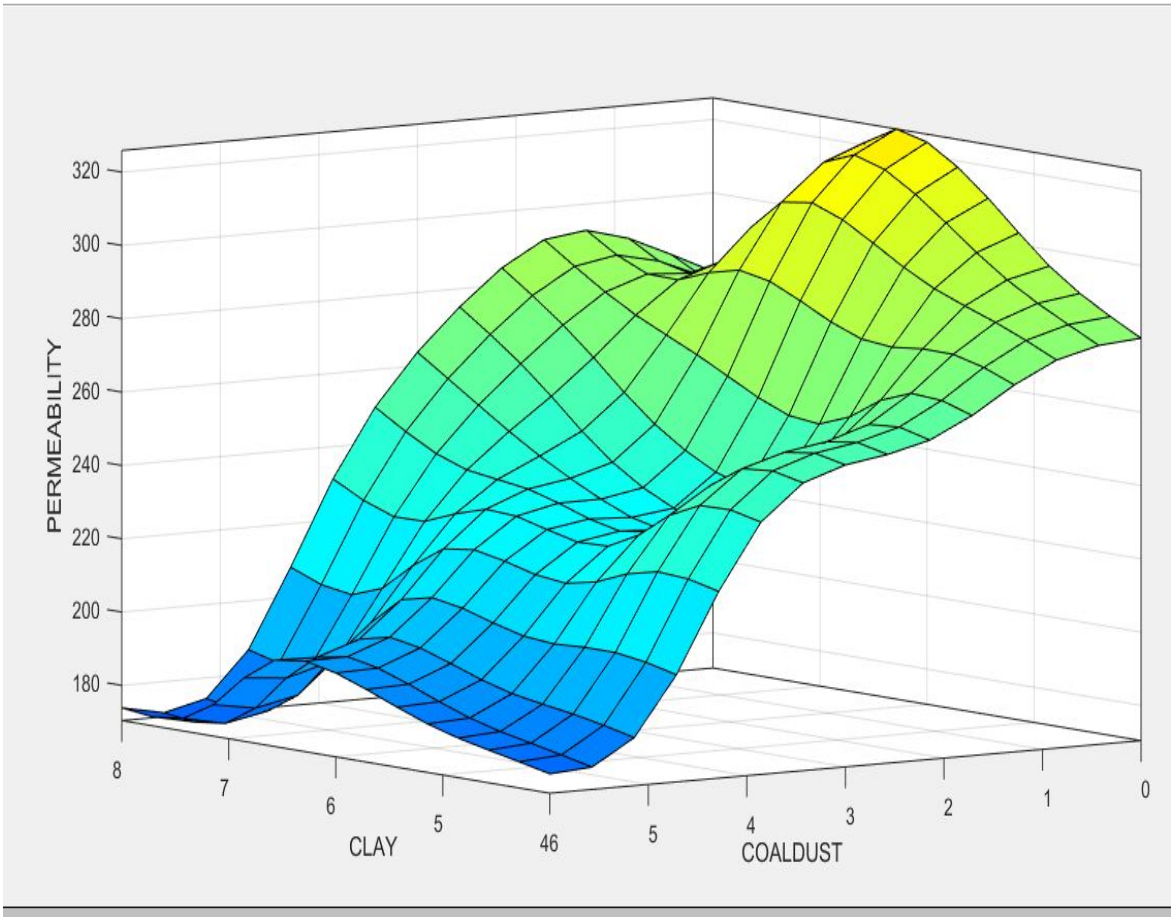

Figure-3a: Output Surface Graphs Generated by the Neuro-Fuzzy Model

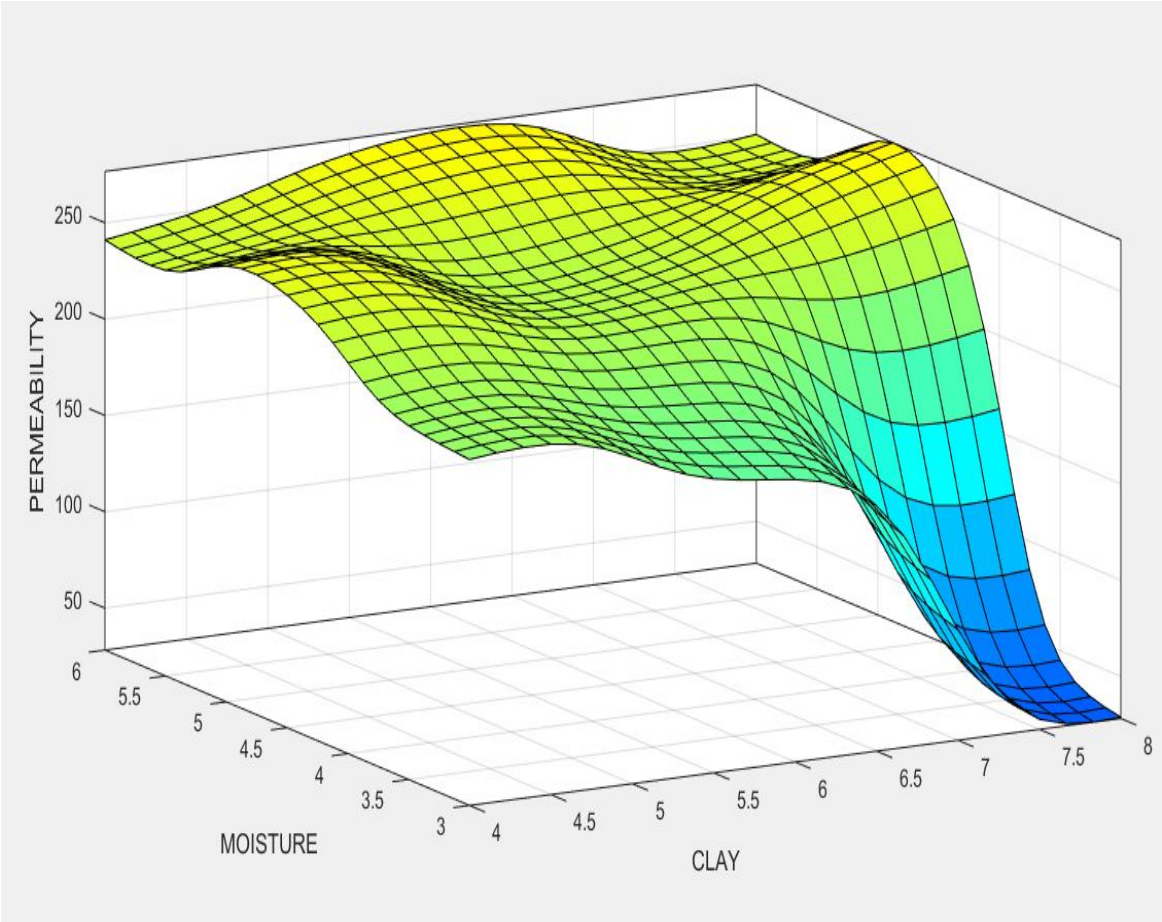

Figure-3b: Output Surface Graphs Generated by the Neuro-Fuzzy Model

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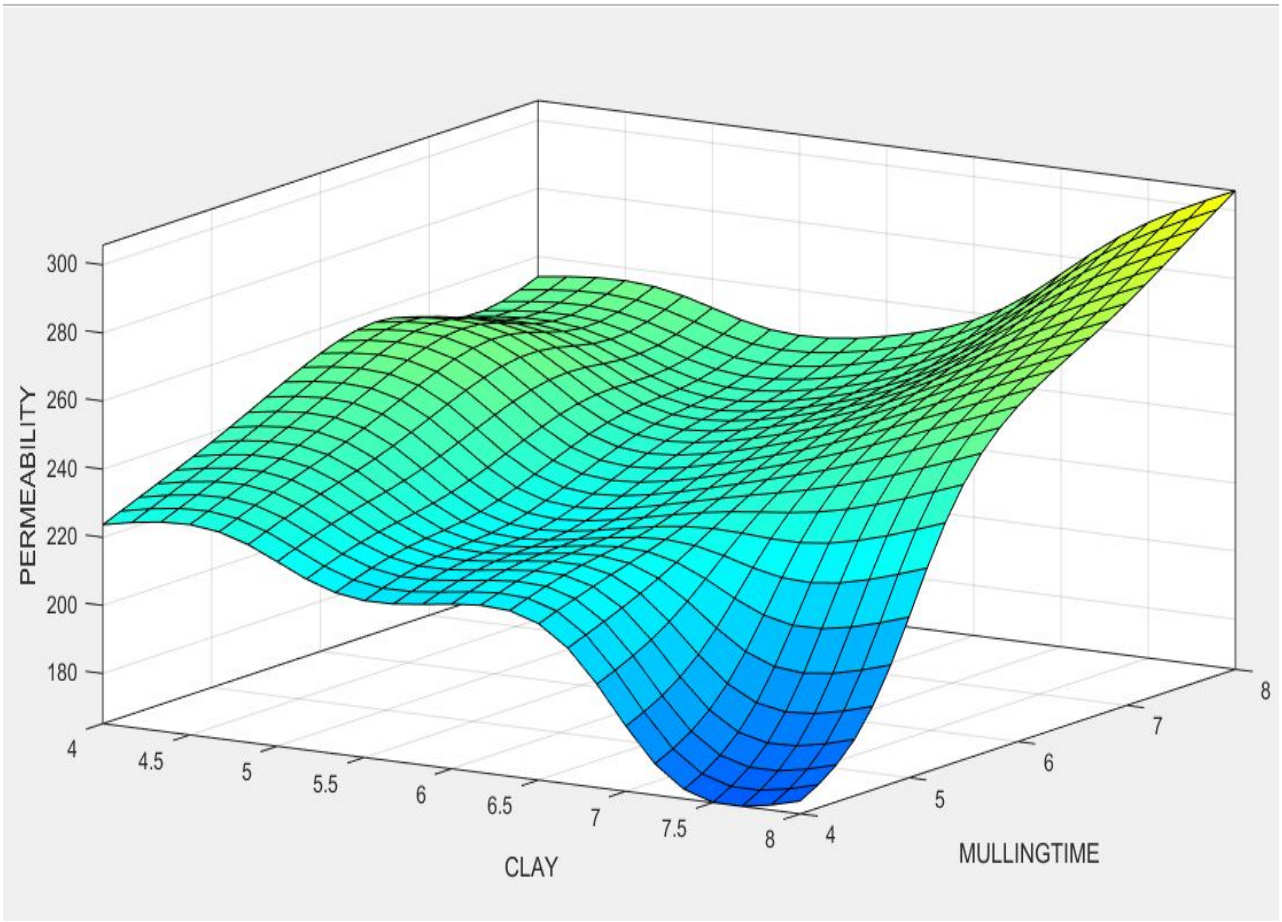

Figure-3c: Output Surface Graphs Generated by the Neuro-Fuzzy Model

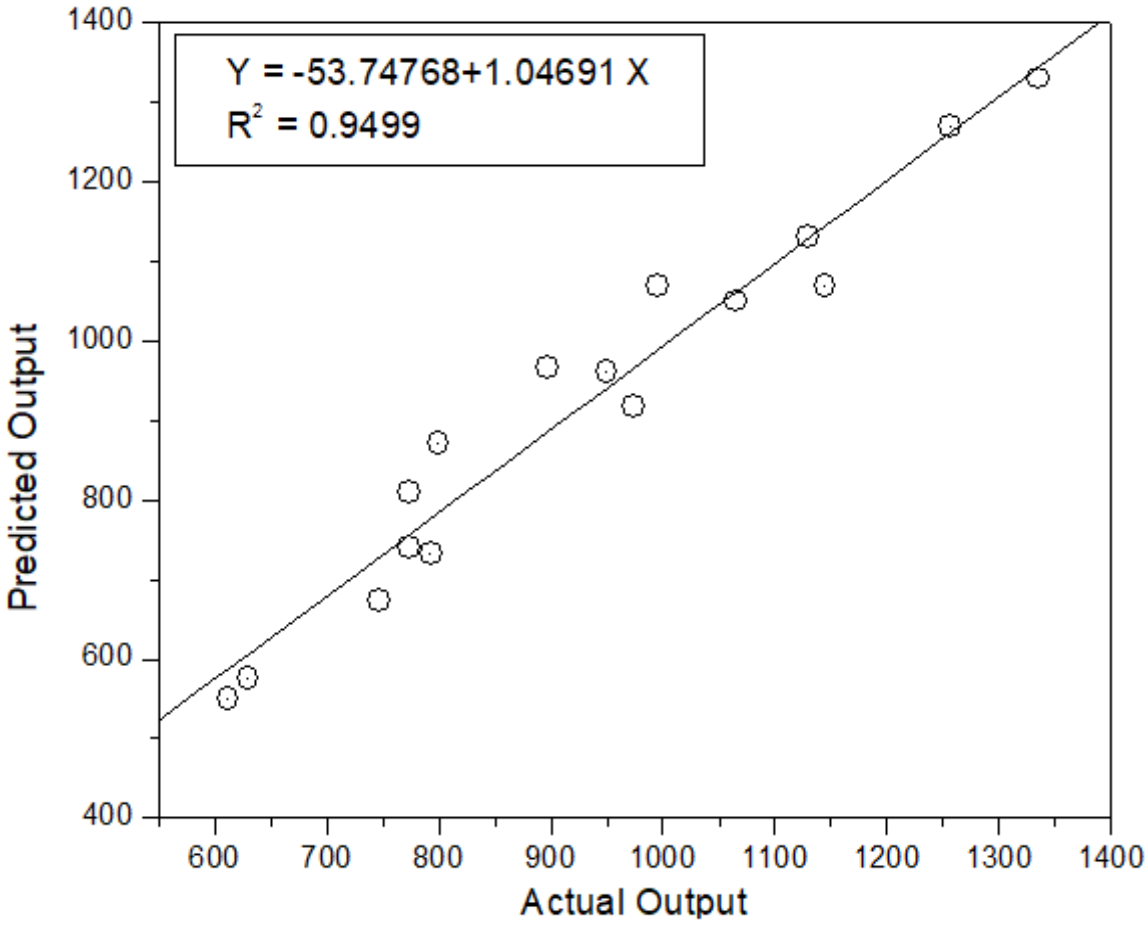

Figure-4: Performance of the Neuro-Fuzzy System for Simulation of Permeability

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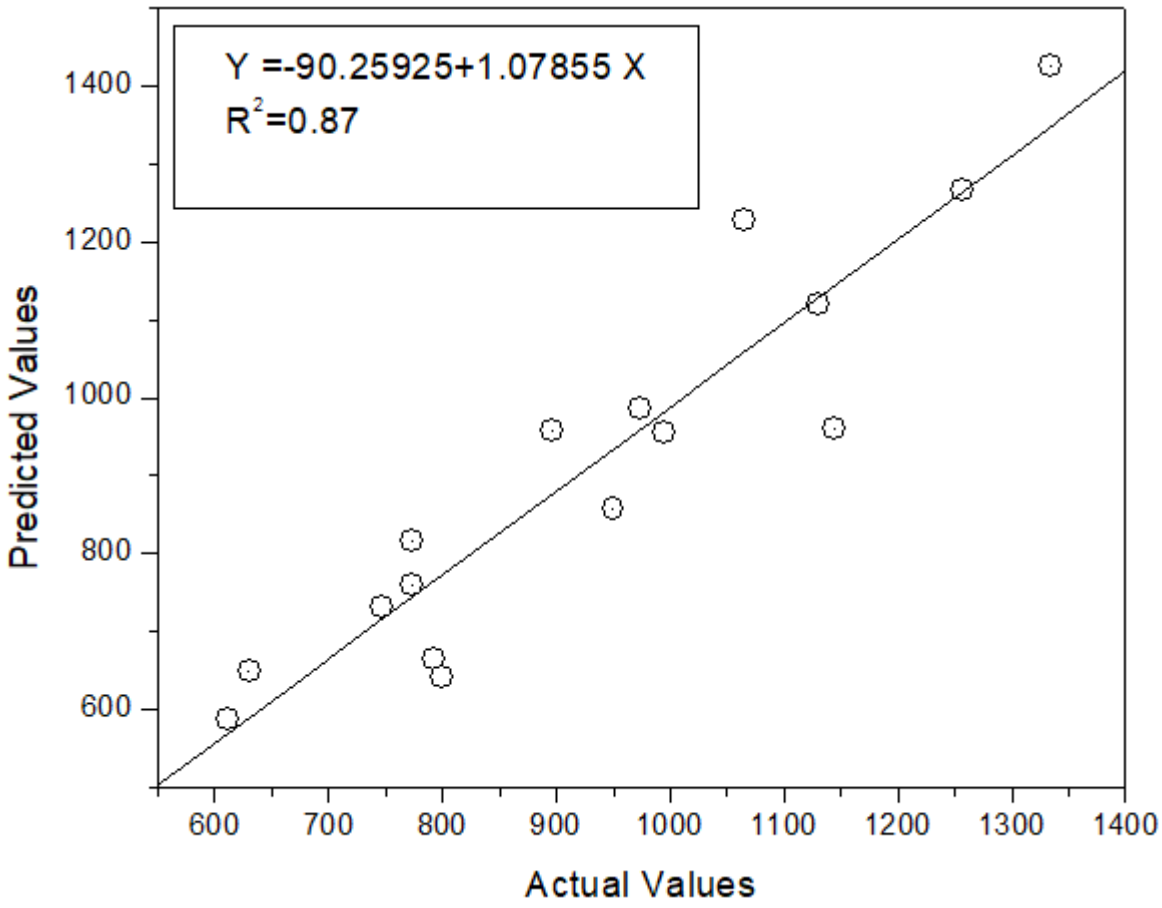

Figure-5: Performance of the Neural Network for Simulation of Permeability

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HAPTIC DEVICES: EARLY STAGES AND EVOLUTION

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ABSTRACT
Haptics is discipline of studies which deals with sense of touch. In this paper various devices developed using Haptic Technology are discussed. In brief, the Evolution of Haptic Devices is reviewed. In early stages, vibrators using either Eccentric Rotating Mass (ERM) or Linear Resonant Actuator (LRA) or Piezoelectric actuators were used. These devices were used to interact with Computers using some direct contact or wearable devices like gloves. Next stages were Non-Contact Haptic Touch devices which are mainly useful in gaming or virtual environments. A review of Evolution, Types of Technologies, Various Devices developed using these technologies like Ultrahaptics, Ultraino, Ultrasound Advanced Open Platform (ULA-OP) is done. The applications of the Devices are also been reviewed.

Keywords: Haptic Technology, Evolution of Haptics, Early Stages, Haptics

I. INTRODUCTION

Haptic (Haptô)is a Greek term which represents "relative to sense of touch" [1]. The studies related to sense of touch is named as Haptics or Haptic technology. In the world with all touch enabled devices gaining importance, different devices are developed which can perform touch enabled tasks. But to project some shape of button or icon into mid-air is still in research stage.

Haptic interface is effective enough to induce sense of tactile "realness" into computer generated imaginary objects and allow the user to touch or manipulate them [1]. When Haptics is applied to Virtual reality some impossible things can happen like Touchable Hologram.

When introduced, haptics was used to take input in the form of pressure or force feedback which was converted into instruction for a computer but later a projection of pressure into mid-air which can be felt by user could be done. This was possible by using Ultrasonic Transducers which made Haptics to Evolve as Non-Contact devices.

Some of the applications such as Ultrahaptics [2], Ultraino [3] and Ultrasound Advanced Open Platform (ULA-OP) [4] are also discussed. Let us start with Early stages in the Haptic Device Development.

II. EARLY STAGES

An output generated from computer could be made touchable by Artificial Intelligence Laboratory of MIT (Massachusetts Institute of Technology), which was first Haptic simulation in 1993 [1]. In early stages Haptic touch was generated using Sensors or Motors (Actuators). Evolution in Haptics has led the technology into usage of computer hardware and software, other than using only sensors. This enabled a vast range of sensations that can be created for different applications. They could render touch into virtual objects after lot of research.

A. List of devices

In early stages Haptic systems used the following devices:

- Sensors: Pressure sensors, temperature sensors etc.
- Actuator control circuits: ERM, LRA, Piezoelectric actuators [5],[6].
- Real-Time algorithms: Achieved using Reprogrammable FPGA.
- Application programming interface: Layers of programming such as Graphical, Behavioural, Raw layers [7].

B. Devices used in Early stages

1) Eccentric Rotating Mass (ERM)

Eccentric Rotating Mass (ERM) actuator shown in Fig. 1 is commonly used actuator to create vibrations in most electronic devices. ERM uses Haptic feedback [5]. It generally consists of an unbalanced weight attached to a motor shaft. The rotation of shaft causes the actuator and the device attached to vibrate or shake. ERM's are slow, which led to development of other actuators like LRA.

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2) Linear Resonant Actuator (LRA)

Linear Resonant Actuator (LRA)is shown in Fig.1, is used in devices such as Apple's MacBook and iPhones are actuators that moves a mass in reciprocal manner, by means of a magnetic voice coil [5]. Response time of LRA is quicker than an ERM, which results in accurate Haptic imagery. Researcht in Haptic Technology resulted in development of actuators such as Piezoelectric Actuators.

3) Piezoelectric Actuator

Other kind of actuators called piezoelectric actuators are also employed for more precise motion with less noise and in smaller platform [5]. As shown in Fig.1 the disadvantage is that they consume high voltages than ERM and LRA implementations and are fragile. This was the first stages of Force Feedback technology in Haptic.

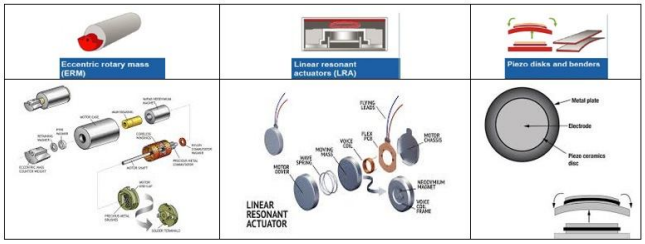

Fig-1: ERM(Eccentric Rotating Mass), LRA(Linear Resonant Actuator, Piezoelectric Actuator

A. Force Feedback Haptic Training

Force Feedback devices use motors to manipulate the movement of peripheral held by user. The videogames and simulators used for racing and automobile driving games use these kinds of devices.

The Falcon released by Novint in 2007 is one of the first consumer 3D touch device with high resolution 3DForce Feedback [8]. By Haptic simulation objects, textures, recoil, momentum and physical presence of objects in games can be allowed, experimental setup for Haptic Training is as shown in Fig,2.

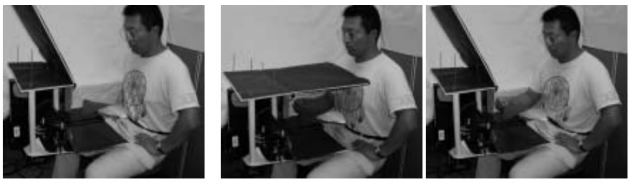

Fig. 2. Haptic Training Experimental Setup

Haptic training is the result of these Force Feedback devices. The mechanisms underlying these processes include Kinesthesis and Proprioception, which mediate Haptic interaction with the world. Kinesthesis is the human sense of position and movement which is created from proprioceptive cues arising from receptors in joints and muscles.

Force Feedback technologies led to various applications in Medical Field [9], Development of Assistive Devices for Visually impaired etc. Most of the applications were Wearable Devices such as Gloves, Belt [10], Cap or Vest etc.

Technologies when evolve may lead to level of next generation technologies which could be unimaginable. Such evolution was seen in Haptics when it evolved into from Wearable devices to Non-Contact Devices [11].

III. EVOLUTION

When sense of touch without physical contact of a device happens, it is called Non-contact Haptics or Mid-air Haptic Technology. Interactions with a system in (Three Dimension) 3D space using feedback is done, physical input devices are absent to perform action on system. A Non-contact haptic device is shown in Fig.3, where a 3D object is projected which is invisible but can be sensed when user touches it.

Fig-3: Haptic Rendering by Non-Contact Mid-air Touch

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A. Non-contact tactile sensation producing Airborne Ultrasound

When tactile feedback is provided to the user's bare hands in free space, the applications of the system will improve immensely. There are two classic ways to provide tactile feedback in mid-air.

First strategy is to attach tactile display device on user's hands. Second one is to control position of tactile displays so that they contact with skin only when tactile feedback is required.

In first strategy, tactile feelings are degraded because contact between skin and the device occurs even when there is no need to provide tactile sensation. In second strategy due to requirement of bulky and complicated control methods and master-slave environment is also said to be major drawbacks.

The prototype shown in Fig.4 uses 91 Ultrasound Transducers (T410010A1, Nippon Ceramic) packed in Annular array, arranged in Hexagonal manner. The resonant frequency of each transducer is 40khz [12].

This array is connected to a 12-channel amplifier, which is in turn connected to (Personnel Computer) PC via Digital (Input/Output) I/O card (CSI292144, Interface Corporation) [12]. The prototype was able to produce vibrations up to 1khz in Mid-air.

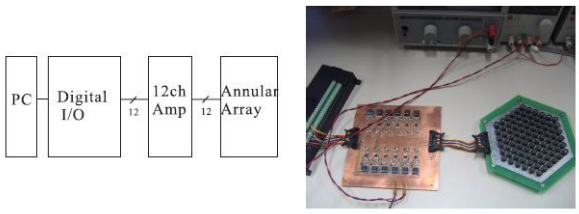

Fig-4: Block diagram and Experimental setup with Annular Array of Ultrasonic Transducers and 12 channel Amplifier circuit with drivers

This device doesn't contain programmable devices like FPGA or Arduino etc. which results in a smaller number of options while manipulating the wave generation in Ultrasonic Transducers.

B. Non-contact tactile sensation syntesized by Airborne Ultrasound

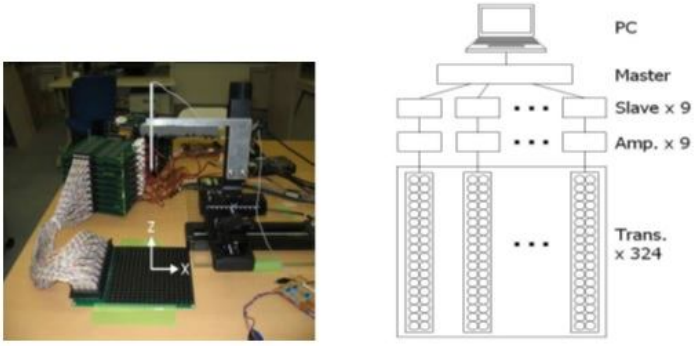

Fig-5: Experimental setup for FPGA Master/Slave

The operation of system is based pre-calculated Look-Up Table for phase delays and amplitudes, downloaded to the slaves. When command is sent from PC, the slaves drive the Ultrasound Transducers of corresponding phase and amplitudes based on the table.

The prototype shown in the Fig.5 has a cycle of40khz rectangular waves divided in 16 segments (i.e. 1.5625μs) [13]. The phase control is done by HIGH (=24v) period within 16 segments. Amplitude is controlled by HIGH (i.e. PWM). Thus, phase and amplitude are quantised by 4 bits and 3 bits respectively.

The FPGA allows the user to reprogram the phase and amplitudes according to the requirement and enhances the applications. The number of channels connected cannot be extended as the capacity of FPGA is limited and the programming is also complex

Some researchers developed a prototype using Arduino Boards Ultraino, which could be extendable as the boards could be connected parallelly depending on requirement of number of channels [3].

IV. HAPTIC DEVICES DEVELOPED BASED ON VARIOUS PLATFORMS

Haptic devices which are used for mid-air tactile displays, are based on different platforms like FPGA, Arduino, amplifiers etc. Some of them include Ultrahaptics, Ultraino, ULA-OP etc.

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A. Ultrahaptics

Ultrahaptics, shown in Fig.6 is a device which is developed based on FPGA platform with an external circuit for support is attached [2].

Ultrahaptics employs focused ultrasound to project discrete points of haptic feedback through the display and directly on to the user's hands.

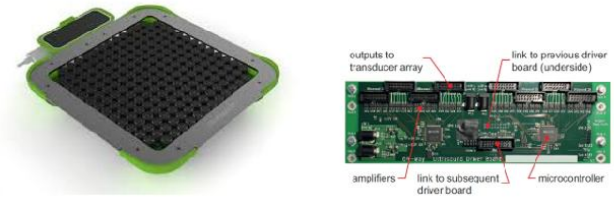

Fig-6: Ultrahaptics TOUCH Kit, Driver Board

Applications of Ultrahaptics include Air-piano, shown in Fig.7 which allows user to play a Piano in Mid-air, to make the projection visible an HMD device is used [14].

Fig-7: Setup for Air-Piano using Ultrahaptics Device

B. Ultraino

Ultraino is a Haptic display device shown in Fig.8, designed based on Arduino board platform [3]. The system hardware consists of a driver board which is capable of reading amplitude phases produced by software and the generating half-square wave driving signals of upto17vpp and π/5phase resolution for 64 individual channels.

Fig-8: Ultraino setup and Arduino Board, Shield mounted on top of Ardiuno Board

C. Ultrasound Advanced Open Platform (ULA-OP)

The hardware used for developing ULA-OP consists of two driver boards which can control 64 elements simultaneously [4]. These boards are connected to PC using an USB cable as shown in Fig.9.

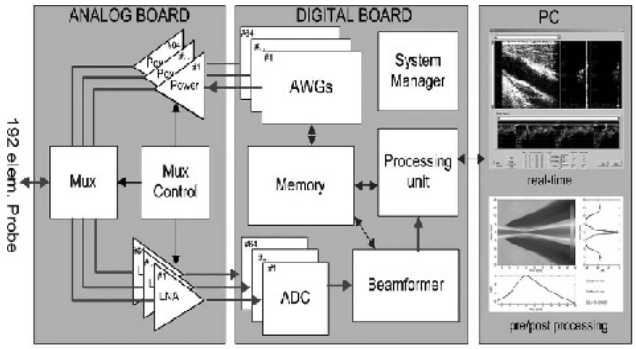

Fig-9: Block Diagram for ULA-OP

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V. CONCLUSION

A review paper on Evolution and Development of Haptic Technology is presented. Haptic technology is one of the fast-developing technologies. By having a glance on the Evolution and development of such technologies the application range can be expanded vastly. In Early stages only touch with vibration on force feedback were applied where a device could be wearable or should be in contact to the user. But in later stages a Non-contact Mid-air touch was made possible where no direct contact is required by the user. This resulted in revolutionary changes happening in Gaming, Medical and some touch enabled services. Augmented Reality and Virtual environments at full demand, enabling touch to them will take them into un-imaginary positions. Thus, it is concluded that the upcoming applications in Haptic may result in Touchable environments which are visible in near future.

REFERENCES

[1] Gianni Campion "The Synthesis of Three Domentional Haptic textures, Geometry, Control,and Psychophysics" Euro Haptics Springer(EHS) 2011.

[2] Tom Carter, Sue Ann Seah, Benjimin Long, Bruce Drinkwater ans Sriram Subramanian "Ultrhaptics Multi-Point Mid-air Haptic Feedback for Touch Surfaces" UIST 2013,ST.Andrews, UK.

[3] Asier Marzo, Tom Corkett and Bruce Drinkwater "Ultraino: An Open-Phased Array System for Narrowband Airborne Ultrasound Transmission" IEEE Transactions on Ultrasonics, 1-Jan-2018.

[4] Piero Tortoil et al "ULA-OP: An Advanced Open Platform for Ultrsound Research", IEEE Transaction on Ultrasonics, 10-Oct-2009.

[5] Martin Grunwald "Human Haptic Perceptions: Basics and Applications" Springer Science and Bussiness Media 17-Oct-2008.

[6] Mudit Ratna Balla, Harsha Balla and Anand Balla "Haptic Technology: An Evolution towards Naturality in communication" IJARCS 2010.

[7] David Ledo, Miguel A.Nacenta, Nicolai Marquardt, Sebastian Boring and Saul Greenberg "The HapticTouch Toolkit: Enabling Exploration of Haptic Interaction" Research Report 2011-1012-24 Department of Computer Science,University of Calgery, Calgery AB, Canada.

[8] David Faygin, Madeleine Keehner and Frank Tendick "Haptic Guidance: Experimental Evaluation ofHaptic Training Method for Perceptual Motor Skills" IEEE 2002.

[9] J.B.Pegador et al "Augmented Reality Haptic (ARH): An Approach of Electromagnetic Tracking in Minimally Invasive Surgery" IntJCARS 2-July-2010.

[10] Troy McDaniel, Sreekar Krishna, Vineeth BlasubramanianDirk Colbry andSethuraman Panchanathan "Using a Haptic Belt to ConveyNon-Verbal Communication Cues during Social Interactions to Individuals who are Blind" Haptic Audio Video Environments and Their Applications, Otawa, Canada, 18-19 Oct 2008.

[11] R.Valázquez, "Wearable Assistive Devices for Blind" Chapter 17 in A.Lay Ekuakille and S.C Mukhopadyay (Eds) Wearable Autonomous Biomedical Devices and systems for Smart Environment: Issues and Charecterization, LNEE 75, Springer pp331-349,2010.

[12] Takayuli Iwamoto, Mare Tatezono and Hiroyuki Shinoda "Non-Contact Tactile Sensation Procedure by Ultrasonic Transducers" EuroHaptics 2008, LNCS 5024, pp 504-513, Springer 2008

[13] Tayuki Hoshi, Takayuki Iwamoto and Hiroyuki Shinoda "Non-Contact tactile sensation Synthesized by Ultrasonic Transducers" Third Joint Euro Haptic Conference and Symposium on Haptic Interfaces for Virtual Environment and Teleoperating Systems, Salt Lake city,UT, USA, Mar 18-20 2009.

[14] Inwook Hwang, Hyungki Son and Jin Ryong Kim "Air-Piano: Enhancing Music Playing Experience in Virtual Reality with Mid-air Haptic Feedback" IEEE World Haptics Conference, Munich, Germany, 6-9 July 2017.

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LOW POWER CONSUMPTION LOSSLESS IMAGE COMPRESSION ALGORITHMS: A SURVEY

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ABSTRACT
Information pressure can be comprehended as a strategy that takes an info information and creates a shorter portrayal of the information with less number of bits contrasted with that of a unique. The invert procedure is called decompression, which takes the compacted information and produces or remakes the information. Some of the time the pressure (coding) and decompression (interpreting) frameworks together are known as a "CODEC". In this work, Image Compression calculation application is utilized in low power self-sufficient cell phones. The demosaicing activity, shading space change, and downsampling are assets requesting pre-preparing tasks are past strategies. Bayer RGB is the technique is utilized to pack the picture at sensor input this is the present strategy. The DCT-and wavelet-based picture pressure, for example, JPEG performs exceptionally well at moderate piece rates; in any case, at higher pressure proportion, the nature of the picture debases in view of the ancient rarities coming about because of the square based DCT and wavelet plot. So we are utilizing the Bayer RGB model and creepy crawly monkeys improvement to take care of the issues. This is another methodology for numerical enhancement is proposed by displaying the searching conduct of spider-monkeys.

1. INTRODUCTION

Picture compression is the utilization of Data pressure on advanced pictures. The goal of picture pressure is to lessen excess of the picture information so as to have the capacity to store or transmit information in an effective frame. Picture pressure can be lossy or lossless. Lossless pressure is some of the time favored for counterfeit pictures, for example, specialized illustrations, symbols or funnies. This is on the grounds that lossy pressure techniques, particularly when utilized at low piece rates, present pressure curios. Lossless pressure strategies may likewise be favored for high esteem content, for example, therapeutic symbolism or picture examines made for authentic purposes. Lossy strategies are particularly appropriate for regular pictures, for example, photographs in applications where minor loss of constancy is adequate to accomplish a significant decrease in bit rate. The lossy pressure that produces vague contrasts can be called outwardly lossless. Run-length encoding and entropy encoding are the strategies for lossless picture pressure. Change coding, where a Fourier-related change, for example, DCT or the wavelet change are connected, trailed by quantization and entropy coding can be refered to as a technique for lossy picture pressure.

2. COMPRESSION ARTIFACT

A compression artifac is the result of an aggressive data compression scheme applied to an image, that discards some data that may be too complex to store in the available data-rate, or may have been incorrectly determined by an algorithm to be of little subjective importance, but is in fact objectionable to the viewer. Artifacts are often a result of the latent errors inherent in lossy data compression. Some of the common artefacts are:

2.1 BlockingArtifacts

A distortion that appears in compressed image as abnormally large pixel blocks. Also called "macroblocking," it occurs when the encoder cannot keep up with the allocated bandwidth. Image uses lossy compression, and the higher the compression rate, the more content is removed. At decompression, the output of certain decoded blocks makes surrounding pixels appear averaged together and look like larger blocks.

2.2 Colour Distortion

As human eyes are not as sensitive to colour as to brightness, much of the detailed colour (chrominance) information is disposed, while luminance is retained. This process is called "chroma subsampling", and it means that a colour image is split into a brightness image and two colour images. The brightness (luma) image is stored at the original resolution, whereas the two colour (chroma) images are stored at a lower resolution. The compressed images look slightly washed-out, with less brilliant colour.

2.3 Ringing Artifacts

In digital image processing, ringing artifacts are artifacts that appear as spurious signals ("rings") near sharp transitions in a signal. Visually, they appear as "rings" near edges. As with other artifacts, their minimization is a criterion in filter design. The main cause of ringing artifacts is due to a signal being bandlimited (specifically, not having high frequencies) or passed through a low-pass filter; this is the frequency domain description. In

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terms of the time domain, the cause of this type of ringing is the ripples in the sinc function, which is the impulse response (time domain representation) of a perfect low-pass filter. Mathematically, this is called the Gibbs phenomenon.

2.4 Blurring Artifacts
Blurring means that the image is smoother than originally.

3. LITERATURE REVIEW
J. Someya, N. Okuda, and H. Sugiura[1]explains that Adapting an image compression technique for the reduction of stored frame image data has resulted in a frame memory which uses less DRAM. In this report we discuss a method of suppressing the noise caused by memory reduction when a specific pattern is applied such as a dithering image

S. Hauck and A. DeHon [2] propose that FDTD algorithm is very suitable for hardware implementation. The FPGA implementation of the finite-difference time-domain method will empower many FDTD applications in medical, military, and other areas by providing fast, small, low-power, and inexpensive implementations. Many cellular automata, which share similar properties, are also suitable for FPGA hardware implementation.

E. Monmasson and M. N. Cirstea [3] The aim of this work is to present the contributions of FPGAs to the control of industrial systems. After a short description of FPGAs and their CAD tools, the authors have focused on the design methodology issue. Indeed, due to the simultaneous increase of the control algorithm complexity and the chip density, using an efficient design methodology is essential in this context. To this purpose, a modeling technique is proposed for the holistic investigation of power electronic systems. This is based on System Level Modeling Languages or Hardware Description Languages and allows rapid FPGA prototyping of the control systems. The digital controller designs are developed from idea, through the design and simulation stages, to complete systems in a short time and in close interaction with the optimized holistic model of the complex engineering industrial system to be controlled.

ISO/IEC DIS 10 918-1, Digital compression and coding of continuoustone still image[5]The requirements which these processes must satisfy to be useful for specific image communications applications such as facsimile, Videotex and audiographic conferencing are defined in CCITT Recommendation T.80. The intent is that the generic processes of Recommendation T.80 will be incorporated into the various CCITT Recommendations for terminal equipment for these applications

C. Loeffler and A. Lightenberg and G.S. Moschytz [10] they presented a new class of practical fast 8-point DCT dgorithms. These algorithms have only 11 multiplications and 29 additions. It has been shown here, how these algorithms can be varied in order to obtain different communication structures, different output orders, as well as how to change the signs of the outputs. These variations do not impose a higher number of operations for performing the DCT and can be used to optimize hardware implementation. An extension for a 16-point DCT results in an algorithm requiring 31 multiplications and 81 additions. This algorithm does not reach the theoretical minimum number of multiplications, but nevertheless it has one multiplication less than, and the same number of additions as the best currently known algorithms. More complicated graph transformation are involved to achieve the minimum theoretical hound. It has further been shown, that an 8-point DCT can be calculated with 12 multiplications in pornllel, i.e. with no signal path having more than one multiplication in cascade.

C.Y Pai, W.E. Lynch and A.J. Al-Khalili[15]they combined three optimization techniques for specific image compression based on the 1D-DCT algorithm. The first one is about the granularity analysis where the 2R4C granularity has been introduced to perform higher image quality. The second optimization concerns the constant coefficient multiplier. The theoretical formulas of DCT coefficients have been derived by applying the CSD encoding and the sharing of common subexpressions. It has been shown that the CSD-based design implies an area and energy economies. Finally, these techniques have been used jointly with a simple and efficient quantization process. Hence, the image quality of compressed image may be handled with the silicon area and power consumptions.

Swarm and Evolutionary Computation [18] this contains recently proposed variations of SMO, known as ASMO and AMSMO individually. These calculations depend on contrast in age and other unique capacities of insect monkeys like connection, speed of correspondence and adjusting to the adjustments in condition. These calculations are contrasted and the first SMO calculation and results are recorded. The diagram and tables demonstrates the significance of adding this element as far as combination rate. In all the above variations of SMO tried and thought about it is discovered that the adjusted form of ASMO for example AMSMO with 4

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little gatherings is most steady and has indicated most elevated intermingling rate in a large number of the tried benchmark capacities. To additionally analyze the execution different non parametric tests were done which again demonstrated hugeness of AMSMO calculation contrasted with SMO and ASMO. For better investigation of intermingling rate regarding time, multifaceted nature counts were finished. Lower unpredictability and better assembly of AMSMO demonstrates it to have a superior union rate as far as time in contrast with SMO and ASMO calculations. Further correlations of AMSMO calculation was finished with different best in class calculations like LdDE, ILABC, SSG-PSO, ECLPSO, EABC, MPU-SMO, Sa-SMO and MVMO demonstrates the centrality of AMSMO in contrast with present day advancement procedures. Future prospect is broaden the utilization of AMSMO calculation in taking care of multiobjective enhancement issues. The proposed calculation can be utilized in different complex certifiable enhancement issues like plan of remote broadcast communications systems, hydro-warm coordination, grouping and information mining.

4. CONCLUSION

Finally after a broad literature survey understand that image compression is very important parameter in mobile communication and 4G and 5G technologies. So different methods give particular solutions for image compression, but it is required to reduce the complexity in design point of view (VLSI). We are using the bayers RGB model with help of spider monkeys optimization reducing the MSE and increasing the PSNR.

REFERENCES

[1] J. Someya, N. Okuda, and H. Sugiura, “The suppression of noise on a dithering image in LCD overdrive,” *IEEE Trans. Consumer Electron*., vol.52, no. 4, pp. 1325-1332, Nov. 2006.

[2] S. Hauck and A. DeHon, Reconfigurable computing: the theory and practice of FPGA-based computation, ISBN 987-0-12-370522-8, ElsvierInc 2008.

[3] E. Monmasson and M. N. Cirstea, FPGA Design Methodology for Industrial Control SystemsA Review, IEEE Transactions on industrial electronics, Vol. 54, No. 4, pp. 1824-1842, August 2007.

[4] M.W. James, An Evaluation of the Suitability of FPGAs for Embedded Vision Systems, CVPR ’05: Proceedings of the 2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, Washington, DC, USA, pp. 131-137, 2005.

[5] ISO/IEC DIS 10 918-1, Digital compression and coding of continuoustone still image, 1992.

[6] ISO/IEC JTC1/SC2/WG11, MPEG 90/176, Coding of moving picture and associated audio, 1990.

[7] K. F Blinn, What’s the deal with the DCT?, IEEE Computer Graphics and Applications, pp. 78-83, July 1993.

[8] A. Alfalou, M. Elbouz, M. Jridi and A. Loussert, A new simultaneous compression and encryption method for images suitable to optical correlation, Optics and Photonics for Counterterrorism and Crime Fighting V, edited by Colin Lewis, Proc. of SPIE Vol. 7486, 74860J-1-8, 2009.

[9] A.Alfalou and C. Brosseau, Optical image compression and encryption methods, Adv. Opt. Photon. 1, 589-636 (2009).

[10] C. Loeffler and A. Lightenberg and G.S. Moschytz , Practical fast 1-D DCT algorithm with 11 multiplication, IEEE, ICAPSS, pp. 988-991, May 1989.

[11] P. Duhamel and H. H’mida, New 2n DCT algorithm suitable for VLSI implementation, IEEE, ICAPSS, pp. 1805-1808, November 1987.

[12] A. Avizienis Signed-Digit Number Representations for Fast Parallel Arithmetic, IRE Transaction on Electron. Computer, Vol. EC-10, pp. 389- 400, 1961.

[13] R. Seegal, The canonical signed digit code structure for FIR filters,IEEE Transactions on Acoustics, Speech and Signal Processing, Vol. 28, No. 5, pp. 590-592, 1980.

[14] R.I. Hartley, Subexpression sharing in filters using canonic signed digit multipliers,IEEE Transactions on Circuits and Systems II: Analog and Digital Signal Processing, Vol. 43, No. 10, pp. 677-688 October 1996.

[15] C.Y Pai, W.E. Lynch and A.J. Al-Khalili, Low-Power data-dependant 8x8 DCT/IDCT for video compression, IEE, Proceedings. Vision, Image and Signal Processing, Vol. 150, pp. 245-254, August 2003.

ISSN 2394 - 7780

[16] D. Slawecki and W. Li, DCT/IDCT processor design for high data rate image coding, IEEE Transactions on Circuits and Systems for Video Technology, Vol. 2, No.2, pp, 135-146, Jun 1992.

[17] H.Kim and H.-J. Lee, "A low-power surveillance video coding system with early background subtraction and adaptive frame memory compression," *IEEE Trans. Consumer Electron.*, vol. 64, no. 4, pp. 359- 367, Nov. 2017.

[18] Swarm and Evolutionary ComputationVolume 28, June 2016, Pages 58-77 2016 Published by Elsevier B.V.

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SECURE SOCIAL NETWORK MODEL USING MACHINE LEARNING AND INTELLIGENT SYSTEM

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ABSTRACT

The study of networks of social interaction can be seen to originate from the work of Jacob Moreno in the 1920's. At the turn of the millennium new actors entered the field, researchers with a background in physics and computer science, which brought with them a new set of tools that could be used to collect and analyses large sets of data. Analysis of large scale social network data from various sources has increased our knowledge of the common features of various social networks, observed in networks of acquaintance and collaboration alike. The quantification and modeling of a particular feature of social networks, namely the tendency of individuals to form densely connected groups with relatively few links to individuals outside the group (called communities in complex networks theory), has taken large steps in recent years. Modeling these structures and their effect on social dynamics is a highly topical issue, relevant for fields such as spreading of epidemics or rumors and formation of opinions, with applications such as prevention of epidemics and marketing. This thesis aims to increase our understanding of the structure of large scale social networks, and of dynamics unfolding in such networks, in several ways, There are three primary types of social networks Egocentric networks are connected with a single node or individual (e.g., you and all your friends and relatives).In order to answer a need for social network models that generate realistic structures at large scale, we introduce a model based on simple local mechanisms leading to community structure. Socio-centric networks are closed networks by default. Two commonly-used examples of this type of network are children in a classroom or workers inside an organization. A thorough comparative study of models for social networks assesses the adaptability of the models to fit real social network data, and their success at reproducing prominent structural features of social networks.. Open system networks are networks where the boundary lines are not clearly defined, which makes this type of network typically the most difficult to study. The type of socio-political network we are analyzing in this article is an example of an open system network.We study models of competing options, with focus on perhaps the most important feature of social network structure, namely complex networks, since they display non-trivial topological features, with patterns of connection between their elements that are neither purely regular nor purely random.

Keywords: Secure, Machine techniques and social network.

1. INTRODUCTION

This paper is intended for researchers willing to start their work in the field of ML and security. Along with the description of the machine learning some references to prominent works have been cited and some valuable examples are put forth how cyber problems are often tackled by ML. From early 2000 several prominent surveys on the ML research has already been described. Nguyen puts forth a comprehensive study of IP traffic classification technique that does not rely on well- known port numbers or known packet payloads. Techniques involving ML along with statistical traffic characteristics used in IP classification is reviewed in this paper.

The contribution of the paper is to identify cyber security datasets that can be used by researchers and to point out the algorithms that can be applied to cyber specific problems. A set of machine learning algorithm have been evaluated in the later part of the paper on collected ICS dataset to identify various attacks while analyzing remote terminal unit (RTU) in a gas pipeline.

2. EXPLAINATIONS

Machine learning, by its definition, is a field of computer science that evolved from studying pattern recognition and computational learning theory in artificial intelligence. It is the learning and building of algorithms that can learn from and make predictions on data sets. These procedures operate by construction of a model from example inputs in order to make data-driven predictions or choices rather than following firm static program instructions.

"A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E." -- Tom Mitchell, Carnegie Mellon University.

So if we want our program to foresee, for example, traffic forms at a busy node (task T), we can run it through a machine learning process with data about previous traffic patterns (experience E) and, if it has successfully "learned", it will then do better at predicting upcoming traffic patterns (performance measure P).

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We need machine learning in the following cases:

• Human expertise is absent. E. g. Navigating on Mars.

• Humans are unable to explain their expertise. E. g. Speech Recognition.

• Solution changes with time E. g. Temperature Control.

Machine learning involves two types of tasks: • Supervised machine learning: on a pre-defined set of "training examples", which then facilitate its ability to reach an accurate conclusion when given new data.

• Unsupervised machine learning: bunch of data and must find pat therein.

MACHINE LEARNING TECHNIQUES FOR SECURE SOCIAL NETWORK MODEL

Few popular ML techniques are described in this section. For each method the application to cyber security have been identified.

1. Bayesian Network -The network is developed as a random set of variable and their conditional dependencies via a directed acyclic graph. The nodes representing the child are dependent on the parent nodes and each node maintains the states of the conditional probability form and the random variable. Fig 1 . shows the attack signature detection using Bayesian network. Each state is an input to the underlying state with varying state values. The calculated probability tables are calculated and shown in the figure. Bayesian networks can also be used to infer unobserved variables.

Bayesian network can be used for anomaly detection and known attack signature and patterns can also be compared with the streaming data for known attacks. Jemili et. al. [14] developed an intrusion detection system using the Bayesian network. The KDD 1999 was used with 9 of its attributes to model the system. A performance of 88% and 89% was achieved in normal and attack scenarios. The model provided detection rate of 99%, 21%,89% and 7% for Probe, scan , DOS and R2L. Since the number of training instances were very low in case of R2L the accuracy of the model suffered substantially.

2 Decision trees -The decision tree is very much analogous to a tree. The trees have leaves which represents the various classifications and the branches are the links or features that in-turn provides the path to the classifications. ID3 and C4.5 are few popular algorithms for generating decision trees automatically. The comparing process of the SNORT rules with the incoming traffic is slow because of the large number of signatures. Kruegel and Toth et al. [15] replaced 150 SNORT rules by using a variant of ID3 algorithm. Their aim was to replace these algorithm by a decision tree model. This would be effective in increasing the speed of processing. Rule clustering was used to replace the Snort rules. This minimizes the number of necessary comparisons. This also allows parallel evaluation hence speeds up the comparison procedure. The clustered rule was applied to DARPA 1999 dataset. The processing speed and efficiency of the develop model was compared with the snort analysis. The model reached a maximum speed up of 105% and the minimum speed up was of 5%. For further experimentation the number of rules replaced was increased from 150 to 1581. Although Toth does not provide any kind of quantitative figures yet the study detected a profound speed up using the decision tree method, secondly the processing time was reduced drastically. 3.3 Clustering This is an unsupervised learning method where similarity measure is used to group data together. Clustering algorithms can learn from audit data and explicit description of different attack classes by the system administrator is not necessary. Hendry et. al. [16] demonstrates the application of real-time signature detection using clustering algorithm. The normal and anomalous network traffic was created by a density based clustering scheme known as Simple Logfile Clustering Tool (SLCT). Two clustering schemes are used: Firstly, for detection of normal and attack scenarios, secondly the other scheme can be used to determine the normal traffic in a supervised manner. In this model parameter M is used to define the feature that is contained in the cluster. By setting M parameter to 97%, 98% attack data is detected with a 15% FAR. The signatures are created from the samples of the high density clusters of the model. The KDD dataset was used to validate the generated model. Cluster integrity was used as the performance metrics to improve the accuracy of the model. An accuracy of 70 % to 80 % was achieved for unknown attacks. Considering the unknown nature (new or zero-day) of the attacks this level of accuracy is quite impressive.

4 Artificial Neural Networks- (ANN) The ANN behaves mainly like human brain. The neural network has a layer layout. The input from the data actuates the neuron the second layer of the network. Which in turn outputs to the next layer of the hierarchy. This carries on and finally the output is produced by the last layer of the network. The internal network which plays an important part in the neural network are black boxed from the environment and is known as hidden layers. One major drawback of neural network is the huge learning time

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due to the occurrence of local minima. This approach was prevalent in mid-nineties but due to the advent of support vector machines (SVMs) ANN started to fade away. With the introduction of convolution NN the popularity of neural network is on the rise again. Canady [17] describes an ANN model which makes use of multi category classifier to detect anomalies. RealSecure network monitor was used to generate the data. The attack signatures were built into the system. Around 3000 attacks were simulated by program like Satan and Internet Scanner out of the 10000 recorded attacks. The data preprocessing was performed using nine selected features: ICMP code, ICMP type, source address, destination address, protocol identifier, source port, destination port, raw data length and raw data type. Then the study used the normal and attack data to train the ANN. Canady et. al. report an error rate of 0.058 and 0.070 during training and testing scenarios. Hence, an RMS of 0.070 translates to a normal accuracy of 93% for the testing phase. Here the data is either categorized as normal traffic or as malicious traffic.

5 Genetic algorithm and genetic programming - Two of the most popular computation method based on the principle of survival of the fittest is- GA and GP. These algorithms functions on the population of the chromosomes that evolve based on certain operators. The three basic operator used is selection, crossover and mutation. The algorithm is started with a randomly generated population, a fitness value is computed for each individual. This signifies the ability of the each individual to solve the current problem and individuals with higher probability have higher chance of being chosen in the mating pool. Two capable individual will perform the next step called crossover and finally each will undergo mutation. Among the two mutated individual the highest fit chromosome will be rallied over to the next generation. Abhram et. al. [18] used a simple GP model to develop a classifier for attacks. Three popular GP models were used in this analysis: Linear Genetic Programming (LGP), Gene Expression Programming (GEP) and Multi Expression Programming (MEP). The model made use of different mathematical operators as function sets. The DARPA 1998 data set was used as the prime dataset to validate the generated model. The dataset had 4 main types (U2R, R2L, DoS and probing) of attacks with a total of 24 different attack scenarios. The False alarm rate (FAR) of the above model was as low as 0% to 5% depending on the type of attack being investigated.

6 Hidden Markov Models (HMM) -This is a statistical Markov model with a set of states which are interconnected using transition probabilities that determines the topology of the model. The system is assumed to be a Markov process with unobserved parameters. This model provides a forward- backward correlation which can be used to determine the hidden parameters from the observable parameters. Since the probability distribution in each state is different the system can change states overtime and is capable of representing nonstationary sequences. Joshi et. al. [19] made use of HMM to develop an intrusion detection system. Five definite states are used each having six observation symbol per state. The interconnection between the states are developed in such a way that any state can transition into any different state. To estimate the HMM parameters the Baum-Welch method can be used. For the validation of the model the KDD 1999 dataset was used. Out of the extensive 41 features of the datasets 5 was chosen for the analysis. The positive detection rate of the model amounted to 79% with a false positive rate of 21%. If more than 5 features are used in the analysis the accuracy of the model might improve but no quantitative analysis was performed by the authors to support this improvement claim. 3.7 Inductive Learning The inference of certain information from a dataset is known as deduction. On the other hand the other approach of moving from specific observation to develop theories and patterns is known as inductive learning. These are the two primary methods used for the inference of information from the data. Inductive analysis

develops some general patterns and which are used to develop some hypothetical conclusions. Fan et. al. [20] developed an artificial anomaly generator to generate random events and anomalous traffic. Two prime approaches of distribution based anomaly generation and the filtered artificial anomalies was used to generate these random anomaly. This generated data was randomly fused with the DARPA 1998 dataset. This data was used by Fan et. al. to study the performance of the developed inductive learning model. The model showed a successful detection rate of 94 and a low FAR of 2% was achieved. This study enumerated the correct methodology to develop the dataset that can be used for anomaly detection and showed the application of inductive learning model on the developed dataset.

INTELLIGENT SYSTEMS

The area of Intelligent Systems (ISs) has expanded phenomenally over the years since the 1940s; both in terms of the range of techniques and also in terms of the number of applications wherein they have often provided a competitive edge when compared with others approaches. IS includes a range of techniques that work synergistically and provides, in one form or another, flexible data/information processing capabilities for handling real life situations. IS, unlike conventional techniques, can exploit the tolerance for imprecision,

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uncertainty/ambiguities, approximate reasoning and partial truth in order to achieve tractability, robustness, and low cost solutions. The techniques are in general based on biologically inspired strategies for solving problems. At the current time the major categories of IS include neural networks (NNs), fuzzy logic/systems (FL/Ss), evolutionary computation/algorithms (EC/As) (including genetic algorithms (GAs), genetic programming (GP), evolutionary strategies (ES)), support vector machines (SVM), particle swarm optimization (PSO), memetic algorithms (MAs), and ant colony optimization (ACO). In addition hybrid combinations also play a mayor role. These include neuro-fuzzy, neuro-genetic, fuzzy-genetic systems and so on. These techniques became more and more necessary and popular to meet needs such as: 1) Handling large datasets which are very complex and comprise various forms of uncertainty, in a robust and computationally efficient manner. 2) Much of the data are inherently uncertain and noisy, thus making FLS a natural choice for processing them. 3) The learning capability of NNs, supervised, unsupervised or hybrids can be utilized effectively when extracting patterns from large datasets. This is especially true in data-rich environments where the data may be mined. 4) Many of the tasks involve search and optimization of different criteria (such as energy, alignment score and overlap strength), while requiring robust, fast and close approximate solutions. 5) Evolutionary and other search algorithms such as ACO, PSO provide effective techniques to search and explore very large and multi-modal solution spaces.

3. CONCLUSIONS

In this paper an elaborate survey was performed to enlist few popular datasets then few ML techniques were discussed along with their application in security. Finally few recommendations were made regarding the choice of ML. In the later part of the paper a brief analysis was performed with Intelligent System. . Starting from IP traffic classification, filtering malicious traffic for intrusion detection, ML is the one of the promising answers that can be effective against zero day threats. New research is being done by use of statistical traffic characteristics and ML techniques. This paper is a focused literature survey of machine learning and its application to cyber analytics for intrusion detection, traffic classification and applications such as email filtering for secure social network.

REFERENCES

1. Morris, T. H., Thornton, Z., & Turnipseed, I. (n.d.). Industrial Control System Simulation and Data Logging for Intrusion Detection System Research.
2. Nguyen, T. T. T., & Armitage, G. (2008). A survey of techniques for internet traffic classification using machine learning. Communications Surveys & Tutorials, IEEE, 10(4), 56–76. http://doi.org/10.1109/SURV.2008.080406
3. A. Sperotto, G. Schaffrath, R. Sadre, C. Morariu, A. Pras, and B. Stiller, “An overview of IP flow-based intrusion detection,” IEEE Communications Surveys & Tutorials, 12(3), 2010, pp. 343–356
4. Almomani, A., Gupta, B. B., Atawneh, S., Meulenberg, A., & Almomani, E. (2013). A survey of phishing email filtering techniques. IEEE Communications Surveys and Tutorials, 15(4), 2070–2090. http://doi.org/10.1109/SURV.2013.030713.00020
5. P. Garcia-Teodoro, J. Diaz-Verdejo, G. Maciá-Fernández, and E. Vázquez, “Anomaly-based network intrusion detection: Techniques, systems and challenges,” Computers & security 28, no. 1, 2009, pp. 18–28
6. M. Hall, E. Frank, J. Holmes, B. Pfahringer, P. Reutemann, and I. Witten, “The WEKA data mining software: an update,” ACM SIGKDD Explorations Newsletter, 11 (1), 2009, pp. 10–18
7. R. Core Team, “R Language Definition,” 2000
8. M. Graczyk, T. Lasota, and B. Trawinski, “Comparative analysis of premises valuation models using KEEL, RapidMiner, and WEKA,” Computational Collective Intelligence. Semantic Web, Social Networks and Multiagent Systems. Springer Berlin Heidelberg, 2009, pp. 800–812
9. Fowler, C. A., & Hammel, R. J. (2014). Converting PCAPs into Weka mineable data. 2014 IEEE/ACIS 15th International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, SNPD 2014 - Proceedings. http://doi.org/10.1109/SNPD.2014.6888681
10. Buczak, A., & Guven, E. (2015). A Survey of Data Mining and Machine Learning Methods for Cyber Security Intrusion Detection. IEEE Communications Surveys & Tutorials, (1), 1–1. http://doi.org/10.1109/COMST.2015.2494502

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A SURVEY FOR SMART MANHOLE MANAGEMENT SYSTEM IN SMART CITIES

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ABSTRACT
The main goal for the government of India is to improve the faster development and management of the city through the use of modern technology and smart solutions to have healthy and safe cities that delivers the real-time services. In this paper, we have conducted a systematic literature review in order to investigate proposed manhole management services driven by Internet. We have define the research question, search strategy and selection criteria for manhole management services. This review has discussed the different techniques used for the safe manhole cover management. The paper is categorized by the smart city services to the Waste Management services, they proposed or described. The various ways or techniques that are used to save the lives of the people due to improper manhole covers and how the system will meets the expected function, which is helpful to realize the management of manhole covers and promote the construction of urban information platforms, create a harmonious and peaceful living environment are recognized in this paper.

Keywords: Internet of Things (IoT), Intelligent Transportation System (ITS), Manhole

INTRODUCTION
In urban areas, Manholes and Sewer Wells are used for managing flow of rainwater, drainage as well as power cables, telecommunication cables etc. It is a necessary facility in local area for traffic management. Manholes are usually covered with a metal cover to keep away any garbage from dropping into the wells. However, if the cover is broken or removed by someone or caused by some calamity, it may lead to a dangerous situation for the moving vehicles and pedestrians. Therefore, efficient and cost-effective means are very essential to monitor the damage to the lids to prevent potential disasters on the road. Hence, monitoring and detecting the sewer well and manhole covers is very essential in cities especially in smart cities. [1]

With the rapid development of government public facilities, the necessity of manhole covers in varied size, its accurate positioning as well as its timely repair increased to a large extent. In case of any lapses by municipal corporations, it has triggered shocking accident, resulted in huge economic losses, threatened traffic safety and personal safety. Hence, the need to design a security monitoring and management system to get rid of risky situations caused by the faulty manhole covers is felt strongly. [2]

Nowadays Manhole Cover failure is on the rise particularly during heavy rainfall and generally affects the safety, security and economy of the society. This is why the need for a fully automated monitoring system has become very essential. Monitoring of Manhole Covers automatically can be considered as part of the development of Smart Cities. It demands smart manhole covers and also Internet of Things (IoT) for instant communication. So to come out with the proper solution, it is proposed to design the smart manholes which will detect the water floating above the manhole lid as soon as it increases and send a warning message to the transport department. It is proposed here to make the manhole area immediately noticeable when the lid is not properly placed by creating a mesh of rods exactly over the manhole along with start of a blinking warning red light. The whole effort is to indicate that the manhole is open, and take the diversion as the location is dangerous to the moving cars and pedestrians.

With its large number and wide distribution, manhole cover is an important part of city drainage system. But owing to the complex structure and imperfect function of manhole cover, hundreds of people suffer from all kinds of losses because the manhole cover is broken or missing every year. This system is provided with real-time monitoring, timely alarm, accurate positioning, rapid processing, etc. Therefore, the goal of this paper is to investigate how to design a secure monitoring and managing system to safe guard the lives of pedestrians due to damaged manhole covers.

The literature review will be conducted in order to obtain the solution for the defective manhole covers for threatened traffic safety and personal safety. The paper is organized as follows. The second section provides a review description of various different incidents that have been happened due to the damaged manhole covers. The third section describes the review of smart cities and manhole cover management. The fourth section presents the review of research methodology used for the identification of manhole covers. The result of the

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review and discussion is presented in section fifth. The final section summarizes the article along with the suggestions for future description.

PRACTICAL INCIDENTS

Incident of Dr. Deepak Amrapurkar, Gastroenterologist

Let us understand the disaster caused by unmanaged manholes in heavy rains by Bombay Municipal Corporation. On August 29, 2017, Dr Deepak Amrapurkar, a renowned gastroenterologist from Bombay while returning home on a flooded street fell into an open manhole and could not be saved. Amrapurkar's umbrella got stuck in the mouth of the manhole shown Fig 1, hence could be identified by his family enabling his search along the pipeline. The doctor's body was found in Worli two days later. His colleagues could identify the body recognizing his wristwatch. [3]

Fig-1: Dr. Deepak Amrapurkar drowning in Manhole

Incident of Dinesh Jatholiya

Let us illustrate one more case of Kurla, a man died after he fell into an open manhole at Kurla near Eastern Express Highway. The incident took place late on Friday night, between 12 and 12.30 am on 24th, June, 2018 according to the Brihanmumbai Municipal Corporation (BMC) disaster management unit. Local residents said Dinesh Jatholiya, 24, fell into a manhole which was covered by a plastic sheet, while he was out on a stroll. He cried out for help for over an hour. Eventually, he was pulled out by locals, but it was too late. It is likely that low visibility at night prevented Jatholiya from spotting the open manhole, resulting in his fatal fall. He had been walking on the footpath which is the median between the Eastern Express Highway and a lane to enter Kurla, when he stepped on the plastic sheet spread over the manhole, which was on the footpath, and fell in. [4]

Fig-2: Dinesh Jatholiya falling into Manhole

Incident of Aadiyan Parvez

On June 7, three-year-old Aadiyan Parvez Tamboli had died after he failed to see an open gutter in Cheetah Camp area in Chembur (E) during the rains. [4]

Incident of Pregnant Woman

Here it is one more example, *"Pregnant woman falls into manhole, feared dead august 15, 2005"*, a seven-month pregnant woman constable of the Chandigarh Police was feared drowned in an uncovered manhole of a sewerage line in Sector 30 adjoining the CSIO along the Dakshin Marg. [5]

Therefore, these are the few incidents review, which have occurred because of faulty manhole covers.

LITERATURE REVIEW

Ravi Kishore Kodali and Siva Ramakrishna P [6], the drainage system plays a key role in the development of a city and it is crucial for the community in the urban areas as this reduces the floods by carrying away the water. Improper maintenance of drainage system causes many people to suffer, and the existing drainages are not functioning up to the expected standards. Nowadays most of the cities are adopting underground drainage systems which should be smart. In rainy season the blocking of drainage system causes significant disturbance in normal human life while leading to heavy traffic jam. The selected drainage system operates with connected devices for continuous monitoring and controlling to take necessary actions using sensors and Internet of Things. The drainage problems are related to improper maintenance and design of drainage systems, and these problems intensifies during heavy rains. As of now in India smart cities do not have drainage systems equipped with communication technologies like IoT that can hamper threatening situations.

Tsun-Hua Yang, Sheng-Chi Yang, Hong-Ming Kao1, Ming-Chang Wu and Hao-Ming Hsu [7], Extreme weather and climate events such as super typhoons and unprecedented recorded high intensity rainfall events

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have increased in recent years due to climate change which cause loss of life and property. Therefore, efficient strategies and measures for flood mitigation and prevention are essential. Computer-aided techniques can increase the speed of emergency response and reduce the impacts of a flood. IoT was introduced in 2005 and is mostly applied to supply chain management, environmental monitoring, and other non-stress environments. The author identified that the IoT technology can match the identified information requirements and provide added value to emergency response operations in terms of obtaining efficient cooperation, accurate situational awareness, and complete resource visibility. In addition, the system analyzes all the collected information and forecasts to trigger active actions based on the situation; for example, the system controls the start or stop function of water pumps.

Yang Liu, Mingyi Du, Changfeng Jing, Yun Bai [8] The manhole covers are one of the important urban infrastructures, but unfortunately they are stolen frequently. If the uncovered manholes cannot be found timely and processed immediately, it may threaten to the city's normal operation. Because the ownership of the manhole covers is unclear, it is much harder to manage these ownerless manhole owners (OLMCS). Based on the deep analyses of the current management status of the ownerless manhole covers, a supervision network and management system for the ownerless manhole covers in Xicheng district, Beijing was established taking advantages of sensors and 3G transmission technology in this paper. Several fixed RFID base stations were settled in some key supervision points where the manhole covers were lost easily and frequently, and each ownerless manhole cover was fixed a dormant RF card. The condition of the manhole covers was transferred to the supervision center in a timely manner by the GPRS wireless network. This formed an active and intelligent way of supervision and management of the ownerless manhole covers.

Theodora S. Brisimi, Christos G. Cassandras,Chris Osgood, Ioannis Ch. Paschalidis And Yue Zhang [9], discussed about the prototype of smart city. The emerging prototype for a Smart City is one of an urban environment with a new generation of innovative services for transportation, energy distribution, health care, environmental monitoring, business, commerce, emergency response, and social activities. The term ``Smart City'' is used to capture this overall vision as well as the intellectual content that supports it, which are continuously monitored through various sensors to observe, for instance, air/water quality, traffic conditions, occupancy of parking spaces, the structural health of bridges, roads, buildings, as well as the location and status of city resources including transportation vehicles, police cars, police officers, and municipal workers. The data collected need to be securely communicated (mostly wirelessly) to information processing and control points. These data may be shared and the control points can cooperate to generate good (ideally, optimal) decisions regarding the safe operation of these physical elements (e.g., vehicles guided through the city).

Marko Mijac, Darko Androcec, Ruben Picek [10], conducted a systematic literature review in order to investigate proposed smart city services driven by IoT. As, information and communication technology has been reshaping our society. These effects have been so immense, that it is hard to believe that the advent of personal computers, World Wide Web, smart phones and other enabling technologies has happened in just a few decades. More than ever, we deserve to call ourselves information society.

Alexandra Georgiana Ioan, Anton Anton [11], presented here is introducing an overview of climate changes. In recent years, due to climate changes in many areas of the world, natural phenomena such as floods have cost numerous losses of human life. This is of course a positive development for cities that tends to have a positive impact on human health and society; these are called “blue-green cities”, by taking into account flood protection measures such as changes in urban waterways depending on the event they are exposed to. Over the next decades, extreme rain events are expected to become even more frequent due to climate changes..

Akshay Bhalerao1, Anima Ghosh, Siddhita Mhatre, Sayalee Vadgaonkar, Pallavi Wajge and Ninad Shinde [12], describes a smarter way to monitor fill level of garbage bins as well as manholes, using sensors and informing municipal authorities in time, to prevent them from overflowing. The issue of overflowing garbage bins and manholes has become common in many urban areas in India, the delay in cleaning them by sanitary workers being major reason and causes environmental pollution, which results into health hazards. A smarter solution to this problem needs to be discovered. The integration of computing, sensing and communication devices can be used for effective waste management. The sanitary workers can locate bins and manholes which have reached their limit, using android app.

Sreenu Ponnada, SrinivasYarramalle, Madhusudhana Rao T.V [13], Recognition of an object is a bare minimum restraint for an individual in order to sort out or classify the type of the object. In particular, while recognizing the staircases and manholes, a prototype of mobility recognition is presented using Feature Vector Identification and Sensor Computed Processor Arduino chips. This prototype provides more sovereignty to the

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sightless people while walking on the roads and helps to pass through on their own without any backing. This prototype is developed using Arduino kit along with feature detection module and helps the visually challenged in reaching their destinations with ease.

Gangyong Jia, Guangjie Han, Huanle Rao, Lei Shu [14], An intelligent manhole cover management system is one of the most important basic platforms in a smart city to prevent frequent manhole cover accidents. Some systems, such as drainage system, electric power system, network system, and so on, are laid underground in a modern city. However, manhole cover accidents, including vehicles and people falling in the holes, frequently occur as a result of manhole cover displacement, loss, and damage, threatening lives and safety and no way to monitor their status in real time. It is difficult to solve the problem of manhole covers being stolen with no method for monitoring traditional manhole covers and it is easy to carry. Therefore, such thefts constitute not only public property losses, but also an increased risk of uncovered holes.

Yih Chang, Pei-Chi Ho [15] Road formation is the basic requirement of modern country. Manholes on the road are the main objects result in uneven surfaces. They are not only the killer of public safety, but also the main cause of national compensation; therefore, it is necessary to implement the underground manhole. However, it is not easy to search for the manhole from underground. Thus, it is essential to develop a set of searching, authentication, and precision positioning technologies. The authors analyzed the pros and cons of metal detection, GPS location and RFID authentication approaches as well as their restrictions, of which the first two can only be used as navigational aids to arrive at the scene. While RFID can help to identify manholes, putting the manhole cover 20 cm below the asphalt concrete (AC) pavement creates more complications. Not only the reading distance is way too long for normal operation, but also the filling through the aquifer, and to avoid metal interference comes from the manholes, traditional RFID reader cannot achieve such purpose. Therefore special design is inevitable. In this paper, the author analysis the RFID spectrum as well as the characteristics of binding RFID tags and metal. And than utilize the environmental characteristics of underground manhole, and design a special-purpose RFID tag — Ground Tag, in order to propose an integrated solution for searching, authentication and precision positioning of the underground manhole.

RESULT ANALYSIS

- Traditional manhole management did not take technical measures.
- Presently there is no digital data available regarding number of manholes.
- It is time and money consuming in discovering cycles of the damaged covers.
- It’s a real-time difficulty to ensure timely maintenance.
- Real time-alerting systems of missing lids do exist but real-time repairing and avoiding the loss of lives and property is not achieved yet.

CONCLUSION AND FUTURESCOPE

The conclusion of the paper is to implement the best Manhole management system which can digitized the manholes and a real-time alerting system can be achieved. The Scope of the system is to monitoring interface will induce the flexibility and perfect functionality to support a variety of hardware platforms. To allow anti-theft for manhole covers could be proposed. This monitoring and management system can be implemented to other cities and other areas. It has a great impact on urban society and the digitization of urban information.

REFERENCES

[1] Yongtao Yu, Jonathan Li, Haiyan Guan, Cheng Wang and Jun Yu (2014).: “Automated Detection of Road Manhole and Sewer Well Covers From Mobile LiDAR Point Clouds”. IEEE Geoscience and Remote Sensing Letters, 11(9),1549 – 1553.

[2] http://www.thehansindia.com/posts/index/Telangana/2016-06-28/Killer-manholes-dot-Hyderabad-roads/238104

[3] https://timesofindia.indiatimes.com/city/mumbai/4-locals-held-for-docs-death-in-open-manhole/articleshow/60725311.cms, as on 06 august, 2018

[4] http://www.freepressjournal.in/mumbai/man-falls-into-open-manhole-in-kurla-dies/1303124 , as on 06 august, 2018.

[5] https://www.tribuneindia.com/2005/20050818/chd.htm, as on 06 august, 2018

[6] Ravi Kishore Kodali and Siva Ramakrishna P: (2017), “Modern sanitation technologies for smart cities”, IEEE Region 10 Humanitarian Technology Conference (R10-HTC)

ISSN 2394 - 7780

[7] Tsun-Hua Yang, Sheng-Chi Yang1, Hong-Ming Kao1, Ming-Chang Wu1 and Hao-Ming Hsu : (2017), "Cyber-physical-system-based smart water system to prevent flood hazards", Springer Open, 1-13.

[8] Yang Liu, Mingyi Du, Changfeng Jing, Yun Bai: (2013), "Design of supervision and management system for ownerless manhole covers based on RFID", 2013 21st International Conference on Geoinformatics, IEEE.

[9] Theodora S. Brisimi, Christos G. Cassandras, Chris Osgood, Ioannis Ch. Paschalidis And Yue Zhang.: (2016)," Sensing And Classifying Roadway Obstacles In Smart Cities: The Street Bump System", Ieee. Translations And Content Mining, Vol 4, 1301-1312.

[10] Marko Mijac, Darko Androcec, Ruben Picek.: (2017), "SMART CITY SERVICES DRIVEN BY IOT: A SYSTEMATIC REVIEW", Journal of Economic and Social Development – Vol 4. No 2, 40-50.

[11] Alexandra Georgiana Ioan, Anton Anton.: (2017), "Sewer System Calibration for Smart Cities", International Conference on ENERGY and ENVIRONMENT (CIEM), 475-479

[12] Akshay Bhalerao, Anima Ghosh, Siddhita Mhatre, Sayalee Vadgaonkar, Pallavi Wajge and Ninad Shinde.: (2017), "IoT Based Smart Waste Management System", I J C T A, 10(8), 607-611.

[13] Sreenu Ponnada, SrinivasYarramalle, Madhusudhana Rao T.V.: (2018), " A Hybrid Approach for Identification of Manhole and Staircase to Assist Visually Challenged", IEEE Access, Vol 6, 41013 – 41022.

[14] Gangyong Jia, Guangjie Han, Huanle Rao, Lei Shu.: (2018), "Edge Computing-based Intelligent Manhole Cover Management System for Smart Cities", IEEE Internet of Things Journal, 5(3), 1648 – 1656.

[15] Allen Y. Chang, Chang-Sung Yu, Sheng-Chi Lin, Yin-Yih Chang, Pei-Chi Ho : (2009), "Search, Identification and Positioning of the Underground Manhole with RFIDGround Tag", Fifth International Joint Conference on INC, IMS and IDC

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CHANGING FACETS OF HOSPITAL MANAGEMENT IN VUCA WORLD

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ABSTRACT
Changing facets of hospital management in VUCA world

VUCA is the acronym referring to a situation that is Volatile, Uncertain, Complex, and Ambiguous. It accurately describes the healthcare environment today as unstable and rapidly changing. The VUCA world has brought in the changes in many facets of the health-care. The stakeholders across the world are looking for innovative, cost-effective ways to get patient-centered, technology- enabled health care, in the hope of getting quality, good results and value for money. Coping up with the ever-changing requirement of the stakeholders, offering them newer services, achieving operational efficiency at minimum cost and maintaining the bottom-line have become important challenges for any hospital to survive in the long run. Accelerated decision-making, high-value care, waste reduction, cost control, effective usage of technology, understanding changing demographic and economic trends, efficient staffing and design of hospitals, teaming up with the patients and their families etc. are some of the suggestions to overcome the challenges and to improve efficiency in hospital management.

The present research is a descriptive research based on secondary data.

Keywords: Hospital Management, VUCA World

1. INTRODUCTION
The healthcare environment today is unstable and rapidly changing.The Volatile, Uncertain, Complex and Ambiguous (VUCA) social, cultural, economic, technological environment has brought in the changes in many facets of the health-care. Volatility relates to the nature, speed, and magnitude of change, uncertainty relates to the unpredictability of issues and events, complexity deals with the multiple and difficult-to-understand causes of problems whereas ambiguity pertains to the lack of clarity about the meaning of an event.

The stakeholders across the world are looking for innovative, cost-effective ways to get patient-centered, technology- enabled health care, in the hope of getting quality, good results and value for money. At the same time, coping up with the ever-changing requirement of the stakeholders, offering them newer services, achieving operational efficiency at minimum cost and maintaining the bottom-line have become important aspects for any hospital to survive in the long run.

The healthcare market in India is expected to reach US$372 billion by year 2022 driven by increasing incomes, greater health awareness, lifestyle diseases and greater access to insurance. The hospital industry in India is expected to grow CAGR of 16-17% to reach the Rs. 8.6 trillion (US$132.84 billion) by year 2022 from Rs. 4 trillion (US$61.79billion) in 2017.

2. OBJECTIVE OF THE STUDY
The objective of the study is to understand the Changing facets of hospital management in the VUCA world of today.

3. LITERATURE REVIEW
- Digvijay H. Gadhari, Yadnyesh P. Kadam, Prof. Parineeta Suman, (2016) observed that the basic working of various hospitals in India is still on paper as compared to hospitals in European countries where computers have been put in to assist the hospital personals their work. The concept of automation of the administration and management of hospital is now being implemented in India also, with large hospitals like APPOLO and AIIMS in Delhi, ESCORTS in Chennai. They concluded that with the usage of Hospital Management System, the hospital administrators would be able to significantly improve the operational control and thus streamline operations.

- Kumar, Prem &Kosalram, Kalpana. (2013) observed that the Hospital InformationSystems (HIS) are in high demand to handle increasing population needs. They also aid the practicing doctors and hospital service and support staff with timely service and precision. The authors discussed various performance indicators and standards of E-Hospital management solutions and Hospital Information System(HIS). They concluded that the success factors of E – HMS / HIS tend to vary depending upon leadership support, training, technology adoption, user friendliness etc.

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- LAXMITEJ WUNDAVALLI, S.G. BULKAPURAM, N.L. BHASKAR, N. SATYANARAYANA, (2018)carried out a cross-sectional mixed methods study using a convergent parallel design at a tertiary care public sector hospital in Hyderabad, Telangana (i) to qualitatively investigate the nature and determinants of patient safety incidents occurring in the hospital; (ii) to quantify the perception of hospital staff regarding factors affecting patient safety from an organizational perspective; and (iii) to triangulate the results to highlight areas in need of improvement. According to them, the most common factors affecting patient safety were situational factors, working conditions and latent organizational factors including communication systems. They concluded that there is a need to build team work, improve trust and communication between various departments, invest more in training, and provide supervisory support along with structural and process improvements in issues such as drug procurement and developing patient-friendly physical environment.

4. METHODOLOGY

4.1 Data Collection

The present research is a descriptive research based on the secondary data collected from various research papers, reports, research studies and websites.

4.2 Limitations of the study

The present study focuses on the broad changes in the facets of hospital management in today's VUCA world.

5. IMPLICATIONS AND VALUE OF THE STUDY

The present study will help academicians, researchers, corporate sector, policy makers and citizens in understanding the changing facets of hospital management.

6. HOSPITAL MANAGEMENT - EXPECTATIONS OF THE STAKEHOLDERS

- Provision of proper treatment when needed
- Usage of technology to deliver more accurate diagnosis and results
- Effective usage of the up-to-date information
- Easy access of the patient data for its efficient usage
- Instant information to the patients
- Provision of health care in a cost-effective way, especially to areas and people who lack it
- Effective waste management
- Well-organized hospital administration so that delays and errors are avoided

7. CHALLENGES POSED BY THE VUCA WORLD

- Changing demographics, urbanization create change in the need for health care services.
- The requirements of the neo middle-class in India have changing health care demands.
- In several parts of the country, majority of the patients still lack the awareness about health insurance. In such a case pricing of the patients becomes a challenge as they cannot afford the same.
- Lack of understanding of the aspects such as operational efficiency, cost structure, technological changes, workforce inefficiency, market condition and competition, etc. can create a strain on the profit margin of the hospital.
- Generating revenues is a big challenge considering the huge capital expenditures, rising cost of equipment and services and technological changes.
- There is a lack of necessary infrastructure to cope up with the changing requirements especially in developing countries.
- Millions of patients cancel, skip or reschedule appointments with their clinicians every year. As per a study, in USA, this has created vacant schedules and expenses that have cost the industry $150 billion annually.
- There is a lack of dedicated funds with hospitals for all the target population.
- Hospital administrative staff lacks awareness and training for management financial, operational, compliance, and cyber risks.

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- Maintaining basic hygiene for food/linen and allied services especially at hospitals in remote locations is a concern.
- Availability of 24X7 power back up is a challenge in remote/rural areas of India.

8. OVERVIEW OF GLOBAL TRENDS IN HOSPITAL SPENDING

- In USA, the hospital spending is projected to have grown 4.4 percent in 2018. Hospital spending growth is projected to accelerate to 5.7 percent per year on average over 2020- 27, because of faster spending growth from all payers. In order to fight dwindling margins and mounting costs, many health systems are responding to new financial incentives to treat patients outside traditional hospital settings instead of increasing inpatient volume.
- 28% of Japanese are older than 65, compared with 15% of Americans and 21% of Germans. More old people, in turn, means higher health-care costs. Last year the government budgeted ¥15trn ($138bn, or 15% of its total expenditure) for health care and nursing, excluding the charges it levies for the public health-insurance scheme. The Government views caring for people at home as one of its best options. Japan's government has set up an Integrated Community Care System that combines health care, long-term care, housing, and livelihood support services in a unified manner so that Japan's elder citizens can receive constant care in their local communities. In April 2017, Japan's government began allowing medical corporations to create nonprofit holding companies without corporate acquisitions under which, a holding company can manage several medical institutions/nursing care facilities in the region which is especially beneficial in rural areas.
- In China, the profit margins of hospitals are eroding due to its policy of "zero markups" for drugs sold at hospitals. The number of private hospitals in China surpassed public hospitals in 2015, resulting in more regulatory supervision of the registration, drug management, medical environment, and physician certification of private hospitals.China plans to add 89,000 new hospital beds by 2020 to reduce the strain on its health care system**.** Big medical groups in China are trying to form a supply chain wherein the segments such as pharmaceuticals and commercial medical insurance are integrated with the healthcare thereby achieving the quality and security of services.
- The United Kingdom's 2015 NHS Five Year Forward View to 2020 focuses on growth through its Efficiency Plan. It seeks to use the technology and innovation more effectively, motivating patients to take a more active role in their own health and care and supporting the staff to do their jobs more efficiently.
- Many Canadian hospital providers are working toward enhanced hospital information systems to allow them to better manage patient care.

9. OVERVIEW OF TRENDS IN INDIA

- Spending on new hospital infrastructure in India is expected to reach USD $200 billion by 2024
- The hospital and diagnostic centers attracted Foreign Direct Investment (FDI) worth US$ 5.25 billion between April 2000 and June 2018, according to data released by the Department of Industrial Policy and Promotion (DIPP).
- Hospitals in India are realizing the need to build financially sound operating models.
- Availability of several Hospital Management Software - **e-Sushrut C-DAC's** (Centre for Development of Advanced Computing) Hospital Management Information System is a major step towards adapting technology to improve healthcare. HMIS incorporates an integrated computerized clinical information system for improved hospital administration and patient health care. It also provides an accurate, electronically stored medical record of the patient.
- There is a price control on drugs, consumables and medical devices.
- Courses on Hospital Management are available to groom the students for Planning and Control, Management of Medical Staff, Management and Research in Healthcare, Epidemiology and Community Health, Strategic Management etc.

10. STRATEGIES ADOPTED BY HEALTH CARE PROVIDERS

- The traditional workforce planning is combined with predictive analytics to improve efficiencies in labor costs.
- New technologies and analytics tools that help improve processes and coding to reduce claims denials are adopted.

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- Hospitals and health care centers are going in for mergers and acquisitions and other such schemes to get the benefit of economy of scale.
- Efforts are being made to increase physician network and diversify the specialized services.
- Joint ventures, public-private partnerships (PPPs), and other collaborative efforts are being made within and across health care sectors and regions.
- Hospitals are banding with biotech companies to offer personalized remedies.
- In order to avoid cancellations or rescheduling of appointments some hospitals and medical providers are partnering with ride-hailing services to overcome transportation barriers.

11. HOSPITAL MANAGEMENT – WAY AHEAD IN THE CURRENT DIGITAL ERA

- Centralized digital centers for decision making & continuous clinical monitoring,
- Targeted treatments (such as 3D printing for surgeries),
- Use of smaller, portable devices
- Usage of Digital and AI technologies and Robotics to improve patient experience,
- Reducing the time of documenting
- Improving operational efficiencies and back-office efficiencies through automation

12. SUGGESTIONS

- Accelerated decision-making is needed to match with the speed of change.
- Commitment of the hospital managements for high-value care, waste reduction and Cost control.
- Learning lessons and upgrading from every care experience.
- New technologies should be used to collect and analyze data at the point of care.
- Demographic and economic trends and advancing technologies should be used to decide the aspects such as staffing and design.
- Use mobile technology and data analysis to provide effective services in rural areas.
- Optimize inpatient and outpatient settings.
- Engaging patients and their families to improve a cooperation, teamwork and transparency.
- Application of digital solutions such as remote patient monitoring, telehealth, advanced analytics to improve efficiency.
- Usage of robotics, advanced analytics, and automation to achieve cost efficiencies.
- Rebuild outdated infrastructure.
- Analyse and improve patient satisfaction.
- Work with community closely and provide need-based services.
- Try to reduce accounts receivables with the help of corporate clients, insurance etc.
- Monitor the cost and revenue regularly.
- Try to collaborate with like-minded organisations for sharing services and exchanging ideas.
- Having Mobile hospitals is a possible innovative solution which can be formed as hub n spoke model to deliver affordable healthcare.

13. CONCLUSION

The ever-changing social, cultural, economic, technological environment has brought in the change in the way the hospitals will be managed. There are several challenges posed by the VUCA world such as changing demographics, rising costs, lack of operational and workforce efficiency, lack of infrastructure, rising competition etc.

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The VUCA environment requires the hospitals to change their operational strategy in order to minimize cost, safeguard revenues and perform well in the competition. Accelerated decision-making, high-value care, mobile hospitals waste reduction, Cost control, effective usage of technology, understanding changing demographic and economic trends, efficient staffing and design of hospitals, teaming up with patients and their families etc. are some of the suggestions to overcome the challenges and to improve efficiency in hospital management.

14. REFERENCES

1. Digvijay H. Gadhari, Yadnyesh P. Kadam, Prof. Parineeta Suman, FEB 2016, HOSPITAL MANAGEMENT SYSTEM, International Journal for Research in Engineering Application & Management (IJREAM) Vol-01, Issue 11.
2. Kumar, Prem &Kosalram, Kalpana. (2013). E –Hospital Management & Hospital Information Systems – Changing Trends. International Journal of Information Engineering and Electronic Business. 1. 50-58. 10.5815/ijieeb.2013.01.06. I.J. Information Engineering and Electronic Business, 2013, 1, 50-58 Published Online May 2013 in MECS (http://www.mecs-press.org/)
3. LAXMITEJ WUNDAVALLI, S.G. BULKAPURAM, N.L. BHASKAR, N. SATYANARAYANA, 2018, Patient safety at a public hospital in southern India: A hospital administration perspective using a mixed methods approach, THE NATIONAL MEDICAL JOURNAL OF INDIA VOL. 31, NO. 1 [Downloaded free from http://www.nmji.in on Tuesday, April 16, 2019, IP: 122.170.31.71]
4. Massuda A, Hone T, Leles FAG, et al. The Brazilian health system at crossroads: progress, crisis and resilience. BMJ Glob Health 2018; 3:e000829. doi:10.1136/ bmjgh-2018-000829
5. https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-hc-outlook-2018.pdf
6. "China's 'zero markup' hospital reforms mixed bag for patented drugs," BioWorld, 2017, http://www.bioworld.com/content/chinas-zero-markup- hospital-reforms-mixed-bag-patented-drugs-2.
7. https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/downloads/forecastsummary.pdf
8. https://www.economist.com/asia/2019/01/10/japan-tries-to-keep-the-elderly-out-of-hospital
9. https://in.reuters.com/article/china-health/china-to-boost-beds-staff-to-handle-healthcare-strains-idINKBN14V038
10. https://www.expresshealthcare.in/blogs/one-of-the-highly-challenging-aspect-of-hospital-is-to-manage-the-revenue-cycle/410792/
11. http://www.crhealthcare.com.hk/English/IndustrialChainAdvantage/HospitalManagement/
12. https://www.healthcaredive.com/news/how-providers-are-working-to-stem-missed-appointments/527899/
13. http://www.indiaeducation.net/management/streams/hospital-management.aspx
14. https://hhbc.in/hospital-information-system-his-market-scenario-of-india/
15. https://www.ibef.org/industry/healthcare-india.aspx

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WOMEN IN "VIRTUAL HOME"

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ABSTRACT
Safety of a women is always the first priority in any of the field, be at work place, in office or in public places. What we think of HOME? It is considered to be the safest place but what about the "VIRTUAL HOME" where we spend the maximum time and we feel no body is around us to watch, nobody is keeping eye on us. Is this the fact? You are in Cyber World that is enough to be "UNSAFE" if you don't know the Cyber Etiquettes and lack of knowledge about Cyber Safety.

Web 2.0, O'Reilly et al.[1] has re-imagined the virtual existence of normal people and has given wide chances to web clients including women to trade thoughts, interface with similar individuals and take part in the improvement of virtual social orders according to one's very own decisions. Social Networking sites (SNWs), a section of Web 2.0 is extremely prevalent among the web clients. Nonetheless, there is a clouded side of these SNW's as well. They have progressed toward becoming safe houses for wrongdoers to exploit women, the most defenseless focuses in the web, after youngsters.

In this paper, I inspect the exploitation of women in the long range social networking sites, investigate the patterns of such exploitation from socio – legitimate point and determine the explanations behind the development of such exploitation. How the society can be made free from these exploitations and what are the preventive steps to be taken is also the objective of this paper.

Keywords: Women, Virtual Home, Social Networking sites (SNWs), Web 2.0, Cyber Etiquettes

1. INTRODUCTION : DIGITAL SECURITY

This is the fact that ladies are increasingly social, expressive and vocal when contrasted with men and what better intends to appreciate such opportunity of articulation than internet based life. Reports recommend that over 76% of online networking clients are ladies; either hoping to make associations, start discourses on ladies explicit points or basically endeavoring to keep in contact with their loved ones.

This instinctual and regularly routine conduct of women to keep loved ones refreshed about their lives and whereabouts frequently impels them to share subtleties like individual data, area, and so forth. The need to in a flash offer data can numerous multiple times be ascribed to the simple accessibility of Wi-Fi at most bistros, cafés, shopping centers, and most different spots ladies love to hang out at.

An ongoing report likewise proposes that a large portion of the key classes via web-based networking media gathering unmistakable quality are for the most part to do with ladies as opposed to men.

While digital security isn't a sex one-sided issue to be dealt with just by ladies, the outcomes of a digital assault can change incredibly for people. There have been developing rates of ladies and young ladies getting stalked, humiliated, pestered or compromised in the virtual world because of wrong sharing of individual data.

As the maxim goes, "the web records everything and overlooks nothing", whatever content is posted about an individual on the web turns into a piece of their perpetual online personality, it is almost difficult to eradicate.

On May 18, 2016, Indian Minister for Women and Child Development Maneka Gandhi expressed that the online maltreatment and trolling of ladies in India ought to be dealt with a similar path as savagery in the genuine world, Choudhury et al. [2] .The following day, the Home Ministry declared that they intend to dispatch an entrance named "Digital Crime Prevention against Women and Children" (CCPWC) that will enable Indian ladies to post grumblings about online harassment, Johari et al.[3].

The report utilizes both subjective and quantitative research, including examination of media reports including on the web provocation of prominent ladies; a review of 500 internet based life clients; and meetings with ten of the respondents. Most of overview respondents were ladies under 35, living in real urban communities, and taught to school level or above.

2. CASES UNDER CYBER CRIME

2.1 In India

• In 2012, various Twitter clients compromised Indian essayist, writer and dissident Meena Kandasamy after she examined a hamburger eating celebration in the southern city of Hyderabad utilizing her own Twitter account, Sethi et al.[4].

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• In 2013, Indian writer Sagarika Ghose was compromised with assault by Twitter clients who found and distributed her little girl's name and school, Arya et al.[5].Ghose said the tweets originated from conservative patriots focusing on "liberal and mainstream ladies." Ghose hence quit sharing her own perspectives on Twitter.

• Kavita Krishnan, a conspicuous Delhi-based ladies' rights dissident, was irritated amid a 2013 online visit about savagery against ladies on news site Rediff by an individual utilizing the handle @RAPIST, until she left the discussion, Arya et al.[6]. Separately, in 2015, Krishnan and Indian entertainer Shruti Seth both censured the head administrator's web based life activity #SelfieWithDaughter, in which he approached fathers to share photographs of themselves with their little girls to advance training for young ladies. Both were sent injurious language and savage dangers on Twitter, Rai et al.[7].

• Rega Jha, Buzzfeed's India editorial manager, was liable to assault dangers after she commended Pakistani players on Twitter amid a 2015 India-Pakistan cricket match, Padte et al.[8]. Many Indian men sent took an interest in the harsh remarks, including essayists Chetan Bhagat and Suhel Seth. India and Pakistan have had a strained relationship since the parcel of India in 1947.

• Journalist Barkha Dutt has been called India's most trolled lady. Maltreatment of Dutt, who is routinely bothered for her online remarks, raised on Twitter and Facebook in December 2015 after she depicted being explicitly manhandled as a tyke in her book “This Unquiet Land”, Ramani et al. [9]. Among other harsh terms, commentators called her "antinational," a conservative slur, Sharma et al.[10].

• In 2015, Media One Group writer V.P. Rajeena from the southern territory of Kerala, distributed an individual record of youngster sexual maltreatment at a Sunni religious school in the southern city of Kozhikode on Facebook. More than 1,700 Facebook clients shared her record, however it additionally pulled in maltreatment from individuals from the Muslim people group, a significant number of whom detailed her Facebook represent damaging network rules, with the outcome that it was briefly blocked ,India Today et al.[11]

• Ritu Kohli Case, cyberlaws.net et al.[12]. Ritu Kohli Case was India‟s first instance of digital stalking, for this situation Mrs. Ritu Kohli grumbled to police against an individual, who was utilizing her personality to talk over the Internet at the site http://www.micro.com/, for the most part in Delhi channel for four back to back days. Mrs. Kohli further grumbled that the individual was visiting on the Net, utilizing her name and giving her location and was talking disgusting language. A similar individual was likewise purposely giving her telephone number to different prattles urging them to call Ritu Kohli at include hours. Therefore, Mrs. Kohli got very nearly 40 brings in three days generally on include hours. The said call made a destruction in close to home existence of the complainant thus IP addresses was followed and police researched the whole issue and at last captured the guilty party. A case was enrolled under the area 509, of IPC and from there on he was discharged on safeguard. This is first time when an instance of digital stalking was accounted for.

• The DPS MMS embarrassment, wikipedia.org et al.[13] is an extremely well known instance of this where a MMS clasp of a school young lady in trading off circumstance was made and circulated among different web systems.

• Dissimilar to different violations like Cyber Stalking, Cyber Defamation, Morphing, Email Spoofing, Cyber Pornography is viewed as an extraordinary case which has been secured by the IT Act 2000 somewhat by Section 67 of the IT Act 2000.

The ongoing Air Force Balbharati School case (Delhi), Behera et al.[14] is an ongoing case goes under the classification of morphing(Morphing is altering the first picture in order to make it look totally or generally changed) where an understudy of the School was prodded by the entirety of his schoolmates for having a scarred face. He, who is worn out on the remorseless jokes, chose to turn the tables on his tormentors and checked photo of his colleagues and instructors, transformed them with bare photos and put them up on a site that he transferred on to a free web facilitating administration. The dad of one of the class young ladies highlighted on the site came to think about this and held up a grievance with the police.

• Email spoofing is a term used to portray false email action in which the sender address and different pieces of the email header are adjusted to seem like the email started from an alternate source; it is finished by properties of the email, for example, the From, Return-Path and Reply-To fields, not well intentioned clients can influence the email to give off an impression of being from somebody other than the real sender. This strategy is regularly utilized by cyber criminals to remove individual data and private pictures from unsuspecting women, these pictures and so on are then used to coerce those ladies. The most mainstream instance of digital ridiculing is Gujarat Ambuja's Executive Case, indiaforensic.com et al.[15], for this situation the culprit claimed to be a young lady for duping and extorting the Abu Dhabi based NRI.

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2.2 Outside India

Digital brutality against ladies can likewise be an expansion of the savagery ladies involvement in their connections. It very well may be utilized by a lady's accomplice as a strategy to keep up power and command over her both while she is in the relationship and after she leaves. An overview led by British association, Woman's Aid, found that of 307 abusive behavior at home survivors, 45% were manhandled web based amid their relationship, Topping et al.[16]. Albeit a few people trust that online maltreatment seeing someone is less genuine than physical maltreatment, similarly that verbal and psychological mistreatment are viewed as less extreme, digital savagery is frequently utilized methodically by abusers related to a scope of different strategies to undermine and control ladies in relationships,Hand et al.[17]. The narrative of Donna, a lady who composed a blog entry itemizing her experience on the Take Back the Tech site, delineates this efficient control, Donna et al.[18]. She depicts how she was in an oppressive association with a man who was exceptionally desirous and possessive, and followed up on this by being over the top about Facebook photos of her with other men, provoked her male Facebook companions, chose her Facebook profile pictures for her, and made her dress expressly and send him pictures on the web. There was additionally close joining of this online maltreatment with psychological mistreatment as he controlled her into feeling remorseful when she didn't do "little things" for him. He made her vibe that she didn't comprehend her body and appearance just as he did, and that defended his authority over her online profile pictures and how she spoke to herself on the web. He focused on what she looked like in pictures and utilized these to assault her with sexualized put-down and slurs. Along these lines, he deceptively consolidated psychological mistreatment with digital savagery to make her vibe feeble and subject to him.

Women are additionally very in danger after they leave injurious connections too. There are visit stories in the media of women being followed, bugged or coerced through web based life by their ex accomplices. An August 2010 story depicted how a 23-year-elderly person imitated one of his ex's online so as to scare and extortion another ex, taking steps to uncover sexual pictures he had of her to her new sweetheart on the off chance that she didn't come back to him, Associated Press et al.[19]. In Seattle, a 31-year-elderly person was digital stalked by her ex, a Seattle cop, after she finished the relationship,Green et al.[20]. He posted sexual pictures of her on a phony Facebook page and after that assaulted her physically also. A September 2013 story in the Guardian told how a lady named Lucy was consistently bothered by her ex-accomplice on the web. He made unknown internet based life records to get in touch with her and her loved ones. Lucy remarked on her experience, " "When you abandon you think you get an opportunity of another existence without them, yet when they reach you online it resembles they are in the room… Being harassed online presents to everything back – you can mend from a punch in the face, however the psychological torment never leaves." " ,Topping et al.[21].

Obviously, women are likewise digitally stalked much more than men as shown in Figure1, pinterest.com et al.[22], they are stalked by individuals other than their accomplices or ex-accomplices. Amanda Hess, " The Next Civil Rights Issue: Why Women Aren't Welcome on the Internet", Hess et al.[23], digs into this issue in detail. She refers to a 2006 University of Maryland think about that made phony online records in talk rooms with ladylike usernames and manly usernames and found that accounts with female usernames got a normal of 100 compromising or unequivocal messages every day, while those with manly usernames got a normal of 3.7. This examination illustrates how women are focused for online badgering only for being women.

A particularly notable story is of Caroline Criado-Perez, who campaigned for the Bank of England to incorporate women other than the Queen on British cash, and therefore gotten several passing and assault dangers on Twitter, while police and Twitter officials would not make a move.

One study respondent shared her experience of getting demise and assault dangers for blogging about sex based viciousness and remarked that it is critical to recognize the manners in which that women of shading are focused on dependent on their sexual orientation and their race. She gives instances of how Asian women who are straightforward are focused for not fitting into the generalization of a "compliant Asian lady", and dark women bloggers are contrasted with non-human primates by their online assailants when they experience online harassment, Battered Women's Support Services et al.[24]. We can likewise perceive how women of shading are exposed to racialized and sex based online savagery in the case of Zerlina Maxwell. Maxwell showed up on a Fox News broadcast banter taking the position that women ought not need to bear firearms to keep themselves safe and the onus ought to be on men and society to make assault unacceptable, Marshall et al.[25].

3. EFFECTS OF CYBER-VIOLENCE AGAINST WOMEN

The effects of digital brutality against women are mental, social, physical and financial. The most pervasive are mental effects, which are felt by most women who experience digital savagery. 65% of the women from our overview detailed encountering some kind of mental effect, going from the most well-known, uneasiness and

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harmed mental self portrait (with generally half and 43% of respondents individually), to the most extraordinary, musings of suicide and participating in self-hurting conduct (10% of respondents) .

Digital brutality against women can have genuine and negative financial effects for women too, especially nonconsensual dissemination of pictures and retribution pornography.

The social ramifications for women can be exceptionally extreme, especially if their whole network is included with the digital brutality.

The most well-known social effect revealed by women is pulling back from online action, with 40% of women detailing that they have encountered this as an effect of digital violence . Having encountered injurious connections previously, the majority of the women abstained from utilizing web based life and online stages so as to guard themselves. They feared the likelihood of individuals web based utilizing their own data against them, abusing their protection and turning into the casualties of tormenting and viciousness. Notwithstanding, evading on the web movement to be careful likewise implied that they were let well enough alone for online informal organizations and the noteworthy measure of mingling that happens online in our general public. Consequently, the genuine social effect of pulling back from online movement is frequently social seclusion.

4. COMMUNITY RESPONSE TO WOMEN WHO EXPERIENCE CYBER-VIOLENCE

There is a tendency to either blame the victim for 'allowing' or 'provoking' abuse, or to urge the victim to just 'ignore' or block the messages." Society never gives the positive response to the victim specially if the victim is a woman.

When women tell people in their community about the cyber-violence they experience, or when the violence they experience is exposed, they get a range of responses from the community. In a very few instances, women's families and friends are supportive and help them with their resistance against the cyber-violence. More often, women's experiences of violence are minimized, with comments like "it's only online, it's not real", "just ignore it" and "don't feed the trolls". Women are also told that if they don't like the abuse, they should just get off the internet. The message is that cyber-violence isn't a serious concern, and it is up to women to ignore and shield themselves from online abuse, that perpetrators of online violence can do whatever they want and no one can stop them. Several women in our online survey commented that this was the response they got from their community100. One respondent said "[people] told me not to express my opinion and censor myself". Another remarked, "Many people told me not to engage or defend myself, instead to just ignore it.", while a third woman commented "I don't think there has been much of a response, it's become "normal" to see and hear these types of things online". One survey respondent describes the way communities frequently minimize women's experiences of cyber violence very thoroughly: Even when the police take action to investigate reports, like in such cases as when girls are sexually assaulted and the assault is recorded on cell phones and distributed, it does not guarantee that survivors will be treated with dignity and respect during this process. The most insidious form of community response is when community members blame girls and women for the violence that happens to them, and side with the perpetrators of the cyber-violence. Women who experience less severe types of cyber-violence are also blamed and shamed for the violence done to them. Victims of revenge porn are frequently criticized for having taken nude pictures of themselves at all, young girls are chastised for engaging in sexting, and women are generally blamed for having any type of personal information publicly accessible online, making themselves willing bait for online predators.

Being blamed for cyber-violence is a common experience for women. 23.3 % of women in our online survey reported being blamed for the violence done to them110. One woman writes, "most people either blamed me for the abuse saying I deserved it. Others ignored it", and another responded, "no help no support at all. I was told that being on line is a risk and if I'm being harassed it's my own fault".

30% of respondents called the experience of being subject to abuse online extremely upsetting

15 % said that online harassment had resulted in mental health issues like depression, stress, & insomnia.

Becoming the victim of cyber crime can have long-lasting effects on any one's life. One can have

- Identity Theft
- Security Costs
- Monetary Losses

5. WHAT NEEDS TO CHANGE

We need to resist the assumption that men's status of entitlement to use the internet and social media allows them to bestow or withdraw the privilege of access from women. We need to challenge the wide-spread

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acceptance of cyber-violence against women as a given and assert the right for girls and women to move freely in cyber-space, and to use the internet, texting and social media without the threat or experience of harassment, blackmail, stalking, humiliation, or otherwise malicious attack because of their gender. Gender and age are the two major criteria on which basis discrimination is done even in cyber world, Women and children can be easily trapped for cybercrime, which can be easily seen in the Figure 2, huffingtonpost.com et al.[26]. Other than legal or social issues we need to change our mentality, we are active participant of the digital world. Here is one of the proposed models for prevention of cybercrime on women. Explained in Figure 3.

CONCLUSION

It surmises that the detectable quality to overcome the computer based violation against women by and large is trying and the primary way is to comprehend digital wrongdoings. **Firstly** government needs to brace the real system to cut down computerized crimes, since offenders consider it much less difficult than standard bad behaviors on account of less probability of being gotten and less discipline. **Second** besides, what ought to be changed is the sense or mien of the overall population towards women, not to consider woman a thing. People need to understand that ruthlessness against women is just a sign of sex partition and divergence in sexual introduction control relations. **Thirdly**, women should understand that the open door has touched base to expel the calm or aversion and approach for doing combating against advanced bad behaviors and for their rights. **Fourthly**, it requires a common research and thought on advanced bad behaviors. It ought to be examined in detail which should be sponsored by government. **Fifthly**, police staff must be given getting ready in order to deal with and manage computerized bad behaviors. Thus, workshops and classes on the web guidance must be dealt with. Women should in like manner look into such sort of activities. Again regardless, **finally**, people needs to change their mindsets towards women and should develop the sentiment of shared trademark since tidiness starts from home. Swami Vivekananda had said "The country which doesn't regard ladies will never turned out to be incredible now and nor will ever in future" thus as to make India an uncommon nation, let us advance toward giving women their much justified status and spot.

REFERENCES

1. O'Reilly T, one of the first proponent of the concept of Web 2.0, the concept can be"visualized" as "a set of principles and practices that tie together a veritable solar system ofsites that demonstrate some or all of those principles, at a varying distance from that core", http://oreilly.com/pub/a/web2/archive/what-is-web-20. html (accessed May 28, 2009).
2. Choudhury S, "Online Attacks On Women To Be Treated As Violence: Maneka Gandhi to NDTV," NDTV, May 18, 2016, http://bit.ly/1YAtGR4. 2. Sneha Johari, "Updated: On Maneka Gandhi saying that online trolling of women will be treated as violence," Medianama, May 19, 2016, http://bit.ly/2aXbr5y.
3. Johari S, "Updated: On Maneka Gandhi saying that online trolling of women will be treated as violence," Medianama, May 19, 2016, http://bit.ly/2aXbr5y.
4. Sethi A, "NWMI Condemns The Violent Abuse Of Meena Kandasamy," Kafila, April 22, 2012, http://bit.ly/2bC8Fbt.
5. Arya D, "Why are Indian women being attacked on social media?," BBC, May 8, 2013, http://bbc.in/2bk99kH.
6. Arya D, "Why are Indian women being attacked on social media?," BBC, May 8, 2013, http://bbc.in/2bk99kH.
7. Rai S, "You maybe next to get abused like Kavita Krishnan, Shruti Seth, and Twitter will do nothing," Firstpost, June 30, 2015, http:// bit.ly/2bCcZYm.
8. Padte RK, "Sexist remarks, stalking and rape threats: how women are punished for speaking online," Scroll, February 19, 2015. http://bit. ly/2bnv5sw.
9. Ramani P, "Why everybody loves to hate Barkha Dutt," Live Mint, April 23, 2016, http://bit.ly/1MKdTOw.
10. Sharma OP ,ANI, "All 'anti-nationals' can go and live in Pakistan: " Business Standard, February 16, 2016, http://bit.ly/2aWpxDN.
11. IndiaToday.in, "What sparked the madarsa controversy? What did VP Rajeena write?," India Today, November 26, 2015, http://bit.ly/2bk9GEC.
12. http://cyberlaws.net/cyberindia/2CYBER27.htm

ISSN 2394 - 7780

13. http://en.wikipedia.org/wiki/DPS_MMS_Scandal
14. Behera A, " Cyber Crimes and Law In India," XXXI,IJCC 19 (2010)
15. http://www.indiaforensic.com/cyberextortion.htm
16. Topping A, "Online Trolling of Women is Linked to Domestic Violence, Say Campaigners," The Guardian, September 3, 2013, accessed April 25, 2014, http://www.theguardian.com/society/2013/sep/03/online-trolling-women-domestic-violence
17. Hand T, Chung D, and Peters M, The Use of Information and Communication Technologies to Coerce and Control in Domestic Violence and Following Separation, report no. 6 (n.p.: Australian Domestic and Family Violence Clearinghouse, 2009).
18. Donna, "My Body Is My Business," Take Back the Tech Blog, entry posted 2012, accessed April 25, 2014, https://www.takebackthetech.net/write/my-body-my-business.
19. Associated Press, "Man Charged in Facebook Stalking Case," NBC News, August 25, 2010, accessed April 25, 2014, http://www.nbcnews.com/id/38851897/ns/technology_and_science-security/t/man-chargedfacebook-stalking-case/#.U1rnDc2K82U.
20. Green SJ, "Seattle Cop Gets 90 Days for Explicit Web Photos of Ex-Lover," Seattle Times, January 8, 2014, Local News, accessed April 25, 2014,http://seattletimes.com/html/localnews/2022626374_cyberstalkingcasexml.html
21. Topping A. "How Domestic Violence Spreads Online," The Guardian, September 3, 2013, News, accessed April 25, 2014, http://www.theguardian.com/society/2013/sep/03/domestic-violencespreads-online-watching.
22. www.pinterest.com, "11 best national stalking awareness" [23] Hess A, "The Next Civil Rights Issue: Why Women Aren't Welcome on the Internet," Pacific Standard Magazine, January 6, 2014, accessed April 25, 2014, http://www.psmag.com/navigation/healthand-behavior/women-arent-welcome-internet-72170/
23. Focus Group with BWSS (Battered Women's Support Services) Staff, interview by the author, Vancouver, March 5, 2014.
24. Marshall J. , "Monstrous," Talking Points Memo, last modified March 9, 2013, accessed April 25, 2014, http://talkingpointsmemo.com/edblog/monstrous?ref=fpblg%5D.
25. www.huffingtonpost.com, "26% of young women report"

FIGURES

Figure-1

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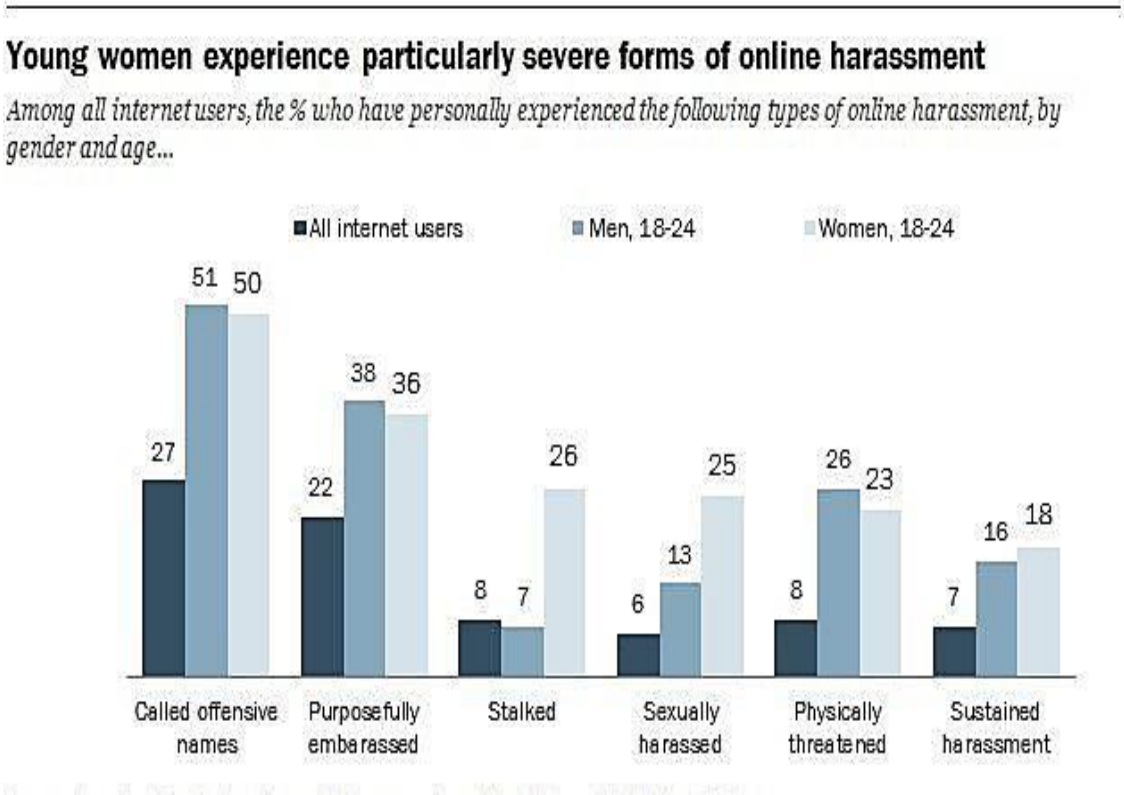

Figure-2

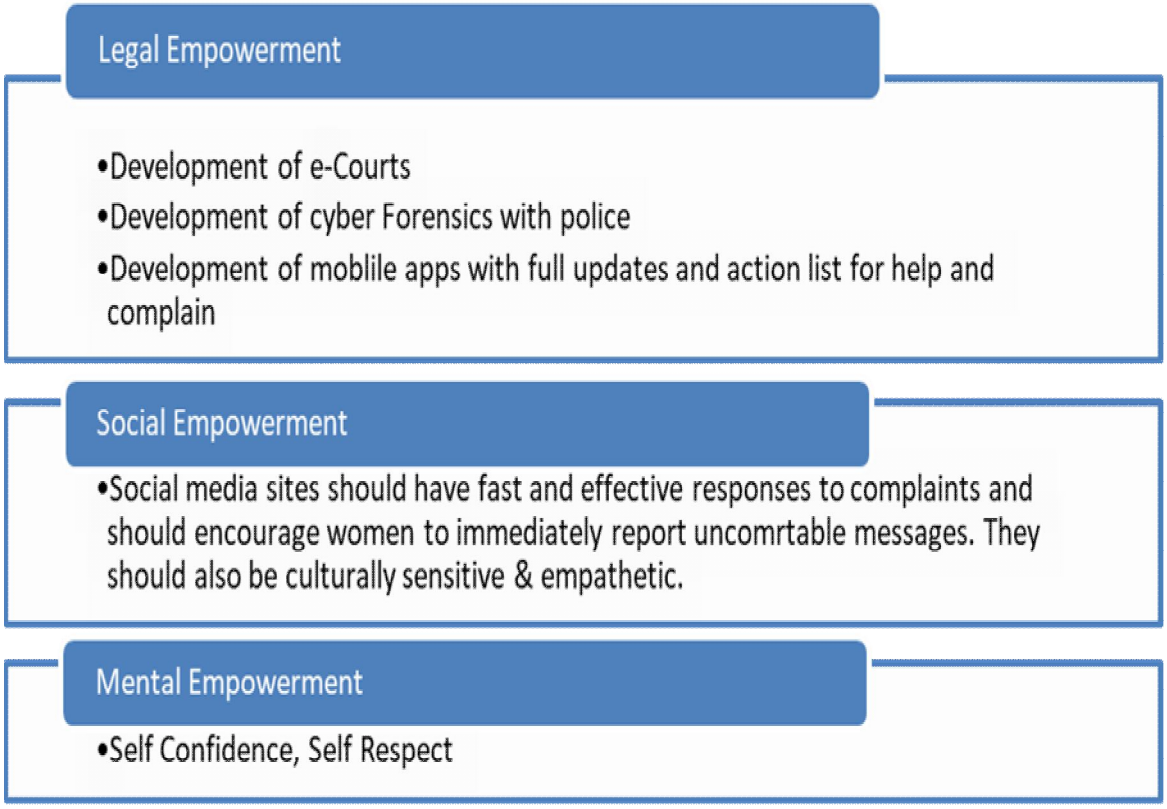

Figure-3: Cyber Crime Prevention Model for Women

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FRESHWATER EDIBLE CRAB, *SARTORIANA SPINIGERA* AS A SOURCE OF ANTIBACTERIAL AGENT AGAINST CLINICAL PATHOGENS

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ABSTRACT
Antibacterial activity of Sartoriana spinigera muscle extract in different organic solvents were studied against 4 bacterial strains. S. spinigera is a freshwater edible crab in Jharkhand. Sensitivity test of methanol, ethanol and acetone extract showed inhibition zone (20.5±0.50 mm), (18.41±0.52 mm) and (16.50±0.50 mm) against Escherichia coli, (18.45±0.50 mm), (16.38±0.53 mm) and (14.16±0.28 mm) against Klebsella pneumoniae, (16.58±0.52 mm), (14.16±0.28 mm) and (12.50±0.50 mm) against Staphylococcus epidermidis, (17.38±0.52 mm), (16.50±0.50 mm) and (15.41±0.52 mm) against Salmonella typhi. Statistical analysis showed that methanol extract proved to have best antibacterial efficacy in comparison to ethanol and acetone extract ($p<0.01$, $p<0.001$) in case of E. coli, K. pneumoniae and S. epidermidis whereas in case of S.typhi, muscle extract in all the organic solvents showed similar antibacterial activity. Thus the present experiment showed that the wet muscle tissue of S. spinigera contains strong antibacterial activity against clinical pathogens and may replace existing inadequate and cost effective antibiotics.

Keywords: Muscle extract, Inhibition zone, t-test, ANOVA, Nalidixic acid.

INTRODUCTION
One of the most alarming thing that has happened in the recent years is increased risk of infection from air, water, food etc but the pace with which the work is being done is very slow leaving a very wide gap between demand and supply. There is a very high demand for antibacterial substances with lesser environmental and toxicological risk so it is high time to develop certain antibacterial substances in the most cost effective manner which would be huge help for the common people.

Freshwater bodies like ponds, rivers and dams are abounding in Jharkhand having large number of resources. These resources contain highest quality of bioactive substances. A very little has yet been done to extract these powerful antibacterial substances from these resources. Though, in recent years much has been done but still leaves a huge scope of work to be done in this field. It is important to discover new antimicrobial compounds with diverse chemical structures and with novel mechanisms of actions for new and re-emerging infectious diseases, Rojas et al. [1].

Jharkhand, where freshwater reservoirs are abounding in having treasure of aquatic species rich in antibacterial substances can prove to be boon for researchers. A particular crab variety which is greatly relished as food and of particular importance as it is distributed in most part of Jharkhand state is *Sartoriana spinigera* (Wood-Mason, 1871). It is omnivorous and feeds on smaller crustaceans, molluscs and small plants of freshwater bodies. The literature regarding its antibacterial activity is grossly lacking. So, here an attempt has been made to assess the antibacterial properties of this tiny freshwater crab.

MATERIALS AND METHODS
Collection of animal material
The animal specimen for the proposed study was collected from local market brought to Zoology Department Laboratory of Ranchi University. Care was taken to select healthy crabs. It was identified as *S. spinigera* (dark brown or black colored freshwater crab) and carapace having only one antero-lateral spine belonging to Gecarcinucidae family.

Preparation of the extracts
The extraction of tissue from the crab was done using the method adopted, Chellaram et al. [2]. 25g wet weight of freshly extracted tissue were soaked in ethanol, methanol and acetone each separately and maintained for 3 days. The extracts were filtered through Whatman $^{@}$No.1 filter paper and concentrated by evaporation using hot plate at 30^0C to obtain a dark brown gummy mass. The resultant residues were stored at 4^0C for further analysis.

Bacterial strains used
Bacterial strains namely *Escherichia coli, Klebsiella pneumoniae, Staphylococcus epidermidis* and *Salmonella typhi* were obtained from Rajendra Institute of Medical Scienes, Bariatu, Ranchi (Jharkhand) 834009. Strains were maintained at 4^0C on nutrient agar media. Each of the microorganisms were freshly cultured prior to susceptibility testing by transferring them into a separate sterile test tube containing nutrient broth and incubated

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overnight at 37^{0}C. A microbial loop was used to remove a colony of each bacterium from pure culture and transfer it into nutrient broth.

Preparation of media

The media was prepared by dissolving 28g of nutrient agar powder in 1 liter of distilled water. This mixture was heated while stirring to fully dissolve all components. Autoclaved the dissolved mixture at 15 lbs pressure at 121^{0}C for 15 minutes. Once the nutrient agar had been autoclaved, allowed it to cool at 55-56^{0}C. Nutrient agar was poured into each 100 mm petri dish (15-20 mL/plate) and was left on the sterile surface until the agar was solidified.

Preparation of inoculum

Each organism was recovered for testing by sub culturing on fresh media. A loopful of inoculum of each bacterium was suspended in 2ml of nutrient broth for 4hrs at 37^{0}C. Standardization of the inoculum was made by preparing *McFarland* Standard and Compared with the turbidity of the inoculum.

Antibacterial assay

Antibacterial assay was carried out by using Standard Well Diffusion Method, Mayer et al. [3] & Mitta et al. [4]. 100 µL of diluted bacterial suspension (10^5 cfu/mL) of test bacterial strains were swabbed on the surface of Nutrient agar plate. After 5 min, 75 µL from 2.8 mg of the extract/mL Dimethyl Sulfoxide (DMSO) was added onto 6 mm diameter well and marked. The plates were then incubated at 37^{0}C for 24 hrs. The susceptibility of the test organisms were determined by measuring the radius of inhibition zone around each well with the help of a Hi Antibiotic Zone Scale. Nalidixic acid and Amikacin discs (30 µg disc^{-1}) were used as a positive control and DMSO was used as a negative control. More than 12 mm in the measurement is sensitive zones, between 4 to 12 mm is moderately sensitive and zones less than 4 mm is resistant. All the extracts were tested in triplicate at attention of accurate results.

STATISTICAL ANALYSIS OF DATA

The recorded data was subjected to statistical analysis by using Student's t-test to determine the level of significance.

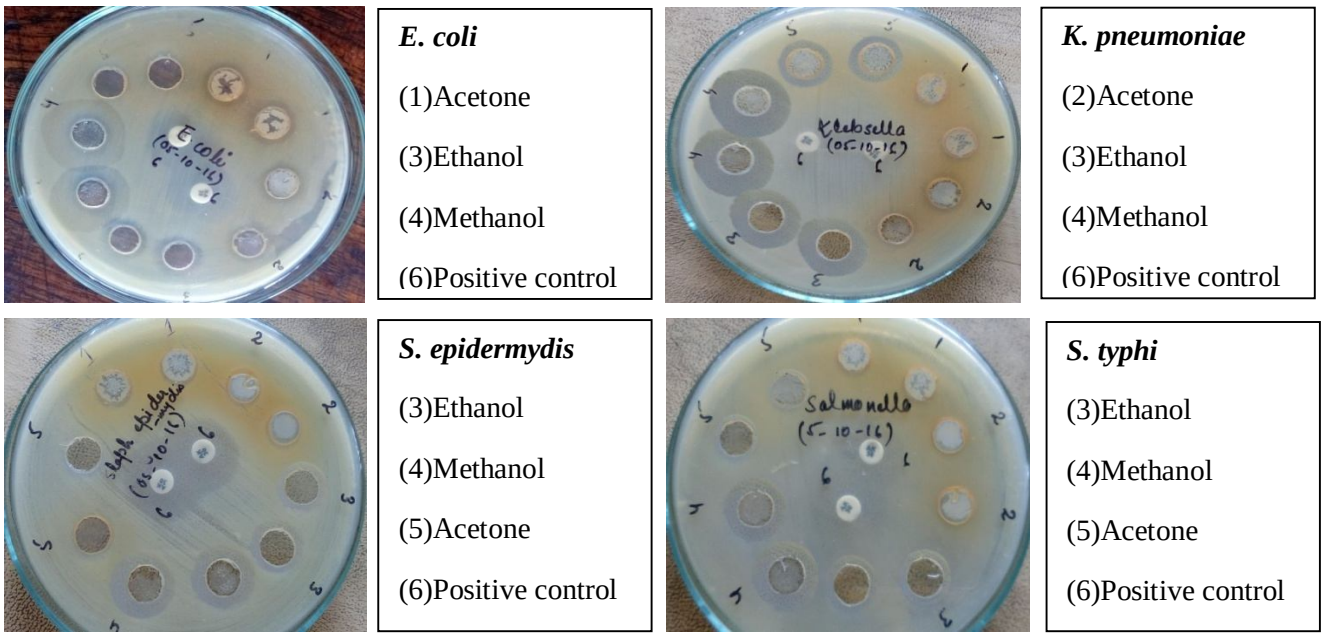

Fig-1: Antibacterial activity of wet muscle extracts using 3 types of solvent methanol, ethanol and acetone against 4 bacterial pathogens *E. coli, K. pneumoniae, S. epidermidis* and *S. typhi*

Table-1: Inhibition zone of crude extracts (2.8 mg/ml) of the wet muscle of *Sartoriana spinigera* against Gram positive and Gram negative human pathogens .

Different Solvents	Zone of inhibition (mm) against different bacterial strains			
	Escherichia Coli	***Klebsiella pneumoniae***	***Staphylococcus epidermidis***	***Salmonella typhi***
Methanol Vs Ethanol	20.50±0.50** 18.41±0.52	18.45±0.50** 16.38±0.53	16.58±0.52** 14.16±0.28	17.38±0.52 16.50±0.50

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Methanol Vs Acetone	20.50±0.50*** 16.50±0.50	18.45±0.50*** 14.16±0.28	16.58±0.52*** 12.50±0.50	17.38±0.52* 15.41±0.52
Ethanol Vs Acetone	18.41±0.52** 16.50±0.50	16.38±0.53** 14.16±0.28	14.16±0.28** 12.50±0.50	16.50±0.50 15.41±0.52
Methanol Vs +ve control	20.50±0.50*** 17.16±0.28	18.45±0.50*** Resistant	16.58±0.52 17.15±0.25	17.38±0.52*** 13.08±0.14
Ethanol Vs +ve control	18.41±0.52* 17.16±0.28	16.38±0.53*** Resistant	14.16±0.28 17.15±0.25***	16.50±0.50*** 13.08±0.14
Acetone Vs +ve control	16.50±0.50 17.16±0.28	14.16±0.28*** Resistant	12.50±0.50 17.15±0.25***	15.41±0.52** 13.08±0.14

Student's t-test * Significant at 5% level, **Significant at 1% level, ***Significant at 0.01% level

RESULTS AND DISCUSSION

In Table 1 sensitivity test of methanol, ethanol and acetone extract against *Escherichia coli* showed inhibition zone (20.50±0.50 mm), (18.41±0.52 mm) and (16.50±0.50 mm) respectively. Difference obtained where statistically analysed using Student's t-test. It was observed that methanol extract showed significantly more zone of inhibition than ethanol ($P<0.01$) and acetone ($P<0.001$) (Table 1, Fig 1). Ethanol extract proved better solvent than acetone ($p<0.01$). When these organic solvents (methanol, ethanol and acetone) extracts were compared with positive control Nalidixic acid (30 µg $disc^{-1}$) showed increased efficacy than control, with methanol ($p<0.001$, with ethanol $p<0.05$) and insignificant in case of acetone. Similar to this maximum antibacterial activity against *E. coli* (14.32±0.75 mm) and (17.41±0.28 mm) in methanol extract and (15.24±0.28 mm) and (4.12±1.28 mm) in acetone extract was reported in the tissue extracts of *Hemifusus pugilinus* and *Natica didyma*, Ravi et al. [5]. Antibacterial activity against *E. coli* (32.16±0.28 mm) and (22.16±0.28 mm) in methanol extract of freshwater crab (*Callinects sapidus*) and snail (*Pomacea insularium*) was also reported by Lekshmi et al. [6].

In case of *Klebsiella pneumoniae* maximum inhibition zone was found in methanol extract (18.45±0.50 mm) whereas in ethanol and acetone extract against the same bacteria the zone of inhibition was found (16.38±0.53 mm) and (14.16±0.28 mm) respectively (Table 1, Fig. 1). Statistical analysis showed that methanol extract showed significantly more zone of inhibition than ethanol ($P<0.01$) and acetone ($P<0.001$) (Table 1, Fig. 1). Ethanol extract proved better solvent than acetone ($p<0.01$). When these organic solvents (methanol, ethanol and acetone) extracts where compared with positive control Nalidixic acid (30 µg $disc^{-1}$), all showed increased efficacy than control ($p<0.001$). Similar to this maximum antibacterial activity against *Klebsiella sp*. (19.83±0.28 mm) and (20.00±0.50 mm) in methanol extract was reported in the tissue extracts of freshwater crab, *Callinects sapidus* and snail, *Pomacea insularium* by Lekshmi et al. [6]. Antibacterial activity against *Klebsiella pneumoniae* (14 mm) in the haemolymph of marine *Ocypoda macrocera*, Sivaperumal et al. [7].

For *Staphylococcus epidermidis* maximum inhibition zone was found in methanol extract (16.58±0.52 mm) whereas in ethanol and acetone extract against the same bacteria the zone of inhibition was found (14.16±0.28 mm) and (12.50±0.50 mm) respectively (Table 1, Fig. 1). Statistical analysis showed that methanol extract showed significantly more zone of inhibition than ethanol ($P<0.01$) and acetone ($P<0.001$) (Table 1, Fig. 1). Ethanol extract proved better solvent than acetone ($P<0.01$). When these organic solvent extracts were compared with positive control Amikacin (30µg $disc^{-1}$) showed slightly lower efficacy than control, with methanol (P<insignificant), with ethanol ($P<0.001$) and with acetone ($P<0.001$). No literature on the antibacterial efficacy has been reported yet against *Staphylococcus epidermidis* in Zootherapy. On the contrary some studies have been reported in plant leaf extracts.

Sensitivity test of methanol, ethanol and acetone extract against *Salmonella typhi* showed inhibition zone of (17.38±0.52 mm), (16.50±0.50 mm) and (15.41±0.52 mm) respectively (Table 1, Fig. 1). Student's t-test between methanol and ethanol extract showed no significant difference zone of inhibition, advocating that both solvents have similar antibacterial activity. Table 1 also showed significantly more zone of inhibition in methanol extract in comparison to acetone ($P<0.05$) (Fig. 1). When these organic solvent extracts were compared with positive control Amikacin (30 µg $disc^{-1}$) showed increased efficacy than control, with methanol ($P<0.001$), with ethanol ($P<0.001$), and with acetone ($P<0.01$). Similar to this maximum antibacterial activity

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were reported in methanol extract of freshwater crab *Callinects sapidus* and snail *Pomacea insularium* against *Salmonella* sp.(18.66±0.28 mm) and (20.00±0.50 mm) respectively, Lekshmi et al. [6]. Antibacterial activity against *Salmonella enteric* (10 mm) reported in the haemolymph of marine *Ocypoda macrocera*, Sivaperumal et al. [7].

CONCLUSION

Although being consumed as a natural zootherapeutic resource by local residents of Jharkhand but the basic molecular knowledge about *S. spinigera* and its extend to cure disease is still not known. The result of present study supports that the muscle of freshwater edible crab *S. spinigera* possess bioactive compounds that have potent antibacterial activities. Thus, further studies are essential to explore those bioactive compounds and to convert them into usable drugs.

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REFERENCES

1. **Rojas A, Hernandez L, Miranda PR, Mata R.** Screening for antimicrobial activity of crude drug extracts and pure natural products from Mexican medicinal plants. *J. Ethnopharmacology* 1992; 35: 275-283.
2. **Chellarm CMEG, Patterson EJK.** Antibacterial activity of the winged oyster *Pteria chinesis* (Pterioida: Pteridae). Indian J Mar Sci 2004; 33: 369-370.
3. **Mayer AM, Rodriguez AD, Berlinck RG, Fusetani N.** Marine pharmacology in 2007-8: Marine compounds with antibacterial, anticoagulant, antifungal, anti-inflammatory, antimalarial, antiprotozoal, antituberculosis and antiviral activities; affecting the immune and nervous system, and other miscellaneous mechanisms of action. Comp Biochem Physiol 2011; 153C: 191-222.
4. **Mitta G, Hubert F, Noel T, Roch P.** Myticin, a novel cysteine-rich antimicrobial peptide isolated from haemocytes and plasma of the mussei *Mytillus galloprovincians* Eur J Biochem 1999; 265: 71-78.
5. **Ravi C, Karthiga A, Venkatesan V.** Isolation and Biomedical Screening of the Tissue Extracts of Two Marine Gastropods *Hemifusus pugilinus* (Born,1778) and *Natica didyma* (Roding, 1798). Asian Fisheries Science 2012; 25: 158-169.
6. **Lekshmi PNCJ, Viveka S, Anusha S, Jeeva S, Brindha RJ, Bharath M.** Antibacterial activity of freshwater crab and snail and isolation of antibacterial peptides from haemolymph by SDS-PAGE (pp. 109-114). Int J Pharm Pharm Sci 2015; Vol 7, Issue 1.
7. **Sivaperumal P, Kamala K, Natarajan E, Dilipan E.** Antimicrobial peptide from crab haemolymph of *Ocypoda macrocera* (Milne Edwards 1852) with reference to antioxidant: A case study. Int J Pharm Pharm Sci 2013, Vol 5, Suppl 2: 719-727.

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CHALLENGES AND ISSUES IN MANAGING HUMAN RESOURCES

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ABSTRACT
The rapid growth of today's global business can be a challenge for businesses. Human Resource (HR) department plays key role in managing company's most valuable resource: employees, as well as provide stability that helps the business run well. Highly efficient HR department can create positive difference in the workplace, as they actively take part in establishing company culture and maintaining employee engagement that will affect directly to the productivity and business bottom line.

Companies that desire to maintain a competitive edge, both now and in the future require human force well equipped to face the ever increasing pace of technological changes and techniques. This is the accountability of the human force manager to properly train the work force to accomplish the competitive advantages of business.

However, managing a workplace consisting of people with various backgrounds and personalities is not easy. Oftentimes, HR department has to deal with numerous issues that can hamper employees' performance in the workplace.

This paper analysis the various challenges which are emerging in the field of HRM. The managers today face a whole new array of changes like globalization, technological advances and changes in political and legal environment, changes in Information technology. This has lead to a paradigm shift in the of roles professional personnel. The great challenge of HRM is to attract, retain and nurture talented employees.

This paper also analysis how to overcome with these challenges. These challenges can overcome through cross cultural training, technological and informational training of HR people and motivation of employees through various techniques.

Keywords: Human Resources, technological changes, globalization, political and legal environment, Information technology

INTRODUCTION
The modern business cannot effectively operate in the business world if the human force not Well equipped with the latest technology and techniques. This is the responsibility of the human Force manager to properly train the work force and to see what is the basic need for the human Force to achieve the competitive advantages of business in 21st century. Great debates on this topic going on for several years and no doubts human is an important part of any Organization but due to rapid changes in the business world, globalization, change in customer Taste and habits, new techniques of production, human in the organization now facing different Kind of problems, to cope this situation the today's HR manager also facing a variety of issues and challenges that how they can best mange and solve all these issues and challenges with Splendid ways.

The modern business cannot effectively operate in the business world if the human force not Well equipped with the latest technology and techniques. This is the responsibility of the human Force manager to properly train the work force and to see what is the basic need for the human Force to achieve the competitive advantages of business in 21st century. Great debates on thistopic going on for several years and no doubts human is an important part of any Organization but due to rapid changes in the business world, globalization, change in customer Taste and habits, new techniques of production, human in the organization now facing different Kind of problems, to cope this situation the today's HR manager also facing a variety of issues and challenges that how they can best mange and solve all these issues and challenges with Splendid ways.

The modern business cannot effectively operate in the business world if the human force not well equipped with the latest technology and techniques. This is the responsibility of the human force manager to properly train the work force and to see what are the basic needs of the human force to achieve the competitive advantages of business.

Human is an important part of any organization but due to rapid changes in the business world, globalization, change in customer taste and habits, new techniques of production, human in the organization now facing

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different kind of problems, to cope this situation the today's HR manager also facing a variety of issues and challenges that how they can best mange and solve all these issues and challenges in splendid ways.

HR manager facing a variety of challenges to meet these challenges for the future, tomorrow HR manager or department must be much sophisticated than their predecessors. Because a one international or multinational organization cannot perform their activities well when their HR manager knows the diversity of technique to hack it with these issues and to how they can prepare a unobjectionable force for the organization to face the rapid competitive business word and to operate in the situation.

All the organizations should prepare their human resources people keeping in view the global environment or market place to ensure competitive advantage. Human resource manager will have to build or developed such a frame work that allows flexibility to develop such a workforce that will be the work force for tomorrow.

OBJECTIVES OF STUDY

- To study the challenges and issues faced by the managers in managing human resources.
- To know how the managers can overcome the issues and challenges in managing human resources.

METHODOLOGY

The present study is descriptive in nature. The data required for the present study are collected from secondary sources. The Secondary data are collected from various published sources such i.e. magazines, newspapers, journals, books, various other publications, website and annual reports.

CHALLENGES AND ISSUES IN HUMAN RESOURCE MANAGEMENT

Human resource management (HRM) is adopted by many companies because of its benefits. But at the same time, various challenges and issues may emerge in front of managers of human resource department while performing their duties. Any capable HR manager would work on these issues and challenges to prevent the organizational activities from being obstructed. But they must first identify these issues. Such issues and challenges are described here:-

1. Recruiting new staff

Companies sometimes need to recruit new talent for various reasons such as an increase in project scope, operations. While recruiting, HRM faces major challenges i.e. selecting the best candidate and making the hired candidate familiar with the environment and culture.

Whether recruitment is handled solely by the internal HR department, or with the assistance of a third party, it is essential that the process is managed centrally and effectively. Where there are dozens of applications, the details of each will need to be recorded for review and comparison.

HRM has to select such candidates which are not only technically expert but socially too because the company cannot receive expected output from employees who are unable to socialize. This affects the productivity of the company.

2. Retention

Hiring employees is not only the challenge that HRM faces; retaining them is also one. Retention of employees is essential to minimize employee turnover rate. This is a major challenge for HRM because of following reasons:

i. **Contingent workforce**

The contingent workforce includes part-time, temporary contract and work-at-home employees. Maintaining such employees in the company is a challenge because they are less attached to the company. So it becomes a major duty of HRM to make such employees feel that they are a part of the company in order to retain them for a long term.

ii. **Demand of expert employees**

Personnel with greater professional and technical knowledge are highly demanded in the job market as such employees have the ability to keep their company ahead in the race. Such employees are an invaluable asset for any company and HRM should focus on maintaining them.

3. Training and Compliance

Skilled workers are the key to the smooth functioning of the organization. Therefore, HRM should manage on-site (within the workplace) as well as off-site (outside the workplace) job training for employees.

Training is an essential aspect of employee development, both for their own education but also to ensure you continue to get the best from your workforce. Certain roles demand official training and certification, such as CORGI registration for gas installers, many of which also have a lifespan for renewal.

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Although the employee bears some responsibility for keeping a track of their own professional registrations, if your business relies on their certified skills, it makes sense to track this information for your own records.

4. Productivity

Maximizing profit and minimizing cost is the essence of productivity. Higher the productivity level, more successful will be the company. HRM should always focus on maintaining high productivity level.

Despite HRM's continuous effort, the company might sometimes get an unsatisfactory result. In such case, it should thoroughly analyze the situation and make a proper conclusion i.e. whether it is the result of inefficient employee or inadequate resources.

If an inefficient employee is the case, HRM should look forward to train employee, or even recruiting new staffs while it should find alternative resources for sufficient input if inadequate resources are the case.

5. Health and safety

It is one of the essential functions of HRM to collect its staff's complete information, including health information. It is necessary for employee's personal safety. Keeping health information about employee's help the company in knowing what kind of tasks or activities is safe for their employees to participate in.

Maintaining health information is also necessary to avoid the risk of legal complications. Several companies at present provide health insurance to its employees as a fringe benefit. In lack of proper health information about employees, various legal issues may arise when such insurance is claimed.

6. Workforce diversity

The composition of the workforce is getting diverse at present situation. Here diversity is not only created by age, gender, educational background and religion but also by the nature, personality and background of workers.

With more diversification of workforce, issues related to bullying, harassment, discrimination, etc may arise, to control which HRM should formulate and implement strict rules and regulations.

7. Payroll

Payroll is a written document which provides information about the company's employees along with the amount of remuneration to be paid.HRM has to conduct a number of tasks every day. In this process, HR manager might forget to pay its employees, if not then he can forget the amount to be paid to the individual employee.

With proper maintenance of payroll, HR manager will be able to pay right amount to right employee at right time, which is essential for extracting satisfactory output from employees.

8. Globalization

Globalization is a process by which a business firm or organization starts operating on an international scale, creating international influence.

Internationalization of firms is obviously a Sign of Success but it is a challenge at the same time because globalization invites issues related to unknown language, laws, work ethics, attitudes, management approach, culture and tradition.

A human resource manager will need to deal with more heterogeneous functions such as scheduling meetings, holiday management, human resource outsourcing, etc to overcome the challenge.

9. Discipline

Discipline is one of the important issues that HRM needs to handle at present days. Lack of discipline causes various problems which ultimately affect the productivity of the company.

For an instance, when discipline is not maintained, employees neglect their responsibilities and duties. They may procrastinate their tasks and may misbehave with co-workers, leading to a conflict that consumes time as well as energy to resolve. The ultimate result of these activities is decreased productivity of the company.

10. Advancement in technology

With rapid advancement in technology, companies nowadays require such human force that has the ability to learn and cope with the changes at an opportune moment.

Technological changes must be taken into consideration by any kind of company. It is because the present world demands every firm to move along with the change, or else be left behind and get extinct.

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Technological changes influence overall nature of work and the company will need to find out employees that are capable to adjust with the change. During this process, unemployment, as well as employment opportunities arises, creating new challenges for HRM.

11. Management of information

Up-to-date information is essential for the operation of any company. Information may be collected internally as well as externally. Once collected, all the information should be safely maintained so that they would be readily available when needed in future.

On the other hand, information is also essential to clear queries of employees. HRM should be able to present relevant facts and data while clearing such queries.

Managing any kind of information is a challenge to HRM because it should know which information is actually useful and which are not. After distinguishing this information, it should select such method of storing information which is safe as well as reliable.

12. Employee queries

The HR department provides the interface between "the company" and the staff. This means that when it comes to employment issues, disputes or queries relating to work, the HP department is the point of first enquiry.

Dealing with queries on pay, perks and performance management reviews on a reasonably regular basis is routine, but also extremely time consuming, particularly where data is not readily available. Every time a member of the HR department needs to chase down a payment detail, or the specifics of a contract variation, they are unable to focus on any of their other responsibilities.

HOW HR MANAGERS CAN OVERCOME KEY CHALLENGES

Human Resource Management used to be considered as other conventional administrative jobs. But over a period of time, it has evolved as a strategic function to improve working environment, plan out human resources needs and strike a balance between the organization and employers in order to increase organizational productivity and meet organizational goals. Not to exaggerate but in today's highly competitive world it has gradually become one of the most important functions of an organization.

It is really a huge challenge to understand the psychology of workforce, retain the best talents of the industry, motivate them to perform better and handle diversity while maintaining unity simultaneously, especially in countries like India, where it is still evolving. Globalization has resulted in many positive developments but it has left many concerns for HR managers.

It's time for **HR managers** to refocus their attention on overcoming the common challenges faced within the workplace. It's time for them to develop plans and initiate policies that will build up their companies and their employees. Acquiring the best talent, overcoming a sluggish economy, and building up a solid leadership team are just a few of the challenges management faces in today's business climate.

These are some of the issues that HR managers can expect to confront within their jobs:-

1. Landing, and Keeping, Talented Employees

The backbone to any great business is having an outstanding group of employees to rely on. For an HR manager, landing these talented individuals is a job. In order to attract potential employees, businesses must work to *set themselves apart* from the competition. The job applicant should not be the only party working to impress the other.

If an HR manager wants to find all-star candidates for any given position, it's essential that they put their best foot forward and show the applicant what they have to offer.

2. Retaining Great Employees

Promoting a positive work environment and sustaining employee morale is a critical task for HR managers. There are certain things that can be done to keep your workers happy and performing at their very best, such as:

i. Encouraging continued education
ii. Offering incentive programs
iii. Establishing a positive workplace culture

i. Encouraging Continued Education

Offering your employees the chance to consistently better themselves and improve their skills is not only good for them on a personal level but will also benefit the company.

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Whether you focus on courses offered in a traditional classroom setting or through online education, there are endless opportunities to foster progress within the workplace.

ii. Offering Incentive Programs

An incentive has a motivational power, a large number of incentives the modern organizations use to motivate their employees may be broadly grouped into (i) financial incentives, and (ii) non-financial incentives.

- Financial techniques refer to monetary rewards.
- Non-financial incentives do not involve money payments. These are also important in motivating employees as they bring in psychological and emotional satisfaction to them.

iii. Establishing a Positive Workplace Culture

Focusing on the wants and needs of your employees as a whole and providing them with an atmosphere that will **challenge them professionally** and **promote camaraderie** should be a top priority for any human resources department.

3. Workplace Security Issues

Whether you're dealing with a potential data breach or a physical situation, ensuring your company is protected against security issues often begins with the HR managers.

Re-evaluating current policies and determining whether they work for present day demands is essential. An HR manager will need to look at any vulnerability that may exist within a company's structure and decide on a course of action that will protect the business and its employees from personal and professional harm.

4. Invest in Leadership Development

Good leadership is an imperative part of company success. This, however, does not only go for business owners. Smooth operations often lie in the hands of the company's current management team and those candidates with future potential.

In order to maintain positive leadership, HR managers are challenged to support these individuals. This can mean offering a variety of things, including:

- Enhanced training opportunities
- Communication encouragement

i. Enhanced Training Opportunities

Individuals with the potential to become good leaders should be molded to do so. This means offering them ample training opportunities.

Hands-on experience is the best way to prepare for upcoming responsibilities. Having the chance to shadow and work alongside current managers is an ideal method of preparation.

For current managers and company leaders, the training should not end. Over time there will always be room for improvement and new policies and technology to discover.

ii. Communication Encouragement

Communication is key within any workplace. While this may seem like an overstated concept, it's surprising how many professional leaders aren't great at communicating with other leaders and employees.HR managers should look into seminars and online resources that encourage enhanced communication.

5. Utilizing Emotional Intelligence

The HR management team should involve themselves in this regard by assisting the company heads in understanding the need for this emotional intelligence.

It's essential that employers look out for more than just their own professional gains and focus on the fair treatment of their employees. HR managers should look for ways to open up a dialogue amongst these individuals and promote a level of appreciation for what their team needs on an emotional level.

CONCLUSIONS

As we have discussed in the previous pages those dominant issues and challenges which are Facing by HR mangers and organization. The first foremost work by the HR is to developed Sound organizational structure with strong interpersonal skill to employees, and also to train employees by introducing them the concept of globalize human resource management to Perform better in the global organization context. All these issues and challenges like, work Force diversity, leadership development. Change management, organizational

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effectiveness, Globalization, E- Commerce, succession planning and compensation etc, Can be best Management by HR manager when they will work with HR practices, such as rigid recruitment and selection policy, division of jobs, empowerment, encouraging diversity in the workplace, Training and development of the work force, fostering innovation, proper assigning of duties And responsibilities, managing knowledge and other functions as are shown. Nutshell when HR Works enthusiastically by keeping all the practices in mind, competitive advantages can thus be accomplished, the value of human resource can be improved, organization efficiency can be Enhanced, and the organization will sustain to survive.

REFERENCES

1. https://www.businesstopia.net/human-resource/challenges-issues-human-resource-management
2. https://www.managementstudyguide.com/hr-challenges.htm
3. https://www.researchgate.net/publication/265541273_Human_Resource_Management_in_21st_Century_Issues_Challenges_Possible_Solutions_to_Attain_Competitiveness?fbclid=IwAR0oSs9tKweR6LXiRvZFIGytvgfEcu75hWhqjsur2iL2ef4EKTW8wzccmgU
4. https://www.go1.com/blog/post-hr-managers-can-overcome-challenges
5. http://www.scribd.com/doc/24594577/Chapter-1-Introduction-to-Human-Resource-Management-Definition-Concept-For

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COMPENSATORY OVARIAN CHANGES FOLLOWING UNILATERAL OVARIECTOMY IN ALBINO RAT

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ABSTRACT
Ovariectomy is a term used for ovarian removal, when one ovary is removed it is called unilateral (partial) and when both ovaries are removed, it is called bilateral (complete) ovariectomy. Compensatory ovarian functions have also been explained as resulting from a hormonal imbalance of the hypothalamus – pituitary –ovarian axis caused by the elimination of one source of steroids (i.e. ULO). Protein and steroid hormones are involved in the hypothalamic- pituitary-ovarian feedback loop. Multi-step enzymatic conversions of cholesterol are responsible for production of steroid hormones in the ovary. The hypothalamus secretes gonadotrophin releasing hormone (GnRH) into the portal blood vessels of the pituitary. This hormone activates the secretion of LH and FSH from the pituitary. In the present study, analysis of unilateral ovariectomy and its consequences with endocrine replacement in mature female albino rats were done which are important to examine both follicular dynamics as well as (compensatory ovulation & hypertrophy). Present experiment was conducted for 4 months. The female albino rats were ovariectomized on 09.09.2017. After 4th, 8th and 16th weeks later, rats were operated to remove one remaining ovary and weighed. The weight of one remaining ovary increased significantly as 32.5% by 4th week after surgery, 54% by 8th week after surgery and 109.6% by 16th week after surgery. It was also observed that the weight of the remaining ovary approached the combined weight of the 2 ovaries in controls by the 16th week after surgery. Changes in number of primordial follicles was insignificant. Number of primary follicles, secondary follicles, corpus luteum also increased significantly all with 0.1% level in hypertrophied ovary after unilateral ovariectomy. Number of Graafian follicles in hypertrophied ovary increased significantly at 1% level. But number of atretic follicles decreased significantly in hypertrophied ovary in comparison to normal rat at 0.1% level. Present investigation showed that unilateral ovariectomy caused compensatory ovarian changes such as weight increase of ovary, increase in rate of ovulation and decrease in rate of follicular atresia resulting higher the number of growing follicles.

Keywords: Unilateral ovariectomy, hypertrophied, albino rats, atretic follicles, corpus luteum.

INTRODUCTION
Compensatory ovarian functions have been explained as resulting from a hormonal imbalance of the hypothalamus-pituitary-ovarian axis caused by the removal of one ovary i.e. elimination of one source of steroids. Hypothalamus secretes gonadotropin releasing hormone (GnRH).This hormone (GnRH) activates the secretion of FSH and LH from the pituitary. FSH induces mitosis in granulosa cells [(1)], activates aromatase activity, LH receptor formation [(2)] and inhibin production [(3)]**.** LH stimulates progesterone and androgen secretion from the theca interna cells of the ovary. Androgen secreted are transported to granulosa cells where they are converted to oestrogen on the activation of FSH [(4,5)]. Inhibin which is also secreted by the granulosa cells has a negative feedback effect on FSH secretion of the pituitary. Activin stimulates the FSH secretion of the pituitary [(6)]. According to Welschen,[(7)] removal of one ovary and thus of half of the total population of antral follicles reduced the amount of inhibin which was favoured a rise in FSH level. The number of oocytes ovulated did not diminish after surgery since the rate of ovulation in the remaining ovary was doubled [(8)]. The weight of the remaining ovary gradually increased after surgery and may attained the combined weights of two ovaries in controls [(9)]. Present investigation was done to study of effects of unilateral ovariectomy (ULO) in mammals to analyze in terms of compensatory hypertrophy of the contralateral ovary i.e. increased weight, enhanced follicular activity and an increase in both the number of ova shed and number of corpora lutea.

MATERIALS AND METHODS
Six female albino rats of 56 days old were used in this study. They were remained in quarantine for a further period of 2 weeks for acclimatization in laboratory condition. The room temperature was maintained 26℃ to28℃. Throughout the period of the experiment the animals were given normal diet and tap water *ad libitum*. The rats were divided into two groups and they were kept into 2 cages in the absence of males. The first group of 3 rats were used as control group (normal rats), while the 3 rats in the second group were used as experimental group (ULO rats). Prior to the surgery, the body weight of the rat was measured by a digital weighing machine. The rat was anesthesized with ether. After shaving the furs, 70% alcohol was used to clean the surface which was required for operation. A single longitudinal skin incision was made on the dorso-lateral

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area at the level of the lower poles of the kidney. The ovary and associated fat were easily located and exteriorized by gentle retraction. A braided silk suture was performed around the area of the distal uterine horn, that was sectioned thereafter and the ovary was removed. The uterine horn was returned to the peritoneal cavity after the removal of ovary. The wound was closed in two layers (muscle and skin) using sterile sutures. High degree of aseptic procedure was maintained throughout the operation. Nebasulf powder was applied on the area to disinfect the skin after suturing. After surgery, ovaries were fixed in Bouin's aqueous fixative and were processed for histology. Serial sections of ovaries embedded in paraffin wax were cut at 6μm thickness and were stained with Haematoxylin and Eosin. Histological slides were studied and photomicrographs were taken by Image analyzer.

STATISTICAL ANALYSIS

Statistical analyses were performed using students 't' test to determine the significance of difference obtained in the investigation.

RESULT AND DISCUSSION

Table-1: Ovarian weights of female albino rats in normal (control) and after unilateral ovariectomy (ULO).

SL.NO.	Body weight of female albino rats (g)	Ovarian weight of control rats (mg)	Weeks after surgery	Ovarian weight of hypertro-phied ULO rats (mg)	Difference of ovarian weights b/w control and ULO rats (mg)	% Increase
1	200	75	4	99.37	24.37	32.5
2	220	70	8	107.8	37.80	54.0
3	250	80	16	166.4	86.40	109.60

Table-2: Statistical analysis of difference between the mean ± SD of two samples through 't' test.

Sl.N0.	Ovarian Follicles	AV.no.of ovarian follicles in normal rat	AV.no. of ovarian follicles in hypertrophied ULO rat	't' value	% Significance
1	Primordial	1.2±0.4	1.1±0.3	0.63	N.S
2	Primary	1.1±0.3	2.9±0.3	13.43	0.1
3	Secondary	3.2±1.03	5.0±0.94	4.09	0.1
4	Graafian	2.0± 0.8	3.4±0.96	3.55	1
5	Corpus luteum	4.7± 0.48	5.9±0.3	6.74	0.1
6	Atretic	2.8±0.42	1.7±0.48	5.50	0.1

Table1**:-** Showed that when unilaterally ovariectomized rats were operated to remove one remaining ovary after 4th**,** 8th and 16th weeks, the weight of remaining ovary increased 32.5%, 54% and 109.6% respectively. It was also observed in Table1 that the weight of the remaining ovary approached the combined weight of the two ovaries in control by the 16th week after surgery.

The previous studies also corroborate the observation made by the present study which showed that the weight of the remaining ovary gradually increased after surgery and attained the combined weight of the two ovaries in controls [(9)]. According to T.G. Baker et al [(10)], nearly 8th week after surgery the weight of the remaining ovary approached the combined weight of the two ovaries in controls. It was also observed by Arai [(11)] and Mc Laren [(12)] that ovarian weight gained largely by the increased number of corpora lutea formed following compensatory ovulation. Moreover, rate of atresia decreased due to enhanced amount of oestrogen and this also support in ovarian weight gaining after unilateral ovariectomy.

Table2**:-** Showed a significant difference between the number of growing follicles in normal (control) rat ovary and hypertrophied ULO rat ovary as follows**:-**

In the present investigation changes in number of primordial follicles was insignificant.

According to Arendsen de Wolf-Exalto et al [(13)], the growth of oocyte started after the transformation of the flattened pregranulosa cells into round granulosa cells. According to Hirshfield [(1)]**,** there was very negligible

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mitotic activity in the primordial follicles. This indicated that primordial follicles develop but at an extremely slow speed due to absence of hormones like FSH, LH and oestrogen which are responsible for growth of growing follicles.

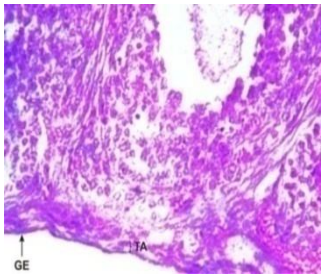
Table2**:** Showed that number of primary follicles and secondary follicles increased significantly at 0.1% level and number of Graafian follicles increased significantly at 1% level in hypertrophied ovary.

According to Mandl **(9),** the total number of oocytes further reduced after unilateral ovariectomy and hence the proportion of growing follicles must be increased in the remaining ovary by a movement of follicles out of the pool. Welschen, Dullart and de Jong **(7)** stated that removal of one ovary and thus of half of the total population of antral follicles reduced the amount of 'inhibin' which was favoured a rise in FSH levels. The enhanced amount of FSH is responsible for the increased number of primary follicles in hypertrophied ULO rat. The early growth of the primary follicles up to the antral stage is stimulated by FSH alone. Goldenberg et al **(14)**, and Herman et al **(15)**, also reported that enhanced amount of gonadotrophin stimulated the development of antral follicles and oestrogen production. High levels of oestrogen would be expected to lower the rate of follicular atresia resulting higher the number of growing follicles and thus to favour compensatory ovulation also. Corpus luteum in hypertrophied ovary also increased significantly at 0.1% level (Table2) corroborating this observation, Razi et el**(16),** also reported that the number of corpora lutea in the test group were approximately doubled in comparison to the control group. But according to Rahima and Bruce **(17),** the number of corpora lutea per ovary were similar in the control and ULO rat.

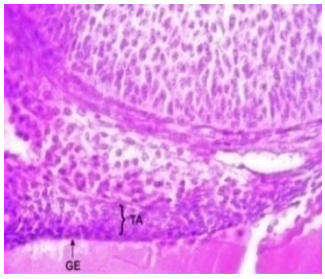
The growth and secretion of corpus luteum is controlled by LH and FSH of anterior pituitary. According to Bhatta Rai **(18),** LH is concerned with progesterone production and maintenance of corpus luteum while FSH is concerned with the production of oestrogen required for implantation in mouse. In case of unilateral ovariectomy in rats, high levels of oestrogen production enhanced the number of preovulatory follicles (Graafian follicles). The enhanced number of Graafian follicles and their compensatory ovulation in hypertrophied ULO rat resulted considerably increased value of corpora lutea.

The present data also indicated that the number of atretic follicles decreased significantly in hypertrophied ovary in comparison to normal rat at 0.1% level (Table2) corroborating it, Kagabu and Umezu **(19)** reported that approximately twice as many large healthy follicles compared with the control rats were saved from atresia producing a compensatory increase in the ovulation number.

The involvement of the hormonal factors in reduction of atretic follicles in ULO rat was due to effects of mainly two gonadal hormones – inhibin and oestrogen.

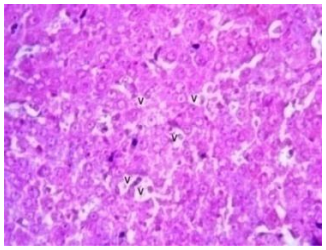


[A]

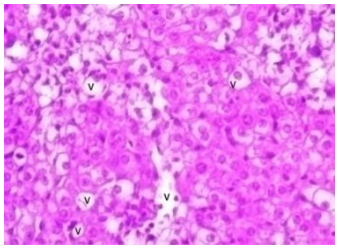


[B]

Fig1. [A] Photomicrograph of histological section of ovary in normal rat showing single layer of germinal epithelium (GE) having thin tunica albuginea (TA). Fig1. [B] showing single layer of germinal epithelium (GE) with thick multilayered tunica albuginea (TA) in ULO rat. (H and E stain x 400)



[A]



[B]

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Fig2. [A] Photomicrograph of histological section of ovary in normal rat showing corpus luteum (CL) with few vacuolation in the cytoplasm of granulosa type cells (lutein cells). Fig2. [B] showing corpus luteum (CL) with more vacuolation in the cytoplasm of granulosa type cells (lutein cells) in ULO rat. (H and E stain x 400)

[A] [B]

Fig3. [A] Photomicrograph of histological section of ovary in normal rat showing corpus luteum (CL) in normal rat. Fig3. [B] showing considerable increase in the number of corpus luteum (CL) in ULO rat.(H and E stain x 40)

Fig1. [A] Showed the histological section of ovary in normal (control) rat having single layer of germinal epithelium (GE) and thin tunica albuginea (TA) on the periphery of the section. But in case of ovary of ULO rat, cells of germinal epithelium (GE) became cuboidal and showed dense basophilic nuclei with thick multilayered tunica albuginea [Fig1. B].

Fig2. [A] Showed that in normal (control) rat, corpus luteum (CL) was made-up of luteinized granulosa cells. These cells were smaller in size, oval in shape with well defined nucleus. Few luteinized cells showed vacuolation in the cytoplasm whereas in case of ovary of ULO rat, corpus luteum (CL) was made-up of large sized luteinized granulosa cells having more vacuolation in the cytoplasm. These luteinized granulosa cells have large vesicular nucleus with many nucleoli in hyper active condition [Fig2. B].

Fig3. [A] Showed the histological section of ovary in normal (control) rat containing three corpus luteum (CL) but in case of ULO rat, number of corpus luteum (CL) significantly increased ($p<0.005$) to six [Fig3. B].

Similar results were confirmed by Razi et al[(16)], they also reported that thickness of tunica albuginea with surface epithelium, size and number of cytoplasmic vacuoles in luteinized granulosa cells and number of corpus luteum also were increased in hypertrophied ULO rat than normal (control) rat.

It may be because of compensatory ovarian hypertrophy in ULO rat, thickness of tunica albuginea with surface epithelium became considerably increased. Moreover, compensatory ovarian hypertrophy in ULO rat may be responsible for increased number of corpora lutea and large sized luteinized granulosa cells having more vacuolation in the cytoplasm in comparison to normal (control) rat.

CONCLUSION

The present investigation describes the compensatory hypertrophy of the contralateral ovary that showed increased weight, enhanced follicular activity and an increase in number of primary follicles, secondary follicles, Graafian follicles and number of corpora lutea also. But number of atretic follicles decreased in hyperactive condition. In majority of cases, the reason for infertility in human females is due to some abnormalities in ovaries. Unilateral ovariectomy (ULO) may be applied in restoration of ovulatory functions from remaining one ovary in patients with diseases like ovarian cancer, benign tumors and multiple cyst formation.

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REFERENCES

1) **Hirshfield, AN. (1989).** Granulosa cells proliferation in very small follicles of cycling rats studied by long-term continuous tritiated-thymidine infusion (pp. 309-316). Biol. Reprod 41.

2) **Moley, K.H., & Schreiber, J.R. (1995).** Ovarian follicular growth, ovulation and atresia, endocrine, paracrine and autocrine regulation (pp. 103-119). Adv. Exp. Med Biol 377.

3) **Lee, W.K., Mc Master, J., Quigg, H., & Leversha, L. (1982).** Ovarian and circulating inhibin levels in immature female rats treated with gonadotropin and after casteration (pp. 1849-1854). Endocrinology 111.

ISSN 2394 - 7780

4) **Fevold, H.L. (1941).** Synergism of follicle stimulating and luteinizing hormone in producing oestrogen secretion (pp. 33-36). J. clin Endocrinol Metab 21.

5) **Falck,B. (1956).** Site of production of oestrogen in rat ovary as studied in micro-transplants (pp. 5-101). Acta Physiol scand suppl 163 (47).

6) **Ling, N. Ying., S.Y.Ueno, N., Shimasaki, S., Esch, F., Hotta, M. & Guillemin, R. (1986).** Pituitary FSH is released by a heterodimer of β- subunits from the two form of **'**inhibin**'** (pp. 779-782). Nature 321.

7) **Welschen, R., Dullart, J. & de Jong, F.H. (1978).** Interrelationships between circulating levels of estradiol-17β, progesterone, FSH and LH immediately after unilateral ovariectomy in the cyclic rat (pp. 421-427). Biol. Reprod 18.

8) **Peppler, R.D. & Greenwald, G.S. (1970).** Effects of unilateral ovariectomy on ovulation and cyclic length in 4 and 5 day cycling rats (pp. 1-8). Am. J. Anat 127.

9) **Mandl, A.M.,Zuckerman, S. & Patterson, H.D. (1952).** The number of oocytes in ovarian fragments after compensatory hypertrophy (pp. 347-356). J. Endocr 8.

10) **Baker, T.G., Challoner, S. & Bergoyne, PS. (1980).** The number of oocytes and the rate of atresia in unilaterally ovariectomized mice up to 8 months after surgery (pp. 449-456). J. Reprod. Fert 60.

11) **Arai, H. (1920).** On the cause of hypertrophy of the surviving ovary after semispaying (albino rat) and on the number of ova in it (pp. 59-79). A.m. J. Anat 28.

12) **Mc Laren, A. (1966).** Regulation of ovulation rate after removal of one ovary in mice (pp. 316-340). Proc. R. Soc. Lond. Biol 166.

13) **Arendsen de Wolf - Exalto, E. & Groen- Klevant, A.C. (1980).** Oocyte growth in the immature rat (pp. 187-192). J. Reprod. Fertil 59.

14) **Goldenberg, R.L., Reiter, F.O. & Ross, G.T. (1973).** Follicle response to exogenous gonadotrophins: an oestrogen mediated phenomenon (pp. 121-125). Fert. Steril 24.

15) **Herman, S.M., Louvet, J.P. & Ross, G.T. (1975).** Interaction of oestrogen and gonadotrophins on follicular atresia (pp 1145-1152). Endocrinology 96.

16) **Razi, M., Feyzi, S., Shamohamadloo, S., Najafi, G., Ensafi, A., Eyvari, Sh. & Peyrovi, T. (2010).** Compensatory ovarian changes, mast cell distribution and luminal structure changes following unilateral ovariectomy in rats (pp. 28-37). J. Veterinary Research, Vol.11, No.1, Ser. No.30.

17) **Rahima, A and Bruce, NW. (1987).** Effects of unilateral ovariectomy before and after mating on growth of corpora lutea and peripheral progesterone concentrations in pregnant rats (pp. 277-281). Biol. Reprod 37.

18) **Bhattarai, T.**, **Dutta, S., Chaudhuri, P., Bhattacharya, K., Sengupta, P. (2014).** Effects of progesterone supplementation on post- coital unilaterally ovariectomized super- ovulated mice in relation to implantation and pregnancy (pp. 29-31). J. Pharmaceutical and Clinical Research, Vol.7.

19) **Kagabu, S and Umezu, M. (2005).** Ovarian follicula**r** development in the unilaterally ovariectomized rat (pp. 89-92). Reprod. Med. Biol 4.

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AN OVERVIEW OF DIFFERENT MODELING TOOLS AND TECHNIQUES FOR SYSTEM DEPENDABILITY ANALYSIS: A STATE-OF-THE-ART-REVIEW

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ABSTRACT
The deployment of safety-critical system adds new challenges for professionals to provide increased system reliability, safety and performance. Several modeling tools and techniques like Unified Modeling Language (UML), Fault Tree Analysis (FTA), Dynamic Fault Tree Analysis (DFTA), Event Tree Analysis (ETA), Reliability Block Diagram (RBD), Dynamic Reliability Block Diagrams (DRBD), Markov Chains and Petri Nets (PN) etc. have been used for designing and modeling a safety system for ensuring the above stated dependability factors. The modeling tools capture the static and dynamic nature of the system depending on their constructs. Not all of the stated modeling techniques are capable of capturing the system dynamics. However, many modeling tools and techniques that are capable of capturing the system dynamics fail to detect many critical aspects of the availability such as nonliveness, deadlock, boundedness, or design errors. The present article provides an exhaustive survey of the existing software modeling tools and techniques to investigate and ensure the different availability factors and the critical aspects required for safety system before deploying it to real time scenario.

I. INTRODUCTION

System modeling has been frequently used as one of the most powerful step towards designing a system since past decades. It consists of sequential steps to develop the abstract models for a system using some kind of graphical notation and system modeling tools like UML, FTA, DFTA, ETA, etc. The system model explains the system from various perspectives like external perspective, interaction perspective, structural perspective and behavioral perspective.

Safety systems are those systems whose failure may be catastrophic in nature and may cause threats to human life, ecological damage, significant economic loss, etc. The failure effect of such system varies from small problem to potential high disasters. Buenos Aires Rail Disaster, Fukushima Daiichi Nuclear Disaster, Japan Cedar Sinai Medical Centre in Los Angeles, California Emergency-Shutdown of the Hatch Nuclear Power Plant, Loss of the Mars Polar Lander, etc. have received potential disaster due to safety breaches [1]. Most of the safety systems have transited from analog to digital systems and are being used in various safety critical applications like aviation industry, medical, railway, nuclear power plant, etc. The failure consequences of such system very high, as a result the dependability analysis of such systems is essentially important. Dependability analysis during the design phase of system development life cycle model plays a vital role in addressing the different dependability concerns before the system is deployed in testing or operational phase. Identifying various system hazards during the design phase will facilitate the designer to take necessary actions in order to minimize the risk and assure that the safety system meets its target dependability requirements. Various state space models have been extensively used by the researchers for dependability analysis by identifying all the possible failure states of a system. RBD, FTA and Markov Chains modeling techniques are statistical in nature and only provide system reliability, performance and safety when the system component is either in active state or failed state. These modeling techniques are also very limited in their ability to accurately model a system's dependence relationships and dynamic properties [2]. The functional dependence of a system can be modeled using DFTA, where the failure of a component causes some other dependent components to fail or become inaccessible. But, DFTA fails to capture a general state-based dependence relationship between system components, e.g., the activation of a unit causes the deactivation of a dependent one. DRBD, also known as an extension of RBD was introduced with some controller components supporting dynamic modeling of the dependent and redundant relationships between components in a system. The DRBD approach is very effective in capturing a system's dynamic properties however; due to its modeling complexity delicate flaws can be easily introduced [3]. The rest of the paper is organized as follows: Section II elaborates and discuses dependability and its attributes. The dependability analysis metrics are discussed in section III. In Section IV, we proposed a systematic review methodology for our study. Several existing system modeling tools and techniques, along with their merits and limitations is discussed in it. Finally, we conclude this paper in Section V.

II. DEPENDABILITY AND ITS ATTRIBUTES

Dependability of any system is defined as a measure of a system's availability, reliability, performance, safety, security and its maintainability [4]. The International Electro-technical Commission (IEC), via its Technical

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Committee 56 develops and maintains international standards that provide systematic methods and tools for dependability assessment and management of equipment, services, and systems throughout their life cycles. Dependability of any system can be broken down into the following three elements:

(i) *Attributes*: The qualities of a system are termed as attributes. Attributes are quantified using Qualitative or Quantitative analysis to determine the overall dependability of a system. Following are the attributes which define the quality of a system:

(a) Availability: Mathematically, availability is the probability that a system is operating or is ready to operate correctly at time t.

(b) Reliability: Reliability of a system is the probability that that the system performs its intended task correctly for a given period of time within the specified operating condition or environment.

(c) Performance: Performance of a system can be defined as finding the minimum cycle time for processing any specific task within the specified operating condition or environment.

(d) Safety: It is defined as the absence of catastrophic consequences

(e) Maintainability: It is the probability that a system will be restored to operational effectiveness within a specified time when the repair is performed in accordance with the prescribed condition,

(ii) *Threats:* Threats are those that affect a system and cause a fall in dependability. Faults, errors and failures are mainly responsible for threats.

(iii) *Means*: The fault-error chain is responsible for breaching the dependability attributes, therefore the dependability of a system can be increased using these four means namely: (a) prevention (b) removal (c) forecasting and (d) tolerance of the errors/faults/failures.

III. DEPENDABILITY ANALYSIS METRICS

Metrics help in increasing the confidence in system dependability attributes. Some of the metrics used are summarized below.

(i) *Failure rate*: The number of failures per unit time defines the failure rate of a system/component.

(ii) *Mean Time to Failure*: It is a mean lifetime of a system/component. It can be defined as an average time during which system/component will be expected to fail while in operation.

(iii) *Mean Time to repair*: It is expected value of repair-time for any failed component/system. It is a ratio of total maintenance time and the number of repairs.

(iv) *Availability*: The availability of a system/component is the likelihood that it will be in operating state at a particular given time.

(v) *Probability of failure on demand (POFOD)*: POFOD is defined as the probability of the system failure when any service request arrives.

(vi) *Rate of occurrence of failure*: It is the probability of system failures which are probably to be monitored relative to the number of system execution, or to a certain time period

(vii) *Probability of failure for a given output*: It is the probability of the specific output of the system, due to software/hardware failure.

IV. A SYSTEMATIC REVIEW: SYSTEM MODELING TOOLS AND TECHNIQUES: MERITS & LIMITATIONS

Research questions, responsible for driving a research work, are formulated based on the rigorous and systematic literature survey done, failing to which leads to finding a formless gap which may result in flimsy research. Systematic literature review (SLR) and systematic mapping studies (SMS) are the two approaches proposed by Empirical□based software engineering [5], out of which SLR is most commonly used and SMS is still not much popular. There are can be many situations when SMS is preferred over SLR, but it completely depends on the nature of the exploration carried out by the researcher. The major difference between both these methodologies lies in the primary goal of pulling out the knowledge from the literature. SMS technique overviews and classifies the existing literature while the SLR technique extracts and acquaintances the finest information from the existing literature [6-7]. Our review methodology follows the SMS technique. For detailed SMS study of software reliability modeling readers can refer to [8]. We framed three research questions based on which our survey accelerates. The research questions (RQs) are shown Table 1:

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TABLE 1. Research Question	
RQs	**Description**
1	**What are the different modeling tools and techniques?**
2.	**Which modeling tools are appropriate for Safety Systems?**
3.	**What are the modeling tools currently in practice for Safety Systems?**

RQ1. What are the different modeling tools and techniques?
We did a rigorous literature survey to get the answer of our RQ1, and found many modeling tools and techniques available in the market for modeling safety systems. The commonly used tools are UML, FTA, DFTA, ETA, RBD, DRBD, Markov Chains, PN and colored PNs.

RQ2. Which modeling tools are appropriate for Safety Systems?
For RQ2, our systematic study focuses and deals with the merits and limitations of the existing modeling tools with respect to safety systems.

(i) UNIFIED MODELING LANGUAGE (UML)
UML was created in 1997 & UML 1.0 was the first version which was developed. Earlier, its primary use was to analyze the complex nature of the software system. It is a diagrammatic representation of the functionalities of a system which helps in preparing the blueprint. Various sign conventions are used in UML modeling based on Grady Booch's approach. UML can be thought of working parallel with object oriented concepts, as it is very effective tools to represent all the concepts that are used in object oriented analysis & design. The basic building block concepts of UML module includes: (1) Structural (2) Behavioral (3) Grouping and (4) Annotational. Important relationships like dependency, generalization and realization can also be captured in UML. Various diagrams are available in the UML to capture the different scenarios of the system like class diagram, object diagram, use case diagram, sequence diagram, collaboration diagram, activity diagram, deployment diagram, and component diagram. Different perspective like design, implementation, deployment etc. can be defined using UML. Its main goal is to model the functionality of the system. The types of UML modeling can be summarized as:

STRUCTURAL MODELING
Structural modeling captures the static behavior of components of a system. They consist of the following − Class diagrams, object diagram, deployment diagram, package diagram, composite structure diagram, component diagram. Structural model represents the framework for the system and this framework is the place where all other components exist. The structural model never describes the dynamic behavior of the system.

BEHAVIORAL MODELING
Behavioral model describes the interaction in the system. It represents the interaction among the structural diagrams. Behavioral modeling shows the dynamic nature of the system. It consists of − activity diagram, interaction diagram and use case diagrams. All the above shows the dynamic sequence of flow in a system.

ARCHITECTURAL MODELING
Architectural model represents the overall framework of the system. It contains both structural and behavioral elements of the system. Architectural model can be defined as the blueprint of the entire system. Package diagram comes under architectural modeling.

Merits: The UML modeling tool is one of the most powerful object-oriented graphical modeling tool for designing and modeling a safety system since past decades. UML can capture all the system requirements, and the developed model is well understood by all the stakeholders.

Limitations: Despite capturing all desired properties of a safety system, the UML fails to detect the critical aspects of the availability such as nonliveness, deadlock, boundedness, or design errors. However, if UML is converted to PN systems then the converted PN system can be analyzed for the mentioned critical aspect [8].

(ii) FAULT TREE ANALYSIS (FTA)
FTA is "analytical logic techniques" for reliability and safety analysis. It is a top down approach and uses logic diagram. FTA identifies the potential causes of system failures before the failures actually occur. It is used to evaluate the probability of the top event using analytical or statistical methods. After performing FTA, we can improve system safety and reliability. It is also referred as negative analytical trees.

FAULT TREE DIAGRAM (FTD)
Fault tree diagrams are logic block diagrams that display the state of a system (top event) in terms of the states of its components (basic events) [9]. It follows deductive failure analysis in which an undesired state of a

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system is analyzed using Boolean logic to combine a series of lower-level events. FTA is mainly used in the fields of safety engineering and reliability engineering to understand how systems can fail, to identify the best ways to reduce risk or to determine event rates of a safety accident or a particular system level (functional) failure.

A FTD follows top-down approach and in term of events rather than blocks. It uses a graphic "model" of the pathways within a system that can lead to undesirable loss event (or a failure). The pathways connect contributory events and conditions, using standard logic symbols (AND, OR, etc.). The basic constructs in a fault tree diagram are gates and events, where the events have an identical meaning as a block in an RBD and the gates are the conditions. A fault tree diagram is used to conduct fault tree analysis (or FTA). Fault tree analysis helps to determine the cause of failure or test the reliability of a system by stepping through a series of events logically.

Merits: A fault tree creates a visual record of a system that shows the logical relationships between events and causes lead that lead to failure. It helps others quickly understand the results of your analysis and pinpoint weaknesses in the design and identify errors. A fault tree diagram will help prioritize issues to fix that contribute to a failure. In many ways, the fault tree diagram creates the foundation for any further analysis and evaluation. Fault tree analysis can also be used in understand the logic leading to the undesired state. It also shows compliance with the (input) system safety / reliability requirements. It monitors and controls the safety performance of the complex system. FTA basically minimizes and optimizes resources. Fault tree analysis is useful in engineering, especially in industries where failure can have huge consequences such as nuclear power plants or aeronautics. However, fault tree analysis can also be used during software development to debug complex systems.

Limitations: FTA fails to model the dynamic relationships between the components of a system. However, despite this failure FTA is the most commonly used approach to capture and handle the safety requirements for a safety system. Moreover, the critical aspects of the availability such as nonliveness, deadlock, boundedness, or design errors also cannot be modeled using FTA.

(iii) DYNAMIC FAULT TREE ANALYSIS (DFTA)

DFTA is an extension of FTA, the most commonly used technique in Probability Safety Analysis (PSA) which fails to model its time requirement. A DFTA increases the use of FTA by allowing it to model the dynamic properties of a system [10]. To overcome the FTA limitations, additional gates are introduced to model the sequential and sparing behavior of a system. Readers are advised to refer [11] for detailed explanation of DFTA.

Merits: DFTA modeling technique allows the system analyst to capture the dynamics between the components of a system to be modeled. DFTA have been successfully applied to time dependent risk profile and parameter optimization in PSA models to minimize the configuration control risks [11].

Limitations: Despite of capturing the system dynamics DFTA, is very limited for modeling of complex systems that may involve dynamic component dependence such as a general state-based dependence [12]. In addition, it also remains silent on the critical aspects like nonliveness, deadlock, boundedness, or design errors verification.

(iv) EVENT TREE ANALYSIS (ETA)

ETA is a method of deducing possibilities & outcomes in a sequential or chronological order. This approach uses a tree diagram called "event tree" to describe the logical relationship between accidents and possible reasons behind it. Through the qualitative and quantitative analysis of the event tree, users can find the main reasons of accidents and provide reliable solutions so as to reach the purpose of speculating and preventing accidents. The analysis of the tree makes it suitable & easier for the development of the event, to choose the best sequential order of execution of events. Through the qualitative and quantitative analysis of the event tree, users can find the main reasons of accidents and provide reliable solutions so as to reach the purpose of speculating and preventing accidents.

METHODOLOGY

The overall goal of event tree analysis is to determine the probability of possible negative outcomes that can cause harm and result from the chosen initiating event. For drawing the event tree full detailed information about the events, intermediate risks & accidental scenarios should be known. The event tree begins with the initial event where consequences of the event follow in a success/failure manner. Each event creates a path in which a series of successes or failures will occur where the overall probability of occurrence for that path can be calculated. The probabilities of failures for intermediate events can be calculated using fault tree analysis and the probability of success can be calculated from:

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$probability\ of\ success + probability\ of\ failure = 1$. This formula is used for calculating the overall success probabilities & failures of different events.

Steps to perform an event tree analysis:

1. **Define the system:** Define what needs to be involved.
2. **Identify the accident scenarios:** Perform assessment to find hazards or accident scenarios within the system design.
3. **Identify the initiating event:** Define initiating events.
4. **Identify intermediate events:** Identify countermeasures associated with the specific scenario.
5. **Build the event tree diagram**
6. **Obtain event failure probabilities:** If the failure probability cannot be obtained use fault tree analysis to calculate it.
7. **Identify the outcome risk:** Calculate the overall probability of the event paths and determine the risk.
8. **Evaluate the outcome risk:** Evaluate the risk of each path and determine its acceptability.
9. **Recommend corrective action:** If the outcome risk of a path is not acceptable develop design changes that change the risk.
10. **Document the ETA:** Document the entire process on the event tree diagrams and update for new information as needed.

Merits: ETA helps in assessing the faults and failures. It can function simultaneously in cases of failure as well as success. ETA can identify the areas of single point failure, system vulnerability, and low payoff counter measures and can also be assessed to deploy resources properly. Those paths or scenario responsible for failure can be identified and traced.

Limitations: The event tree analysis can capture the static behavior of the system and fails for the dynamic one. Moreover, the verification of the event tree is a not trivial and the modeling of the system completely depends on the knowledge of the system analyst. In addition, the deadlock, boundedness, and nonliveness criteria necessary for safety systems modeling cannot be addressed using ETA.

(v) RELIABILITY BLOCK DIAGRAM (RBD)

RBD, also known as dependence diagram, is a pictorial method used to show how component reliability contributes to the success or failure of a complex system. Its main focus is on the analysis of large and complex system using block diagrams to show network relationships. Every block in an RBD represents a component of the system with its failure rate. With the help of RBD we can find out which part of system has lower reliability and after that we can minimize the chances of failure. We can say that it integrates certain probability events into a module, which contains the information like- probability of failure, failure rate, distribution of time to failure etc. It organizes them in a structured way, according to the effects of each module failure. The RBD system is connected by parallel or series connection. A parallel connection means it uses multiple paths and links for connecting start and end node whereas in series connection start and end node are connected by a single link. If in parallel network, parallel paths fail then all the parallel paths must fail for the parallel network to fail. By contrast in series connection any failure along a series path causes the entire series path fail. In RBD we can also use combination of series and parallel connection. A RBD may be drawn using switches in place of blocks, where a closed switch represents a working component and an open switch represents a failed component. Each component of RBD can have attached to it like a probability of failure, a failure rate, a distribution of time to failure, Steady-state and instantaneous unavailability.

Merits: RBD models are success-oriented models, describing a system's function by probabilistic means [14]. System components, represented using blocks, are arranged accordingly in order to make the entire system operational.

Limitations: Reliability block diagrams are used to provide safety system reliability models when components of the system are either in active or failed state; as a result, RBD modeling technique is limited in its ability to accurately model a system's dependence relationships and dynamic reliability properties. Also, the critical aspects of a safety system cannot be verified using RBD.

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(vi) DYNAMIC RELIABILITY BLOCK DIAGRAMS (DRBD)

With the rapid increase of computer-based technology, safety systems exhibit more complex, dependent, and dynamic behaviors. Such dynamic system behaviors cannot be fully captured by existing reliability modeling tools. DRBD is an extension of RBD [3], [13]. RBD ensure interesting features in reliability modeling such as simplicity, versatility and expressive power. Such interesting features are also inherited in a DRBD model, allowing the system dynamics to take part. As a DFT is more complex and less readable than a FT, a DRBD model could be more complex and less readable than a RBD one, but, on the other hand, DFT and DRBD allow to model dynamics. DRBD is more powerful than a DFT in dynamic system reliability model. A Dynamic Reliability Block Diagram is a combination of set of components in the system and set of nodes that represent directed connections among components. A node must contain a unique start node and a unique stop node. Nodes can have zero or more incoming and outgoing component connection. A component has a state, which may Active, Failed or Standby. A component is in active state when it works without any problem. A component is in failed state when it is not working properly. A component is in standby state when it is not working, can be activated anytime without any specific reparation.

Merits: DRBD modeling is an effective technique for modeling and capturing the dynamic behavior of components of a safety system. It overcomes the subtle flaws of RBD, FTA, DFTA, UML and ETA.

Limitations: However, analyzing a DRBD model is not trivial. Formal verification of DRBD model is very complex and still many flaws can be introduced when done manually. Further, the issues like deadlock, boundedness etc. cannot be verified using DRBD.

(vii) PETRI NETS (PN)

Petri nets is a bipartite graphical and promising mathematical modeling tool used for describing and studying the various information processing systems that can be asynchronous, concurrent, parallel, distributed, nondeterministic, and/or stochastic [15]. Petri nets provide visual-communication aid like flow charts, block diagrams, and networks. In order to simulate the dynamic and concurrent activities of systems PN uses tokens. PN being a mathematical tool provides the analyst to set up steady-state equations, algebraic equations, and other mathematical models governing the behavior of systems. Mathematically, PN can be defined by 5-tuples namely: P, T, F, W, M_0 where P denotes the set of finite number of places, T denotes the finite set of transitions, F is a finite set of arcs such that $F \subseteq (P \times T) \cup (T \times P)$, W represents the weight function ranging from 1 to infinity, and M_0 represents the initial marking. Also, $P \cap T = \phi \text{ and } P \cup T \neq \phi$. Places and transitions are in PN are represented by a circle and rectangular bar respectively. A solid circle embedded in a place is the token which represents condition holding for the place. Marking defines the number of tokens in each place at a given instance of time for the system. The transition firing depending on the marking of the system is responsible for the state of the system. Movements of tokens within the place are caused by firing of the transition. An enabled transition is governed by the following rule of firing:

a. Only an enabled transition can fire. Firing of transition is only possible when all the input places contain sufficient number of tokens. The sufficiency of the tokens is equal to weight on its input arc.

b. On firing of transitions, tokens are removed from each of its input places that depend on the weight of its input arc and tokens are deposited into each of its output arcs that also depend on the weight of its output arc.

The working of PN is illustrated in Fig. 1 using the well-known chemical reaction: $2H_2 + O \rightarrow 2H_2O$. Two tokens in each input place in Fig. l (a) show that two units of H_2 and O, are available, and the transition t is enabled. After firing transition t, the marking will change to the one shown in Fig. l(b), where the transition t is no longer enabled.

PN are widely used to verify the control flow of the process or system and to know about the insights of the system [16]. Several dependability properties can be analyzed such as liveness, boundedness, safeness, liveness, etc [17]. *Merits*: PN enables the system analyst to capture the static as well the dynamic behavior of the components of a system. PN, using the tool TimeNet [18], allows user to visualize the control flow within the system as well as find the traps, deadlock, boundedness, liveness and other such critical aspects necessary for dependability analysis of safety systems. Using PN various dependability factors like reliability [17], performance [16], safety [2], security [19] etc have been calculated by various researchers.

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Example 1: An illustration of a transition (firing) rule: (a)The marking before firing the enabled transition t. (b)The marking after firing t, where t is disabled.

Limitations: PN models are stochastic in nature depending on the time delays introduced in it. Stochastic models use the state-space models for the quantification of different dependability analysis. One of the major drawbacks of the stochastic models is that they suffer from state-space explosion problem. However, many researchers like [20] have proposed effective and optimized methodology for the quantification of reliability using state-space model.

RQ3. What are the modeling tools currently in practice for Safety Systems?

Paying attention to the work done in the last decade we have found that fault tree analysis is the most common approach followed by the failure mode effect analysis approach. In [21] authors have shown the current modeling trend for safety system. PN and its different types like colored PN, Timed PN, and Stochastic PN etc. are also being used by many practitioners, academicians and researchers.

V. CONCLUSIONS

The safety system failures can lead to catastrophic disasters and hence must be robust in design. In this paper we discussed various tools and techniques available for modeling safety systems prior to its deployment in the real time scenario. We discussed the merits and limitations of the existing various modeling tools. The selection of modeling tool depends on the requirements and its constraints of the system to be designed by the analyst.

REFERENCES

[1] V. Kumar, L. Singh, and A. K. Tripathi, "Reliability analysis of safety critical and control systems: a state-of-the-art review," IET Software, 2017.

[2] V. Kumar, L. K. Singh, P. Singh, K. V. Singh, A. K. Maurya, and A. K. Tripathi, "Parameter Estimation for Quantitative Dependability Analysis of Safety-Critical and Control Systems of NPP," IEEE Transactions on Nuclear Science, 2018.

[3] R. Robidoux, H. Xu, L. Xing, and M. Zhou, "Automated Modeling of Dynamic Reliability Block Diagrams Using Colored Petri Nets," IEEE Transactions on Systems, Man, and Cybernetics—Part A: Systems and Humans, Vol. 40, No. 2, Mar 2010. pp. 337-351.

[4] R. Kumar, S. A. Khan and R. A. Khan, Revisiting Software Security: Durability Perspective, International Journal of Hybrid Information Technology (SERSC) Vol.8, No.2 pp.311-322, 2015.

[5] Condori□Fernandez N, Daneva M, Sikkel K, Wieringa R, DiesteTubío O, Pastor O, "A systematic mapping study on empirical evaluation of software requirements specifications techniques," Proceedings of Third International Symposium on Empirical Software Engineering and Measurement, 2009, pp.502–505.

[6] Kitchenham B, Budgen D, Brereton P. Using mapping studies as the basis for further research—a participant observer case studies. Inform Softw Technol. 2011;53:638□651.

[7] Kitchenham B, Charters S, "Guidelines for performing systematic literature reviews in software engineering," Technical Report EBSE 2007–001, Keele University and Durham University Joint, Report, 2007.

[8] V. Kumar, L. K. Singh, A. K. Tripathi and P. Singh, "Safety Analysis of Safety-Critical Systems Using State-Space Models," IEEE Software, 2017, pp. 38-47.

[9] W. E. Vesely, F. F. Goldberg, N. H. Roberts, and D. F. Haasl, Fault Tree Handbook (NUREG-0492). Washington, DC: GPO, 1981.

[10] R. Manian, J. Dugan, D. Coppit, and K. Sullivan, "Combining various solution techniques for dynamic fault tree analysis of computer systems," in Proc. 3rd Int. Symp. HASE, Washington, DC, 1998, pp. 21–28.

ISSN 2394 - 7780

[11] Mark Cepin and Bprut Mavko, "A Dynamic Fault tree," Reliability Engineering and System Safety, Vol. 75, 2002. pp. 83-91.

[12] H. Xu and L. Xing, "Formal semantics and verification of dynamic reliability block diagrams for system reliability modeling," in Proc. 11th Int. Conf. Softw. Eng. Appl., Cambridge, MA, Nov. 2007, pp. 155–162.

[13] Salvatore Distefano and Antonio Puliafito, "Dynamic reliability block diagrams: Overview of a methodology," Risk, Reliability and Societal Safety – Aven & Vinnem (eds), 2007, pp. 1059–1068.

[14] M. Rausand and A. Hoyland, System Reliability Theory: Models, Statistical Methods, and Applications, 2nd ed. New York: Wiley-Interscience, 2003.

[15] T. Murata "Petri nets: Properties analysis and applications" Proc. IEEE vol. 77 pp. 541-580 1989.

[16] P. Singh, L. Singh, Design of safety critical and control systems of Nuclear Power Plants using Petri nets, Nuclear Engineering and Technology (2019), doi: https://doi.org/10.1016/j.net.2019.02.014.

[17] Lalit Kumar Singh and Hitesh Rajput, "Dependability Analysis of Safety Critical Real-Time Systems by Using Petri Nets," IEEE Transactions on Control Systems Technology, vol. PP, pp.1-12, March 2017.

[18] C. Lijie, T. Tao, Z. Xianqiong, and E. Schnieder, "Verification of the safety communication protocol in train control system using colored Petri net," Rel. Eng. Syst. Safety, vol. 100, pp. 8–18, Apr. 2012.

[19] Raj Kamal, Lalit Singh, Babita Pandey, "Security Analysis of Safety Critical and Control Systems: A Case Study of Nuclear Power Plant System," Nuclear Technology, 197:3, 2017, 296-307, DOI: 10.1080/00295450.2016.1273702.

[20] Kumar P, Singh LK, Kumar C. An optimized technique for reliability analysis of safety□critical systems: A case study of nuclear power plant. Qual Reliab Engng Int. 2018, pp.1–9.https://doi.org/10.1002/qre.2340.

[21] Kumar P, Singh LK, Kumar C. Suitability analysis of software reliability models for its applicability on NPP systems. Qual Reliab Engng Int. 2018, pp. 1–19. https://doi.org/10.1002/qre.2315.

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A STUDY ON OPINION OF RESPONDENTS TOWARDS DIGITAL MARKETING AND ITS IMPACT IN THANE REGION

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ABSTRACT
Digital marketing is the marketing of products or services using digital technologies, mainly on the Internet, but also including mobile phones, display advertising, and any other digital medium digital marketing's development since the 1990s and 2000s has changed the way brands and businesses use technology for marketing. As digital g are increasingly incorporated into marketing plans and everyday life and as people use digital devices instead of visiting physical shops, digital marketing campaigns are becoming more prevalent and efficient Digital marketing methods such as search engine optimization (SEO), search engine marketing (SEM), content marketing, influencer marketing, content automation, campaign marketing, data-driven marketing, e-commerce marketing, social media marketing, social medium optimization, e-mail direct marketing, display advertising, e–books, and optical disks and games are becoming more common in our advancing technology. In fact, digital marketing now extends to non-Internet channels that provide digital media, such as mobile phones (SMS and MMS), callback, and on-hold mobile ring tones .In essence, this extension to non-Internet channels helps to differentiate digital marketing from online marketing, another catch-all term for the marketing methods mentioned above, which strictly occur online. The main objective of this research is to study opinion of respondent towards digital marketing and its impact in thane region.

Keywords : Marketing Internet , Media

INTRODUCTION
Digital marketing is the marketing of products or services using digital technologies, mainly on the Internet, but also including mobile phones, display advertising, and any other digital medium .Digital marketing's development since the 1990s and 2000s has changed the way brands and businesses use technology for marketing.. A marketer, before launching any products or services, can conduct a survey online and take responses from potential customers, so that a marketer can launch according to the needs of customers, after analyzing the responses given by them Most of the people who use the internet for business and buying the online and selling the goods but some reason for which business man reluctant to go digital marketing . The attitude of people towards the use of digital marketing are different in everywhere in India . Online shopping and selling the goods is a recent phenomenon in the field of e-business most of the company are running their online portals to sell their products/services online, A digital marketing is very common outside India , its growth in Indian market , which is large and strategic consumer market , still is not in line with global market.

Possibility of forgery The researcher has findout certain problems related to digital marketing issue . They are:

1. There was no sufficient budget and time for operating a digital marketing
2. Managing for website of the company
3. Hiring top talent
4. Targeting content for an international invester shareholder etc.
5. Identifying the right technologies for needs of a customers
6. Physical examination of products is impossible

REVIEW OF LITERATURE
In the Review of Literature an attempt is made to go through the available research papers to understand how different researchers have explored different aspects of digital marketing communications and social media engagements. For tracking the development, relevant papers were gone through starting with research covering the evolution of DSMM, the digital & social media marketing.

ONLINE CUSTOMER
Behaviour This subgroup touches upon the conduct of the customers in DSMM platforms. It takes care of the customer behaviour aspects including the navigation pattern across various websites and browsing habits with respect to multiple pages in a site, and duration of stay therein. As usually dealt with in marketing management, customer also includes those who are targeted prospects and are potential customers. For purpose of academic

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discussion and marketing management tasks, the two terms, „customer‟ and „consumer‟ are often used in interchangeable manner. However, to give the most simplistic example of purchase scenario, when a parent buys toy his/her child, parent is a customer and the child is a consumer.

A more comprehensive global picture of children's internet use emerges from a 2009 report (Symantec 2009), although once again this is likely to be outdated as the actual research wascarried out in 2008. The survey was conducted online in 12 countries (the United States, Canada, the United Kingdom, France, Germany, Italy, Sweden, China, Japan, India, Australia, and Brazil) by Harris Interactive on behalf of Symantec between 13 October and 5 December 2008 among 6,427 adults (including 1,297 parents of children aged 8-17) and 2,614 children aged 8-17 who spend one or more hours online each month.

OBJECTIVE

1. To understand the impact of digital marketing
2. 2 To understand the role of digital marketing

HYPOTHESIS OF THE STUDY

H0: There is a no role of Digital marketing in thane region

H01: There is a role of digital marketing in thane

RESEARCH METHODOLOGY

Research Universe	**Thane region**
Sample Size	**70**
Method of Sampling	**Random sampling**
Method of Data Collection	**Questionnaire**
Method of Data	**Primary and Secondary**
Data Analysis Technique	**Graph, percentage method**

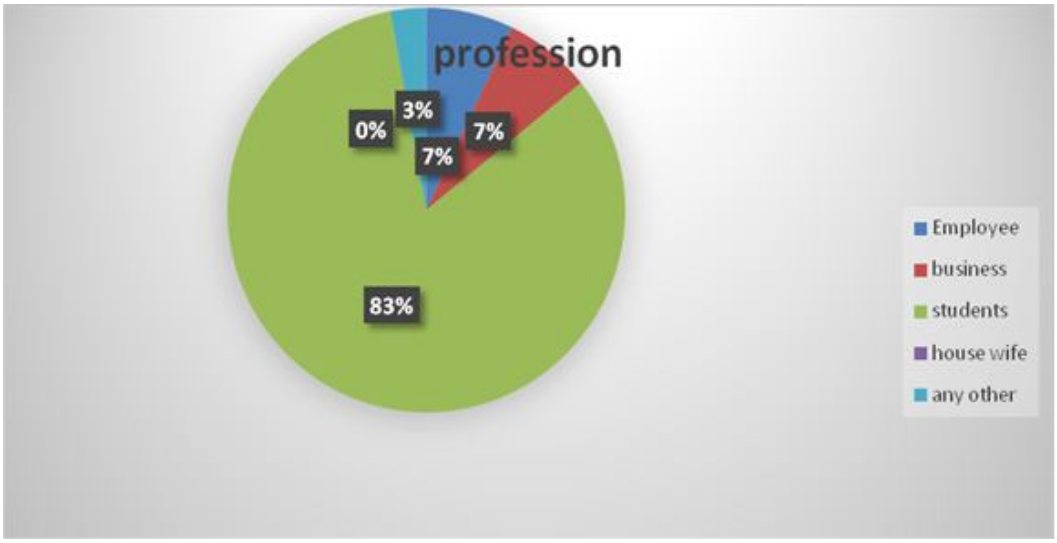
Limitations of the study

1 opinion of the respondents may be based at the time of giving information

Analysis and interpretation of data

1. Respondents of people profession

Choices	%	Count
Employee	**7%**	**5**
Business	**7%**	**5**
Students	**86%**	**58**
House Wife	**0%**	**0**
Any Other	**0.7%**	**2**



Interpretation: The respondent of people are Student 86% and 7% of Business and 7% of Employees are there and the housewives is 0%

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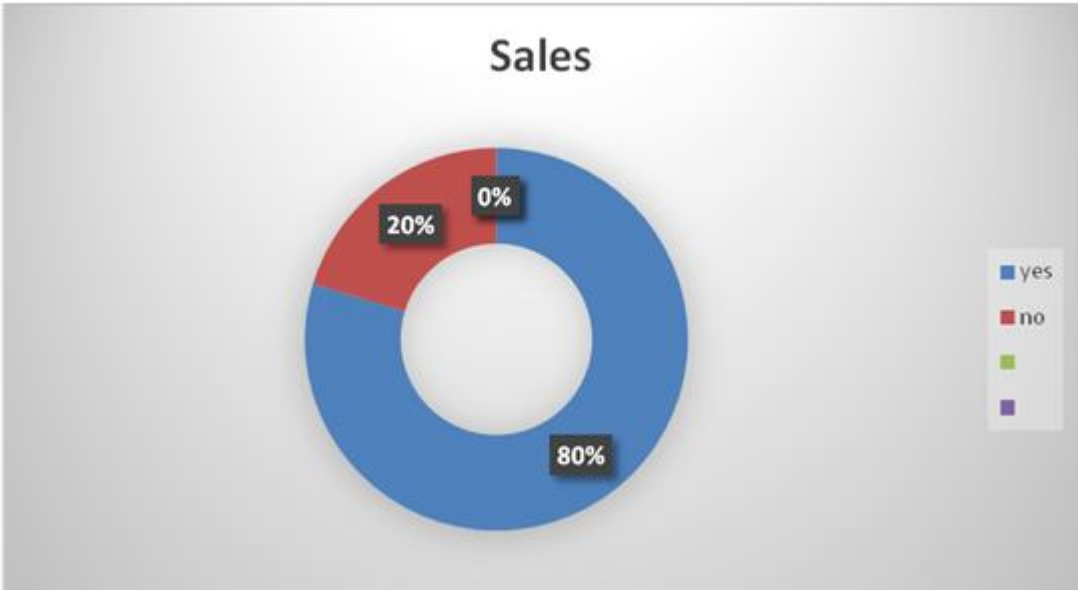
2: Did you know the digital marketing

Choices	%	Count
yes	80%	56
no	20%	14
Other	0%	0

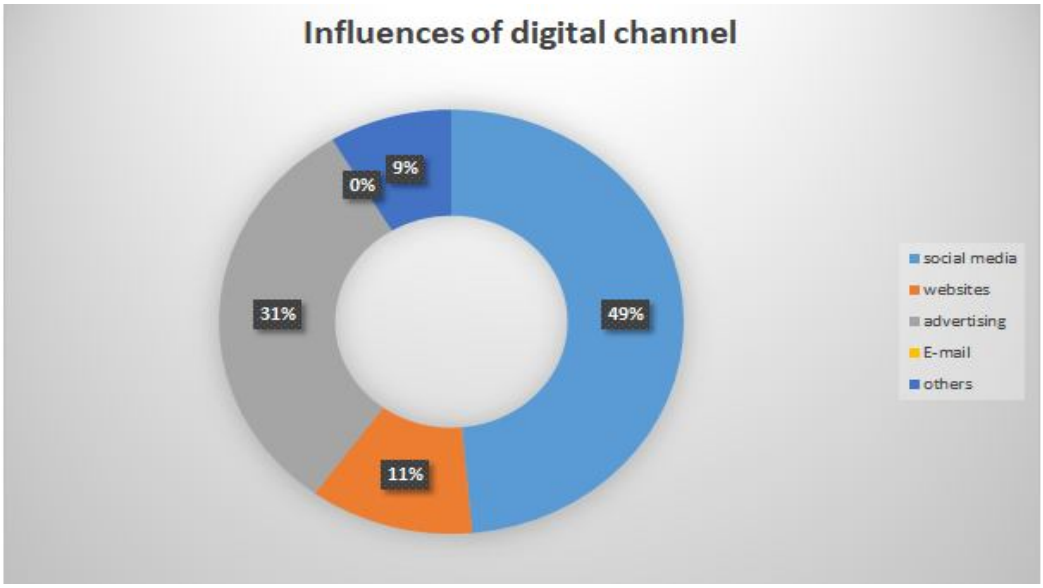


INTERPRETATION

The respondent of people to know the digital marketing 80%of people saying Yes and 20% of people saying No

3: According to you the Influences of digital channels to buy more.

Choices	%	Count
Social Media	49%	34
Websites	11%	8
E-mails	0%	0
Advertising	31%	22
Others	9%	6



Interpretation: The respondent of people the social media 49% are using to buy the goods and websites are uses for digital marketing 11% Advertising are uses by company 31.43% and emails are uses 0% and Other are using 9% .This is the influence of the digital marketing

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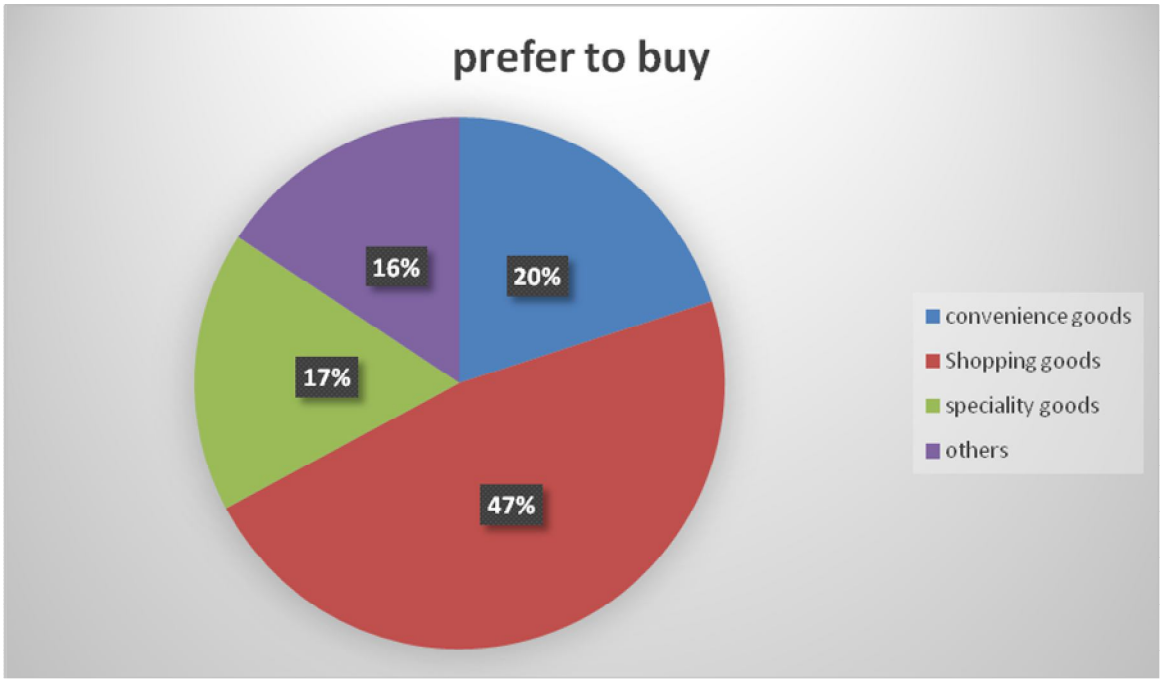
4. what kind of product you would prefer to buy through digital channel

Choices	%	count
Convenience goods	20%	14
Shopping goods	47%	33
Speciality goods	17%	12
Others	16%	11

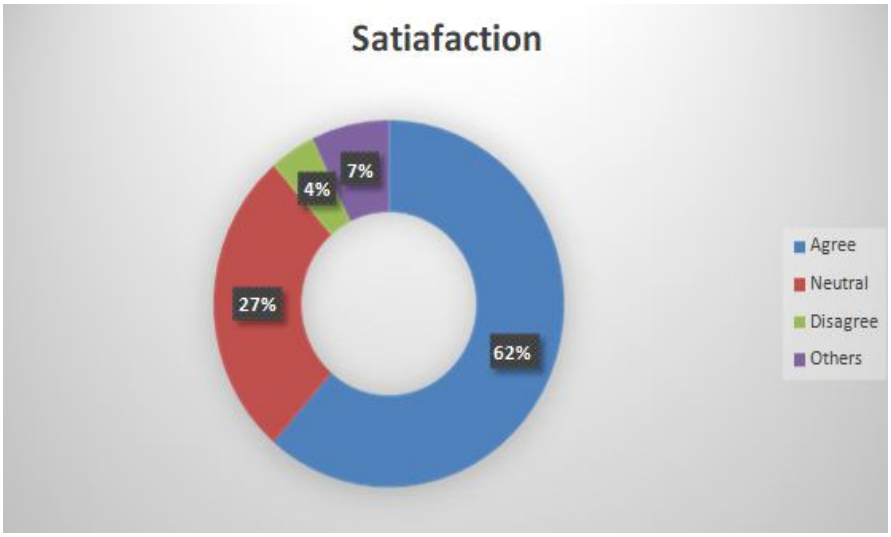


INTERPRETATION

The respondent of people for buying the goods convenience goods 20% shopping goods are 47.14% speciality goods are 17% and others are 16% buying through the digital channel.

5: satisfaction of consumer purchasing through digital channel

Choices	%	Count
Agree	62%	43
Neutral	27%	19
Disagree	4%	3
Others	7%	5



Interpretation: The respondent given by the people 61.43% Agree with the purchasing satisfaction 27.14% are people saying neutral and 4.29% of disagree with the satisfaction may be 7% are given by the people.

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FINDING AND CONCLUSION

Following the certain finding from the primary data collected through a questionnaire the problems are

- Out of the total respondent 20.29% are the don`t know the digital marketing. The 90% people saying digital marketing are required in india and 10% are saying may be
- 48.6% peoples are using social media and online advertising 31% and others using traditional method.
- Sometimes products are highly priced in websites and quality does not match it. This is reaponses 27% people are disagree with digital marketing
- Social media are used by many people 24.29%. websites are 22.86%.
- Suggestion given by the people digital marketing plays an important role in our day to day life .
- Digital channel should be updated continuously so the transaction become easier and it is a time saver

REFERENCES

[1] Chaffey D, E-business & e-Commerce ManagementStrategy, Implementation and Practice Pearson Education, Paris, 2011, 72-79

[2] Chaffey D & Smith P, E-Marketing Excellence: Planning and Optimizing Your Digital Marketing, Routledge. Fourth Edition, 2008, 580-593

[3] Waghmare GT, E-Commerce, A Business Review and Future Prospects in Indian Business. Internet, Marketing in India. Indian Streams Research Journal, 2(5), 2012, 1- 4.

[4] Gangeshwer DK, E-Commerce or Internet Marketing: A Business Review from Indian Context", International Journal of - and e- Service, Science and Technology.

[5] Digital marketing and advertising to children from google.

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A SYSTEMATIC REVIEW OF TEXT MINING BASED ON CLASSIFICATION

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ABSTRACT
As text semantics has an important role in text mining, the term semantics has been seen in a vast sort of text mining studies. However, there is a lack of studies that integrate the different research branches and summarize the developed works. This paper reports a systematic mapping about semantics-concerned text mining studies. This systematic mapping study followed a well-defined protocol. Its results were based on 1693 studies, selected among 3984 studies identified in five digital libraries. The produced mapping gives a general summary of the subject, points some areas that lacks the development of primary or secondary studies, and can be a guide for researchers working with semantics-concerned text mining. It demonstrates that, although several studies have been developed, the processing of semantic aspects in text mining remains an open research problem.

Keywords: Systematic review Text mining Text semantics

INTRODUCTION
Text mining techniques have become essential for supporting knowledge discovery as the volume and variety of digital text documents have increased, either in social networks and the Web or inside organizations. Text sources, as well as text mining applications, are varied. Although there is not a consensual definition established among the different research communities [1], text mining can be seen as a set of methods used to analyze unstructured data and discover patterns that were unknown beforehand [2].

A general text mining process can be seen as a five-step process, as illustrated in Fig. 1. The process starts with the specification of its objectives in the problem identification step. The text mining analyst, preferably working along with a domain expert, must delimit the text mining application scope, including the text collection that will be mined and how the result will be used. The specifications stated in the problem identification step will guide the next steps of the text mining process, which can be executed in cycles of data preparation (pre-processing step), knowledge discovery (pattern extraction step), and knowledge evaluation (post-processing step).

The pre-processing step is about preparing data for pattern extraction. In this step, raw text is transformed into some data representation format that can be used as input for the knowledge extraction algorithms. The activities performed in the pre-processing step are crucial for the success of the whole text mining process. The data representation must preserve the patterns hidden in the documents in a way that they can be discovered in the next step. In the pattern extraction step, the analyst applies a suitable algorithm to extract the hidden patterns. The algorithm is chosen based on the data available and the type of pattern that is expected. The extracted knowledge is evaluated in the post-processing step. If this knowledge meets the process objectives, it can be put available to the users, starting the final step of the process, the knowledge usage. Otherwise, another cycle must be performed, making changes in the data preparation activities and/or in pattern extraction parameters. If any changes in the stated objectives or selected text collection must be made, the text mining process should be restarted at the problem identification step.

Text data are not naturally in a format that is suitable for the pattern extraction, which brings additional challenges to an automatic knowledge discovery process. The meaning of natural language texts basically depends on lexical, syntactic, and semantic levels of linguistic knowledge. Each level is more complex and requires a more sophisticated processing than the previous level. This is a common trade-off when dealing with natural language processing: expressiveness versus processing cost. Thus, lexical and syntactic components have been more broadly explored in text mining than the semantic component [2]. Recently, text mining researchers have become more interested in text semantics, looking for improvements in the text mining results. The reason for this increasing interest can be assigned both to the progress of the computing capacity, which is constantly reducing the processing time, and to developments in the natural language processing field, which allow a deeper processing of raw texts.

In order to compare the expressiveness of each level of text interpretation (lexical, syntactic, and semantic), consider two simple sentences:

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1. Company A acquired Company B.

2. Company B acquired Company A.

Sentences 1 and 2 have opposite meanings, but they have the same terms ("Company", "A", "B", "acquired"). Thus, if we analyze these sentences only in the lexical level, it is not possible to differentiate them. However, considering the sentence syntax, we can see that they are opposite. They have the same verb, and the subject of one sentence is the object of the other sentence and vice versa. If we analyze a little deeper, now considering the sentence semantics, we find that in sentence 1, "Company A" has the semantic role of *agent* regarding the verb "acquire" and "Company B" has the semantic role of *theme*. The same can be said to a third sentence:

3. Company B was acquired by Company A.

Despite the fact that syntactically sentences 1 and 3 have opposite subjects and objects, they have the same semantic roles. Thus, at the semantic level, they have the same meaning. If we go deeper and consider semantic relations among words (as the synonymy, for example), we can find that sentence 4 also expresses the same event:

4. Company A purchased Company B.

Besides, going even deeper in the interpretation of the sentences, we can understand their meaning—they are related to some takeover—and we can, for example, infer that there will be some impacts on the business environment.

Traditionally, text mining techniques are based on both a bag-of-words representation and application of data mining techniques. In this approach, only the lexical component of the texts is considered. In order to get a more complete analysis of text collections and get better text mining results, several researchers directed their attention to text semantics.

Text semantics can be considered in the three main steps of text mining process: pre-processing, pattern extraction and post-processing. In the pre-processing step, data representation can be based on some sort of semantic aspect of the text collection. In the pattern extraction, semantic information can be used to guide the model generation or to refine it. In the post-processing step, the extracted patterns can be evaluated based on semantic aspects. Either way, text mining based on text semantics can go further than text mining based only on lexicon or syntax. A proper treatment of text semantics can lead to more appropriate results for certain applications [2]. For example, semantic information has an important impact on document content and can be crucial to differentiate documents which, despite the use of the same vocabulary, present different ideas about the same subject.

The term semantics has been seen in a vast sort of text mining studies. However, there is a lack of studies that integrate the different branches of research performed to incorporate text semantics in the text mining process. Secondary studies, such as surveys and reviews, can integrate and organize the studies that were already developed and guide future works.

Method applied for systematic mapping

The review reported in this paper is the result of a systematic mapping study, which is a particular type of systematic literature review [3, 4]. Systematic literature review is a formal literature review adopted to identify, evaluate, and synthesize evidences of empirical results in order to answer a research question. It is extensively applied in medicine, as part of the evidence-based medicine [5]. This type of literature review is not as disseminated in the computer science field as it is in the medicine and health care fields[1], although computer science researches can also take advantage of this type of review. We can find important reports on the use of systematic reviews specially in the software engineering community [3, 4, 6, 7]. Other sparse initiatives can also be found in other computer science areas, as cloud-based environments [8], image pattern recognition [9], biometric authentication [10], recommender systems [11], and opinion mining [12].

Systematic mapping planning

The first step of a systematic review or systematic mapping study is its planning. The researchers conducting the study must define its protocol, i.e., its research questions and the strategies for identification, selection of studies, and information extraction, as well as how the study results will be reported. The main parts of the protocol that guided the systematic mapping study reported in this paper are presented in the following.

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- **Research question:** the main research question that guided this study was "How is semantics considered in text mining studies?" The main question was detailed in seven secondary questions, all of them related to text mining studies that consider text semantics in some way:

1. What are the application domains that focus on text semantics?
2. What are the natural languages being considered when working with text semantics?
3. Which external sources are frequently used in text mining studies when text semantics is considered?
4. In what text mining tasks is the text semantics most considered?

- **Study identification:** the study identification was performed through searches for studies conducted in five digital libraries: ACM Digital Library, IEEE Xplore, Science Direct, Web of Science, and Scopus. The following general search expression was applied in both Title and Keywords fields, when allowed by the digital library search engine: semantic* AND text* AND (mining OR representation OR clustering OR classification OR association rules).
- **Study selection:** every study returned in the search phase went to the selection phase. Studies were selected based on title, abstract, and paper information (as number of pages, for example). Through this analysis, duplicated studies (most of them were studies found in more than one database) were identified. Besides, studies which match at least one of the following exclusion criteria were rejected: (i) one page papers, posters, presentations, abstracts, and editorials; (ii) papers hosted in services with restricted access and not accessible; (iii) papers written in languages different from English or Portuguese; and (iv) studies that do not deal with text mining and text semantics.
- We can note that text semantics has been addressed more frequently in the last years, when a higher number of text mining studies showed some interest in text semantics. The peak was in 2011, with 223 identified studies. The lower number of studies in the year 2016 can be assigned to the fact that the last searches were conducted in February 2016.

Distribution of the 1693 accepted studies by publication year. Searches for studies identification were executed in January 2014 and February 2016

The results of the systematic mapping study is presented in the following subsections. We start our report presenting, in the "Surveys" section, a discussion about the eighteen secondary studies (surveys and reviews) that were identified in the systematic mapping. Then, each following section from "Application domains" to "User's interaction" is related to a secondary research question that guided our study, i.e., application domains, languages, external knowledge sources, text mining tasks, methods and algorithms, representation model, and user's interaction. In the "Systematic mapping summary and future trends" section, we present a consolidation of our results and point some gaps of both primary and secondary studies.

What are the application domains that focus on text semantics?
Fig.3 presents the domains where text semantics is most present in text mining applications. Health care and life sciences is the domain that stands out when talking about text semantics in text mining applications. This fact is not unexpected, since life sciences have a long time concern about standardization of vocabularies and taxonomies. The building of taxonomies and ontologies is such a common practice in health care and life sciences that World Wide Web Consortium (W3C) has an interest group specific for developing, evaluating, and supporting semantic web technologies for this field [32]. Among the most common problems treated through the use of text mining in the health care and life science is the information retrieval from publications of the field. The search engine PubMed [33] and the MEDLINE database are the main text sources among these studies. There are also studies related to the extraction of events, genes, proteins and their associations [34, 35, 36], detection of adverse drug reaction [37], and the extraction of cause-effect and disease-treatment relations [38, 39, 40].

As an alternative summary of this systematic mapping, additional visualizations of both the selected studies and systematic mapping results can be found online at. For this purpose, the prototype of the Pinda tool was adapted for hierarchical visualization of the textual data, using K-means algorithm to group the results. The tool allows the analysis of data (title + abstract of selected studies or information extracted from them) through multiple visualization techniques (Thumbnail, Snippets, Directories, Scatterplot, Treemap, and Sunburst), coordinating the user's interactions for a better understanding of existing relationships. Figure 3 illustrates the Scatterplot visualization of studies accepted in this systematic mapping. Some of the possible visualizations of the systematic mapping results are presented in Fig. 4.

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Scatterplot visualization of accepted studies of the systematic mapping

Directories and Treemap visualizations of the systematic mapping results

CONCLUSION

Text semantics are frequently addressed in text mining studies, since it has an important influence in text meaning. However, there is a lack of secondary studies that consolidate these researches. This paper reported a systematic mapping study conducted to overview semantics-concerned text mining literature. The scope of this mapping is wide (3984 papers matched the search expression). Thus, due to limitations of time and resources, the mapping was mainly performed based on abstracts of papers. Nevertheless, we believe that our limitations do not have a crucial impact on the results, since our study has a broad coverage.

The main contributions of this work are (i) it presents a quantitative analysis of the research field; (ii) its conduction followed a well-defined literature review protocol; (iii) it discusses the area regarding seven important text mining dimensions: application domain, language, external knowledge source, text mining task, method and algorithm, representation model, and user's interaction; and (iv) the produced mapping can give a general summary of the subject and can be of great help for researchers working with semantics and text mining. Thus, this work filled a gap in the literature as, to the best of our knowledge, this is the first general literature review of this wide subject.

Although several researches have been developed in the text mining field, the processing of text semantics remains an open research problem. The field lacks secondary studies in areas that has a high number of primary studies, such as feature enrichment for a better text representation in the vector space model. Another highlight is about a language-related issue. We found considerable differences in numbers of studies among different languages, since 71.4% of the identified studies deal with English and Chinese. Thus, there is a lack of studies dealing with texts written in other languages. When considering semantics-concerned text mining, we believe that this lack can be filled with the development of good knowledge bases and natural language processing methods specific for these languages. Besides, the analysis of the impact of languages in semantic-concerned text mining is also an interesting open research question. A comparison among semantic aspects of different languages and their impact on the results of text mining techniques would also be interesting.

LIST OF FIGURES

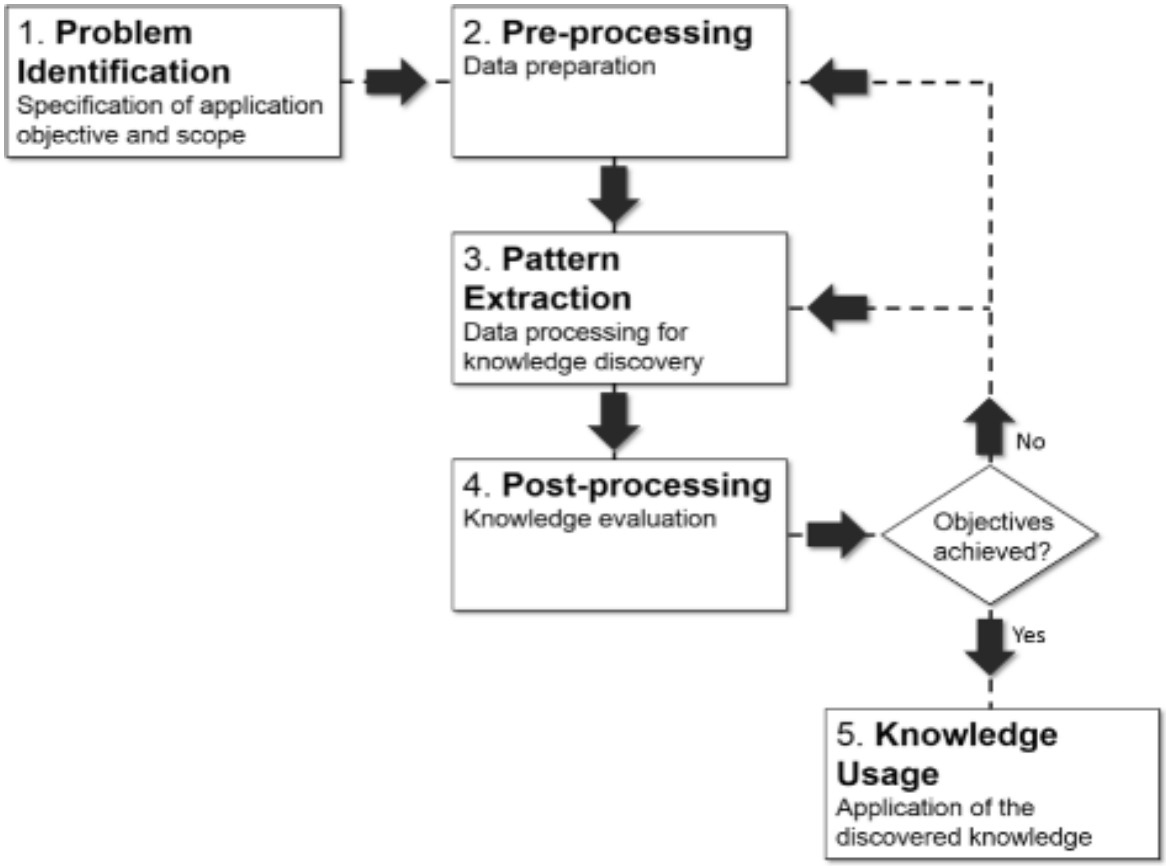

Fig-1

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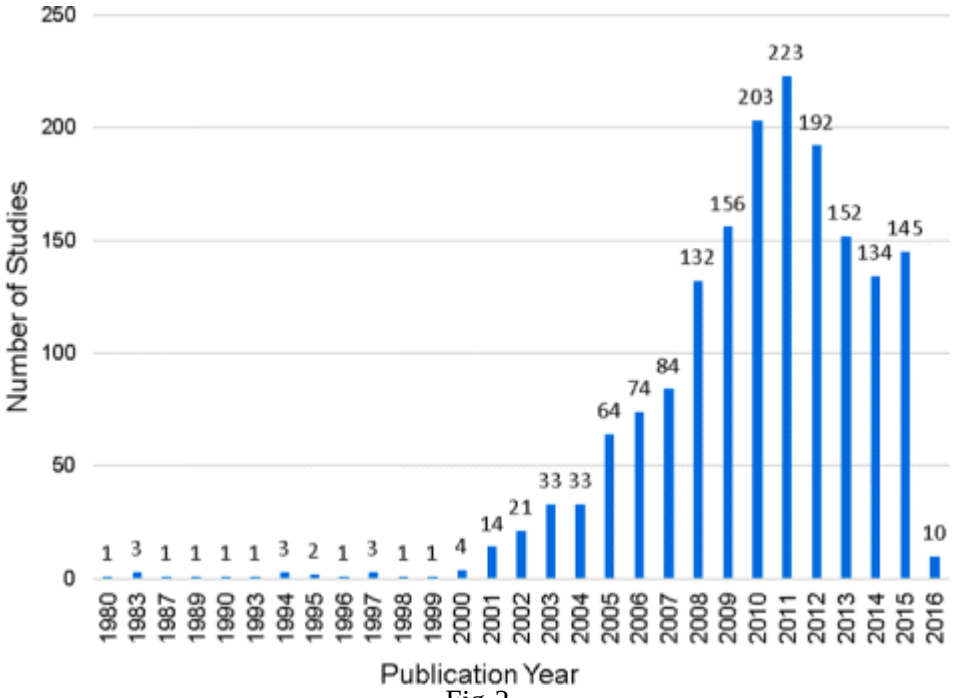

Fig-2

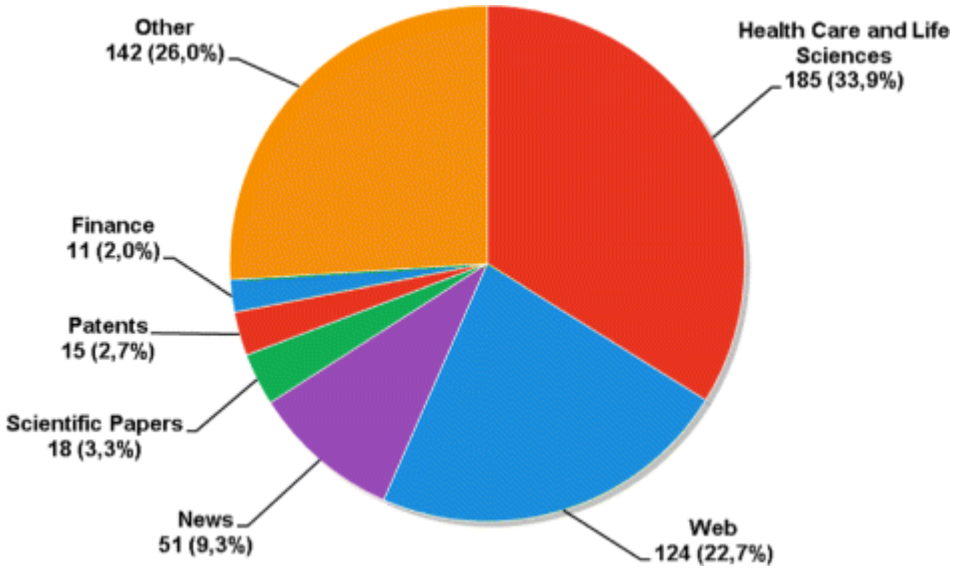

Fig-3

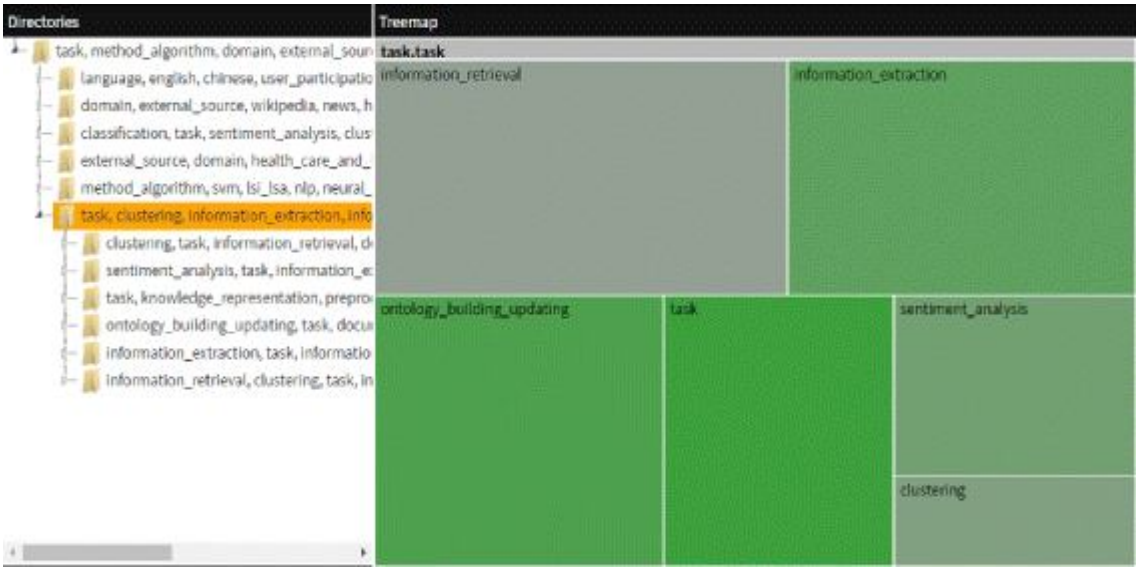

Fig-4

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REFERENCES

1. Miner G, Elder J, Hill T, Nisbet R, Delen D, Fast A (2012) Practical text mining and statistical analysis for non-structured text data applications. 1st edn. Academic Press, Boston.
2. Aggarwal CC, Zhai C (eds)2012. Mining text data. Springer, Durham.
3. Kitchenham B, Charters S (2007) Guidelines for performing systematic literature reviews in software engineering. EBSE Technical Report EBSE-2007-01. Keele University and Durham University Joint Report, Durham, UK
4. Petersen K, Feldt R, Mujtaba S, Mattsson M (2008) Systematic mapping studies in software engineering In: EASE 2008: Proceedings of the 12th International Conference on Evaluation and Assessment in Software Engineering. EASE'08, 68–77. British Computer Society, Swinton, UK.
5. Brereton P, Kitchenham BA, Budgen D, Turner M, Khalil M (2007) Lessons from applying the systematic literature review process within the software engineering domain. J Syst Softw80(4): 571–583.
6. Kitchenham B, Pretorius R, Budgen D, Brereton OP, Turner M, Niazi M, *et al* (2010) Systematic literature reviews in software engineering—a tertiary study. Inf Softw Technol52(8): 792–805.
7. Felizardo KR, Nakagawa EY, MacDonell SG, Maldonado JC (2014) A visual analysis approach to update systematic reviews In: EASE'14: Proceedings of the 18th International Conference on Evaluation and Assessment in Software Engineering, 4:1–4:10. ACM, New York.
8. Moghaddam FA, Lago P, Grosso P (2015) Energy-efficient networking solutions in cloud-based environments: a systematic literature review. ACM Comput Surv47(4): 64:1–64:32.
9. Pedro RWD, Nunes FLS, Machado-Lima A (2013) Using grammars for pattern recognition in images: a systematic review. ACM Comput Surv46(2): 26:1–26:34.
10. Pisani PH, Lorena AC (2013) A systematic review on keystroke dynamics. J Braz Comput Soc19(4): 573–587.
11. Park DH, Kim HK, Choi IY, Kim JK (2012) A literature review and classification of recommender systems research. Expert Syst Appl39(11): 10059–10072.
12. Khan K, Baharudin BB, Khan A, *et al* (2009) Mining opinion from text documents: a survey In: DEST'09: Proceedings of the 3rd IEEE International Conference on Digital Ecosystems and Technologies, 217–222. IEEE.
13. Laboratory of Research on Software Engineering (LaPES) - StArt Tool. Accessed 8 June 2016.
14. Grobelnik M (2011) Many faces of text processing In: WIMS'11: Proceedings of the International Conference on Web Intelligence, Mining and Semantics, 5. ACM.
15. Stavrianou A, Andritsos P, Nicoloyannis N (2007) Overview and semantic issues of textmining. SIGMOD Rec36(3): 23–34.
16. Daud A, Li J, Zhou L, Muhammad F (2010) Knowledge discovery through directed probabilistic topic models: a survey. Front Comput Sci China4(2): 280–301.
17. Wimalasuriya DC, Dou D (2010) Ontology-based information extraction: an introduction and a survey of current approaches. J Inf Sci36(3): 306–323.
18. Bharathi G, Venkatesan D (2012) Study of ontology or thesaurus based document clustering and information retrieval. J Eng Appl Sci7(4): 342–347.
19. Reshadat V, Feizi-Derakhshi MR (2012) Studying of semantic similarity methods in ontology. Res J Appl Sci Eng Technol4(12): 1815–1821.
20. Schiessl M, Bräscher M (2012) Do texto às ontologias: uma perspectiva para a ciência da informação. Ciência da Informação40(2): 301–311.
21. Cimiano P, Völker J, Studer R (2006) Ontologies on demand?—a description of the state-of-the-art, applications, challenges and trends for ontology learning from text. Inf Wiss Prax57(6-7): 315–320.
22. Jovanovic J, Bagheri E, Cuzzola J, Gasevic D, Jeremic Z, Bashash R (2014) Automated semantic tagging of textual content. IT Prof16(6): 38–46.

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23. Wallace BC (2015) Computational irony: a survey and new perspectives. Artif Intell Rev43(4): 467–483.
24. Winnenburg R, Wächter T, Plake C, Doms A, Schroeder M (2008) Facts from text: can text mining help to scale-up high-quality manual curation of gene products with ontologies?Brief Bioinform9(6): 466–478.
25. Leser U, Hakenberg J (2005) What makes a gene name? Named entity recognition in the biomedical literature. Brief Bioinform6(4): 357–369.
26. Dagan I, Dolan B, Magnini B, Roth D (2009) Recognizing textual entailment: rational, evaluation and approaches. Nat Lang Eng15(04): i–xvii.
27. Irfan R, King CK, Grages D, Ewen S, Khan SU, Madani SA, et al. (2015) A survey on text mining in social networks. Knowl Eng Rev30(02): 157–170.
28. Sheth A, Ramakrishnan C, Thomas C (2005) Semantics for the semantic web: the implicit, the formal and the powerful. Int J Semant Web Inf Syst1(1): 1–18.
29. Cheng XY, Cheng C, Zhu Q (2011) The applications of description logics in natural language processing. Adv Mater Res204: 381–386.
30. Martinez A, Martinez W (2015) At the interface of computational linguistics and statistics. Wiley Interdiscip Rev Comput Stat7(4): 258–274.
31. Bos J (2011) A survey of computational semantics: representation, inference and knowledge in wide-coverage text understanding. Lang Linguist Compass5(6): 336–366.
32. W, 3C - Semantic Web Health Care and Life Sciences Interest Group. /. Accessed 8 June 2016.
33. National Center for Biotechnology Information - PubMed. . Accessed 8 June 2016.
34. Miwa M, Thompson P, McNaught J, Kell DB, Ananiadou S (2012) Extracting semantically enriched events from biomedical literature. BMC Bioinforma13(1): 1–24.
35. Ravikumar KE, Liu H, Cohn JD, Wall ME, Verspoor K (2011) Pattern learning through distant supervision for extraction of protein-residue associations in the biomedical literature, vol. 2. pp 59–65. IEEE, Honolulu.
36. Xia N, Lin H, Yang Z, Li Y (2011) Combining multiple disambiguation methods for gene mention normalization. Expert Syst Appl38(7): 7994–7999.
37. Sarker A, Gonzalez G (2015) Portable automatic text classification for adverse drug reaction detection via multi-corpus training. J Biomed Inform53: 196–207.
38. Wu JL, Yu LC, Chang PC (2012) Detecting causality from online psychiatric texts using inter-sentential language patterns. BMC Med Inform Dec Making12(1): 1–10.
39. Abacha AB, Zweigenbaum P (2011) A hybrid approach for the extraction of semantic relations from MEDLINE abstracts. Lect Notes Comput Sci (Incl Subseries Lect Notes Artif Intell Lect Notes Bioinforma)6609 LNCS(PART 2): 139–150.
40. Yu LC, Wu CH, Jang FL (2007) Psychiatric consultation record retrieval using scenario-based representation and multilevel mixture model. IEEE IEEE Trans Inf Technol Biomed11(4): 415–427.
41. Musto C, Semeraro G, Lops P, Gemmis MD (2015) CrowdPulse: a framework for real-time semantic analysis of social streams. Inf Syst54: 127–146.
42. García-Moya L, Kudama S, Aramburu MJ, Berlanga R (2013) Storing and analysing voice of the market data in the corporate data warehouse. Inf Syst Front15(3): 331–349.
43. Eugenio BD, Green N, Subba R (2013) Detecting life events in feeds from Twitter In: ICSC 2013: Proceedings of the IEEE Seventh International Conference on Semantic Computing, 274–277. IEEE, Irvine,
44. Torunoglu D, Telseren G, Sagturk O, Ganiz MC (2013) Wikipedia based semantic smoothing for twitter sentiment classification In: INISTA 2013: Proceedings of the IEEE International Symposium on Innovations in Intelligent Systems and Applications, 1–5. IEEE, Albena.
45. Cao Q, Duan W, Gan Q (2011) Exploring determinants of voting for the “helpfulness” of online user reviews: a text mining approach. Decis Support Syst50(2): 511–521.

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46. Levi A, Mokryn O, Diot C, Taft N (2012) Finding a needle in a haystack of reviews: cold start context-based hotel recommender system In: RecSys'12: Proceedings of the sixth ACM Conference on Recommender Systems, 115–122. ACM, New York.
47. He W, Shen J, Tian X, Li Y, Akula V, Yan G, *et al* (2015) Gaining competitive intelligence from social media data: evidence from two largest retail chains in the world. Ind Manag Data Syst115(9): 1622–1636.
48. He W, Tian X, Chen Y, Chong D (2016) Actionable social media competitive analytics for understanding customer experiences. J Comput Inf Syst56(2): 145–155.
49. Tian X, He W, Tao R, Akula V (2016) Mining online hotel reviews: a case study from hotels in China In: AMCIS 2016: Proceedings of the 22nd Americas Conference on Information Systems, 1–8.
50. ACM - Asian and Low-Resource Language Information Processing (TALLIP). . Accessed 8 June 2016.
51. Chen CL, Liu CL, Chang YC, Tsai HP (2011) Mining opinion holders and opinion patterns in US financial statements In: TAAI 2011: Proceedings of the International Conference on Technologies and Applications of Artificial Intelligence, 62–68. IEEE, Chung-Li,
52. Chen J, Liu J, Yu W, Wu P (2009) Combining lexical stability and improved lexical chain for unsupervised word sense disambiguation In: KAM'09: Proceedings of the Second International Symposium on Knowledge Acquisition and Modeling, 430–433. IEEE, Wuhan.
53. Rusu D, Fortuna B, Grobelnik M, Mladenic D (2009) Semantic graphs derived from triplets with application in document summarization. Informatica (Slovenia)33(3): 357–362.
54. Krachina O, Raskin V, Triezenberg K (2007) Reconciling privacy policies and regulations: ontological semantics perspective In: Human Interface and the Management of Information. Interacting in Information Environments, 730–739. Springer, Berlin
55. Mansuy T, Hilderman RJ (2006) A characterization of WordNet features in Boolean models for text classification In: AusDM 2006: Proceedings of the fifth Australasian Conference on Data Mining and Analystics, 103–109. Australian Computer Society, Inc, Darlinghurst
56. Ciaramita M, Gangemi A, Ratsch E, Šaric J, Rojas I (2005) Unsupervised learning of semantic relations between concepts of a molecular biology ontology In: IJCAI'05: Proceedings of the 19th International Joint Conference on Artificial Intelligence, 659–664. Morgan Kaufmann Publishers Inc., San Francisco

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HINDI- MUSLIM RELIGIOUS DIFFERENCE IN INDIAN NATIONAL IDENTITY AMONG UNIVERSITY STUDENTS OF RANCHI

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ABSTRACTS
The present study investigated "Hindi- Muslim Religious Difference in Indian National Identity among University Students of Ranchi". The research sample consisted of 80 Students University of Ranchi, 40 Hindu, 40Muslim, from Ranchi. Personal Data questionnaire was used to collect information about the respondents and Indian National Identity Scale (INIS) was used for the data collection. High scores on this scale indicate higher level of Indian National Identity. The result of the present study shows that Hindu had higher scored than Muslim religious group on Indian National Identity.

Keywords: Indian National Identity, Religious groups,

INTRODUCTION

National identity is the form of social identity decided by birth or citizenship of a person in a country. Nationalism is the concept arising after the movement of national liberation as a result of colonial rule and reformations of nations in Asia and Africa (Salazaar, 1999). National identity is strengthened with the emergence of nationalism but is formed as a cognitive construct during the developmental phase. Nationality of a person determines the national identity, but nationality is dependent on citizenship of the country. Nation is considered as a deep, horizontal comradeship, in a form of „imagined community" (Anderson, 1991).

Regional identity is somewhat a related concept to state-nation induced identity. In India, states divided on the basis of language and regions give an exclusive example of regional identity. Since the regional or territorial principle is drawn from a belief in ancient heritage, encapsulated in the notion of "sacred geography,, and figures in both imaginations, it has acquired political hegemony over time. Territory is a part of the national identity, but overpowering as an in group when it comes to preference (Vershney, 1993).

RELIGIOUS IDENTITY

Religion as identified in psychology is a set of beliefs and practices related to the divine, God or sacredness. Zinnbauer and Pargament (2005) defined religion as, „system of belief in a divine or supernatural power, practices of worship and other rituals directed towards such a power". They also referred to „religion" as a broad construct, which is not exclusively differentiated from spirituality. Positive effects of religion on group membership provide adolescents „a sense of membership and belongingness", social support, self-esteem and satisfaction (Loewenthal, 2000). Religion offers an orientation to life and channels an individual to facilitate the rationality of self.

REVIEW OF LITERATURE

In another study Shamsi (2005) had conducted her study on urban sample using almost similar research design and found that ethnicity does not seem to influence Indian National Identity. Both the tribal and non-tribal school students are alike on Indian National Identity. Hindus in comparison to Muslims, Sarnas and Christians in comparison to Muslims have significantly higher Indian National Identity. However, Sarnas and Christians have the same degree of Indian National Identity. Caste has significant impact on Indian National Identity. Low caste in both Hindu and Muslim religious groups are found to have higher Indian National Identity than high caste. The two Sarna groups that are Munda and Oraon and also Catholic and Protestant Christian do not differ significantly on Indian National Identity. Females have significantly higher Indian National Identity than males in non-tribal group but in tribal group though the tendency is same, significant differences are not found between male and female school students.

Kumar (2000) studied 720 VIII, IX, X grade (Age 12-13, 13-14, 14-15 years) school students selected from rural areas of Ranchi district. They were equally divided on the basis of religion (Hindu, Muslim, Sarna and Tribal Christian) caste (High and Low- Only for Hindu and Muslim Sample), gender (Male and Female) and age grade as mentioned above the data revealed that Indian National Identity was widely prevalent in all the sample sub-groups, through it was higher in higher age groups. He found an interesting result related to the effect of gender on Indian National Identity. There was no effect of gender in non tribal groups but in tribal groups female students were found to have significantly higher Indian National Identity as compared to male students..

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AIMS OF STUDY

- To study the extent of Indian National Identity in Hindi as well as Muslim University students.

RESEARCH QUESTIONS

- What is the extent of Indian National Identity in Hindu- Muslim religious groups?

SAMPLE

The sample for the proposed research consisted of 80 college students of University Students. They were selected on a stratified random basis from different colleges of Ranchi. The stratification was based on religious Hindu, Muslim, and the sample design given below

Sample Design

Table-1.1

Religion	
Hindu	**Muslim**
40	**40**

Total 80

TOOLS

Personal Data Questionnaire

This elicits information about respondents name, age, gender, religion, caste, college, class, parental income, education, etc.

The Indian National Identity Scale (INIS)

Indian National Identity Scale (INIS) developed by Dr (Mrs) Zeba was used for data collection in the proposed research. This scale has eight dimensions based on the fundamental rights and duties and the directive principles of the constitution of India. The eight dimensions of the scales are as follows:

i. Fundamental Right Social (FRS)

ii. Fundamental Right Economic (FRE)

iii. Fundamental Right Political (FRP)

iv. Fundamental Duty Social (FDS)

v. Fundamental Duty Political (FDP)

vi. Directive Principle Social (DPS)

vii. Directive Principle Economic (DPE)

viii. Directive Principle Political (DPP)

In each dimension of INIS there are 15 items with five response alternatives, ranging from strongly agree to strongly disagree. The items are both positive and negative and the coding is made in such a way that higher scores indicate higher degree of Indian National Identity.

Test/Retest and split half reliability co-efficient of the scale were found to be .68 and .89 respectively. Validity of the scale was evidenced by item content and by the result of item analysis showing that each item discriminated between high and low scores at more than .01 level of confidence.

RESULT AND DISCUSSION

Extent of Indian National Identity in Sample groups by Religious Affiliation

Table-1.2

Groups	Low (120-280)		Average (281-440)		High (441-600)	
	N	%	N	%	N	%
Hindu (N=40)	0	0	13	32.5	27	67.5
Muslim (N=40)	0	0	28	70	12	30

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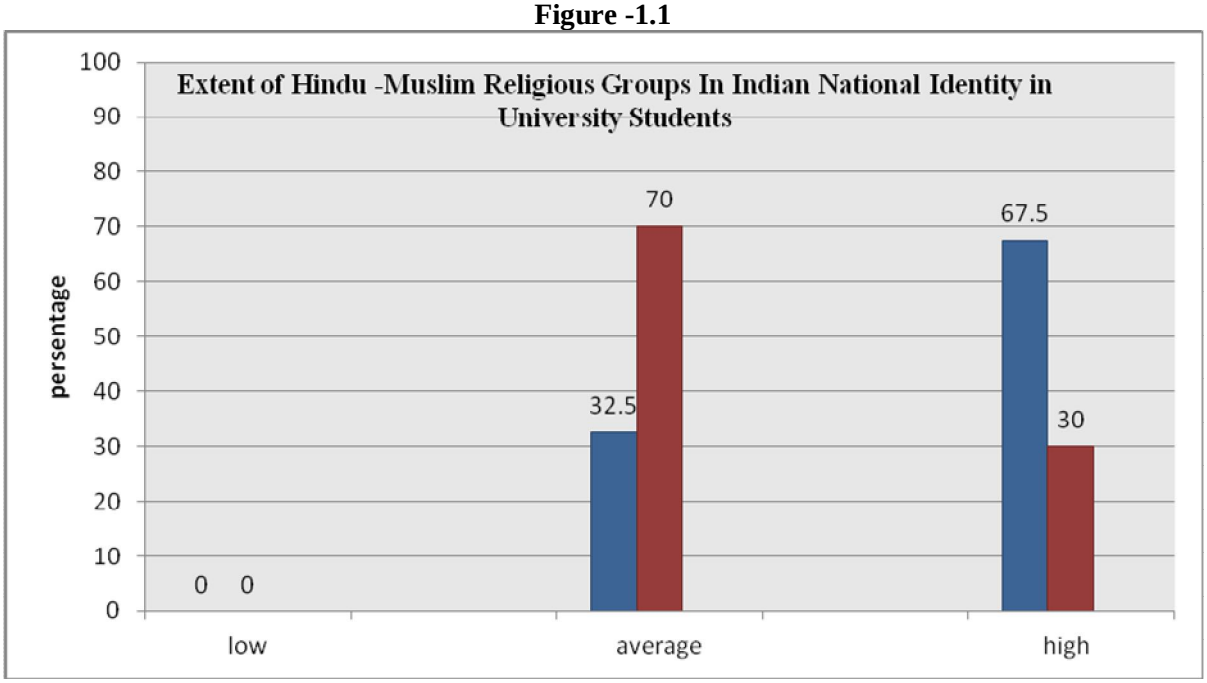
Figure -1.1



The data on Extent of Indian National Identity in Sample groups by Religious Affiliation is presented table 1.2 and figure1.1

- None of the Hindu, as well as Muslim college students had low extent of Indian national identity.
- 32.5% Hindu college students had average Indian National Identity, 70% Muslim college students have average Indian National Identity. This indicated that most of the Muslim students have average level of Indian National Identity.
- 67.5% Hindu college students had high Indian National Identity, 30% Muslim college students have high Indian National Identity. This indicated that most of the Hindu students have high level of Indian National Identity.

REFERENCES

- Anderson, B. (1991). *Imagined Communities*. Reflections on the Origin and Spread of Nationalism. London: Verso.
- Kumar, A. (2000). Development of Indian National Identity in rural school students. Ph.D. Thesis,Vinoba Bhave University, Hazaribag
- Salazaar, J. M. (1998). Social identity and national identity. In Social identity, eds. Stephen Worchel, F. Morales, D. Paez & J-C Deschamps. London: Sage.
- Shamsi, S. (2005). Indian National Identity in Tribal and non tribal school students. Ph.D. Thesis, Ranchi University, Ranchi.
- Varshney, A. (1993). Contested meanings: India's national identity, Hindu nationalism, and the politics of anxiety. *Daedalus*, 122, pp. 227-261
- Zinnbauer, B. J., & Pargament, K. I. (2005). *Religiousness and spirituality. In R. F. Paloutzian & C. L. Park,* (Eds.), Handbook of the Psychology of Religion and Spirituality (pp. 21- 42). New York: The Guilford Press.

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CHALLENGES AND ISSUES IN MANAGING HUMAN RESOURCES

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ABSTRACT

Manufacturing sector in India has contributed significantly to the industrial development of the country. The gradual transformation of the Indian economy through with a service approach is also very interesting. Unlike in the developed countries, India's manufacturing growth has been based largely on its own domestic market with its own limitations and potential. The maximum competitiveness enhancement in manufacturing in the last 3-4 decades seems to have happened in east Asia led by Japan and quickly followed by Korea, Taiwan, Hing Kong and Singapore. It seems that the countries in East Asia had a better understanding of the role of manufacturing.

Realizing this, the Government of India has established National Manufacturing Competitiveness Council (NMCC) to thrust and direction to the sector. National Manufacturing Competitiveness Commission has set a target of raising the share of manufacturing sector to 25% by 2020, though it is 16% at present. It requires all round development in manufacturing sector.

The turbulent global economy and ever-changing socio-economic parameters have brought in a degree of uncertainty though they have stimulated a competitive atmosphere, which is clearly being felt in India. This has compelled manufacturing industries to review and redefine their activities. Intensive globalization, lean and flat organizational structures along-with apt management of human resources, flexible processes, mass customizations are few of the success factors for transforming our vision of India 2022 in reality.

The hyper competitive business environment of today, competence in managing technology is of critical importance for the growth, success and even survival of organizations. Managing human resources and technology are difficult and complex issues and are constrained from many directions.

There has been free flow of information about products and services across countries. This has greatly impacted the business scenario which is a global phenomenon today. The environment has become highly competitive and achieving sustainability and profitability is becoming increasingly complex.

It is the right time to develop innovative tools to handle the complexity and achieve efficiency and effectiveness to arrive at implementable solutions.

Manufacturing is the main activity to create wealth for any country. Since 1950s world trade in manufacturing has grown more than tenfold and tradable nature of products has created a dynamic change in the environment. But simultaneously the challenges of managing human resource, a vital resource at the centre of all activities revolving around sustainable development, has increased many-many fold. Many of the manufacturing concerns were forced to down their shutters due to poor human resource management. Today only those concerns are flourishing which are having proper management of human resources. Managing skilled and employable human resources for industries poses a major challenge for the entire world. This calls for right selection of skilled manpower, their induction & training/retraining on the jobs/issues, maintaining their high level of morale and motivation etc. In absence of the same, one cannot imagine industries focused on sustainable development.

Taking the above into consideration, this paper examines in detail the issues and challenges in managing human resource, a vital resource at the centre of all activities revolving around sustainable development. Our study is limited to managing proper human resource for economic development with special emphasis to manufacturing Industry and sustainability beyond2022

Keywords: Managing Human Resource, Sustainability, lean and flat organizational structure

INTRODUCTION

Challenges and Issues in human resource management in the era of Intensive globalization, lean and flat organizational structures, flexible processes (including green manufacturing process), mass customizations are seen as few of the success factors for transforming vision of India 2022.

The present global system enables free flow of information about products and services across countries and this has greatly impacted the business scenario which is a global phenomenon today. The environment has become highly competitive and achieving sustainability and profitability is becoming increasingly complex.

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The hyper competitive business environment of today and competence in managing technology accompanied with challenges & issues related to human capital are of critical importance for the growth, success and even survival of organizations. These two issues are difficult & complex and are constrained from many directions.

Under the circumstances, manufacturing sector, a major activity for creation of wealth, has a major role in the industrial growth of any country, and this needs critical review. Since 1950, world trade in manufacturing has grown more than tenfold and tradable nature of products has created a dynamic change in the environment. This sector has seen maximum growth along-with enhancement in competitiveness in the last 3-4 decades led by Japan and quickly followed by Korea, Taiwan, Hong Kong and Singapore.

With focus on new technologies, innovations and process improvements, the manufacturing sector is now in the global spotlight. All technologies/improved processes including green manufacturing process are not only focusing on quality, productivity of deliverables and apt human resource management but are also taking care of sustainable development.

The manufacturing sector has seen some degree of uncertainty due to the turbulent global economy and ever-changing socio-economic parameters including HR challenges, although they have also stimulated a competitive atmosphere, which is clearly being felt in India. This has compelled manufacturing industries all over the world including India to review and redefine their activities.

To give thrust and direction to the manufacturing sector, the Government of India has established National Manufacturing Competitiveness Council (NMCC). NMCC has set a target of raising the share of manufacturing sector to 25% by 2020, though it is 16% at present. It requires all round development in manufacturing sector, meet the challenges and sort out the issues of managing human resource.

Challenges and issues of managing human resource, a vital resource at the centre of all manufacturing activities revolving around sustainable development, have increased many-folds. Many of the manufacturing concerns were forced to down their shutters due to poor human resource management (non-adherence to HRM philosophy). Today only those concerns are flourishing which are having proper management of human resources. Managing skilled and employable human resources for manufacturing industries pose a major challenge for the entire world. This challenge gets accentuated in the face of "Green Manufacturing" adopted/being adopted by most of organizations across the globe including India as on date.

Green manufacturing, though not a new term for today, calls for research, development and use of production processes that establish environmental-friendly operations within the manufacturing field. Essentially, it is the "greening" of manufacturing, in which workers use fewer natural resources, reduce pollution and waste, recycle and reuse materials, and eliminate/minimize emissions of green-house gases in processes adopted.

Awareness regarding "Sustainable Development" among all stakeholders of the industry is a must, which needs to be understood as a way for people to use natural resources to meet the needs of the present without compromising the ability of future generations to meet their own needs.

According to the US Bureau of Labor Statistics, workers at Green Companies must have specific manufacturing training in green technologies and practices such as:

1. *Energy from renewable sources:* Generation of electricity, heat, or fuel from renewable sources for use within the establishment. These sources may include wind, biomass, geothermal, solar, ocean, hydropower, landfill gas and municipal solid waste.
2. *Energy efficiency*: Utilization of specific technologies and practices to improve energy efficiency within the establishment.
3. *Pollution reduction and removal, greenhouse gas reduction and recycling:* Use of green technologies and practices to:

- Reduce or remove the creation or release of pollutants in their operations
- Reduce greenhouse gas emissions
- Reduce or eliminate the creation of waste materials
- Collect, reuse, recycle or compost waste materials

4. *Conservation of Natural resources:* Use of specific technologies and practices to conserve natural resources, such as those related to organic agriculture, land management, and soil, water, or wildlife conservation.

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The above holds equally true for India and it becomes imperative that, in the emerging scenario, Indian manufacturing industries need to put major impetus on green manufacturing system and train large human capital on this system so as to maximize efficiency and effectiveness.

Accordingly, the industry must critically examine the processes that lead to the selection of skilled manpower, their induction & training/retraining on the jobs including green manufacturing processes, wages & remunerations, maintaining their high level of morale/ motivation etc. Failure in properly addressing these unique challenges can adversely affect the potential success of the manufacturing industry focused on sustainable development. Various challenges of HRM are further elaborated as under:

RECRUITMENT CHALLENGES

1. Talent Acquisition/Recruitment

This is by far the most important function HR teams perform in manufacturing companies. HR must recruit talent for all areas of the operation in a cost-effective and timely manner. Unfortunately, younger workers are less interested in manufacturing than previous generations, wrongly assuming that the industry is not cutting edge enough for them. Many also think manufacturing jobs are less secure because most companies rely on temps to handle seasonal or periodic spikes in production.

Under the situation, a significant gap is estimated between the talent needed and the available talent by 2022 leading to many of the manufacturing jobs going unfilled. This skill gap holds manufacturers back from growing and threatens the future of the Indian industry. It is apprehended that more than ever, the manufacturing industry could be in dire need of quality human capital in order to face new challenges brought on by increasing globalization, thriving automation and an expanding skill gap for a sustainable development. To overcome the fear of such situation, various studies have been done and suggested actions have been implemented.

Ramesh Menon, CEO, at HyperCITY Retail (India), recalls a time when recruiting agencies brought raw hands from rural areas and threw them into unfamiliar jobs in alien environments. “Unable to cope with the city and job, they would vanish in a few days. In contrast, the ones who come now with certificates and experience are more confident and able to adapt better,” he says.

Very clearly, some hand-holding and support is required as the new recruits acclimatize themselves to an alien urban environment.

Recently, the Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) introduced a migration support framework to address homesickness and cultural alienation. This may be a good strategy. It has envisaged migration support centres in every State that will serve as “a home away from home” for the recruits. State governments are also supported with a fund of ₹ 10 lakh per centre per annum.

Apart from the high dropout rate, the Skilling India initiative has another impediment. It has not been able to create a buzz about itself. Nor has it excited the industry enough for its candidates to be picked up on a priority basis.

There are still questions being asked about the quality of some of the training being imparted. To make its mark, the programme needs to not only scale up but adhere to international benchmarks and build a better skilling reputation

Quality matters

It was Prime Minister Narendra Modi who drew up the broad contours of the Skill Development Mission last year. Envisaging India as the “world’s human resource capital” he said that the country should ready itself to replace the diminishing workforce in other countries. This means we must ready our human resources to cater to the global market and that necessarily entails a greater stress on the quality of training imparted.

In short: should we want our youth to compete with the best in the world then capacity building needs to be taken to a higher and more effective plane.

Towards that goal the Pradhan Mantri Kaushal Vikas Yojana, skill loan scheme and the national policy for skill development and entrepreneurship 2015 were launched. In all, 25 organizations including key ministries are currently involved in the daunting task of skilling youth for jobs. Their effort seems more visible in rural India dominated by youth with less educational qualifications and very few jobs going around. In urban slums, awareness about the programme is limited and the youth still seem to be looking around for skilling opportunities.

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As of now only 2% of Indian workforce is skilled in our country. National Employability Report 2014 concluded that out of the six lakh engineers that graduate annually, only 18.43% are employable for the software engineer-IT services role. These statistics show that there is disparity in supply and demand of labour due to the lack of technical and soft skills; India's youth have more theoretical knowledge than practical experience.

Today's major concern is that formal education does not provide suitable skills to make candidates employable. There is a huge requirement for skilled manpower. The key is to skill today's youth, possible through vocational education. Earning a livelihood through a skill will be a way of life.

When we compare percentage of formally skilled work force globally, India scores the least at 2% against Korea (96%), Japan (80%), Germany (75%), UK (68%) and China (40%). India has tremendous potential to improve skill-based learning to not only cater to domestic work force requirements but also to serve as an effective manpower hub globally.

The Economic Survey 2014-15 has highlighted that in order to bring expansion and structural transformation, India needs to utilise its foremost resource of unskilled labour by creating skilled and industry-ready manpower. While 'Make in India' is an important goal, the future course of Indian development depends on both 'Make in India' and 'Skill India' initiatives. With a substantial amount of foreign direct investments being invited to India, companies that open their factories and manufacturing units in India will need local skilled workforce which can be generated by duly educating the youth through vocational training.

Skilling the youth is the new buzzword in the government, and all the experts agree that it clearly needs a more skilled approach to implement what has been drawn up in a policy paper. It was roughly a year ago the government rejigged the UPA's Skill India policy to announce the National Skill Development Mission with a mandate to train 300 million Indians by 2022.

The good news is, the programme has been chugging along. But it requires a substantial amount of correction to actively push towards the goals. As such, we are to move far ahead to fulfil the gap for technical acquisition.

2. Convergence of Employees' Goals with the Company's Goals

There are many elements comprising an employee's satisfaction & motivation that ensure his full commitment to the company's goals. Compensation is one of the most important elements, which, in fact, tends to be the second largest business expense in manufacturing next to raw materials or purchased goods. Wages alone are not enough to lure in job hunters shopping around for the best salaries, bonuses, benefits and perks. HR teams must determine the most effective combination of these to attract top candidates while aligning all salary and incentive programs with performance markers and working within a tight budget. An employee expects to have fair share in the business/production process. Therefore, a fair compensation system is a must for every business organization.

(i) Benefits Administration

HR managers are required to take care of the difficult job of balancing the needs of employees with rising costs, especially healthcare, safety, education etc. Every aspect of benefit administration—plans, funding, outsourcing, etc. can make a significant impact on the company's bottom line.

An ideal compensation system will have positive impact on the efficiency and results produced by employees. It will encourage the employees to perform better and achieve the standards fixed. It will enhance the process of job evaluation. It will also help in setting up an ideal job evaluation and the set standards would be more realistic and achievable. Such a system should be well defined & uniform and shall apply to all the levels of the organization.

(ii)Training and Development

Long gone are the days of hiring people to just do a job. A manufacturing plant full of workers just "doing a job" cannot adequately compete in the global marketplace. Today employees take care of their jobs and the companies they work for, simultaneously & continuously striving to rise in the hierarchy further. This attitude has a direct impact on productivity as well as on profitability. Competent HR managers use every tool at their disposal—job training, mentoring, coaching, internships, career development, tuition reimbursement, outside consultants, motivational speakers, volunteering, etc. to engage and retain employees. Failing in such function puts the company at risk.

(iii) Performance Appraisal and Management

Skilled employee's performance measurement promotes employee engagement and, as a result, improves productivity and financial performance of the company. HR managers at manufacturing companies can design and implement employee appraisal programs internally or use outside consultants to ensure best practices.

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(iv) Employee and Labor Relations
HR's expertise in employee and labor relations is crucial in manufacturing. In unionized companies, labor relations and negotiations commonly affect company's financial performance and the bottom line. HR's ability to maintain positive and productive employee and labor relations cannot be underestimated.

(v) Legal Compliance Management
HR managers need to be experts in labor law and ensure that key players in the company are, at the very least, familiar with all regulations. Strict compliance management helps manufacturing companies avoid lawsuits and liabilities when disputes arise between employers and employees.

Changes in the manufacturing sector and the ensuing need for an employable workforce make the role of HR of a manufacturing company very challenging.

3. Retention and Attrition
No matter the industry, most HR departments face the very real challenge of retaining highly skilled workers within an organization. Given the already substantial shortages in its workforce and recruiting abilities, minimizing attrition is absolutely critical for manufacturing companies. Unfortunately, the industry can naturally be prone to high turnover rates as people are drawn to explore new and exciting opportunities.

The problem gets further aggravated when coupled with an often-insufficient investment in employee growth and development – from both a professional and personal perspective – as well as the common perception of stagnant pay packages, lackluster benefits, and a poor work environment, combating high turnover rates can be an uphill battle.

4. Low Employer-Employee Interaction
In order to leverage the power and insight provided by its workforce, the manufacturing industry must vastly improve its ability to create and foster engaging work environments.

Especially without proper employee feedback and communication tools, this poses a unique challenge to HR departments within the manufacturing sector due to the sheer size of the workforce as well as its tendency to spread its employee base throughout multiple locations and across great geographical distances. In many companies, leadership and senior management might be in a completely different city, state, or even country than the bulk of its workforce.

To minimize the impact of these differences in location and region, manufacturers would be best served developing healthy and constant contact with the trade unions that are so vital to communication between management and employees. Trade unions are uniquely capable of bridging the inherent gaps in that vital communication that are created strictly by distance, providing an effective channel for organizations to engage their employee base as long as the power of the unions are respected and always kept in consideration.

5. Global Competition
The responsibilities of HR in manufacturing become even more impactful and complex given the significant rise of global competition. Firms are now required to successfully compete with international firms to establish their brand images to be able to attract some exceptional talent and innovators.

Besides, HR must do everything possible to increase productivity and output levels in order to remain competitive in the global marketplace. This means that HR must create a congenial ambience which helps in maximizing the productivity, innovation, and commitment of each and every employee within the organization.

SOLUTIONS/STRATEGIES TO OVERCOME CHALLENGES

- **Workforce Shortage: Attract Millennials (young people 22-37 years old)**

Manufacturing enterprises must place emphasis on recruiting millennials as they are full of energy and possess valuable technology skills and knowledge but, unfortunately, they often favor other industries, e.g. IT industries etc. Millennials tend to stigmatize manufacturing as a slow, outdated career that doesn't align well with their personal interests.

However, enterprises can successfully address this perception by conveying an accurate image of modern manufacturing, an industry that's on the cutting edge of technology and pushing innovation barriers day by day. Using something like VR (Virtual Reality), for instance, at career fairs and conventions will allow millennials to immerse themselves in a modern manufacturing environment and provide them with a picture far more indicative of today's innovative manufacturing industry

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- **Recruitment Process**

Recruiting in the manufacturing sector must be agile and flexible to pivot when needed and quickly address workforce gaps that are impacting productivity throughout the organization. An interview process that seems to extend into perpetuity will cause candidates to quickly lose interest and become frustrated by a bureaucratic approach that pushes them towards other industries.

For reasons previously stated, the manufacturing sector cannot afford to lose talent based on a laborious and unnecessarily lengthy recruitment process. Technology can significantly improve recruiting efficiencies, especially when coupled with feedback surveys given to new hires that will help continually shape the recruiting and hiring process.

- **Retention and Attrition**

While attracting younger generations of employees, obviously crucial to the future of the industry, the current workforce that inhibit growth and productivity will have issues requiring proper solution. Today's workforce thrives when employers hear and heed their collective voice.

Feedback is a critical component of such a concept, improving every stage of the employee lifecycle by integrating the ideas and opinions of every employee into policies and procedures that help shape the organization and industry itself. When management makes changes that stem from employee feedback, the workforce can't help but feel more empowered and, thus, more satisfied with their job.

- **Training and Development**

HR needs to take care of two vital area, i.e. training and development. It is essential for HR to provide adequate training to all employees in order to keep them current with the latest developments within the industry and best prepare them for upcoming challenges.

Likewise, training and development are critical in developing the personal and professional growth that is crucial in creating greater levels of employee satisfaction and stimulation. Along with the much-needed changes that need to take place in recruiting procedures, employee retention, and worker engagement, efficient and effective training and development systems are at the top of the list of functions HR must concentrate on the above functions to stay competitive within the global marketplace.

- **Low Interest in Manufacturing Sector: Focus on Image Improvement**

The manufacturing industry has an image problem. Warranted or not, the sector doesn't appeal to tech-oriented talent like other industries and, thus, often struggles to attract digital-savvy candidates that are necessary to stimulate growth and push innovation. Improving an enterprise's culture establishes a foundation that will address that image problem with time and effort. Driven by feedback to better understand a workforce's opinions and needs, a more satisfying culture creates a better employee experience centered around culture initiatives informed by authentic, timely people data.

- **Global Competition**

Compensation alone isn't the motivating force for a potential employee. However, a comprehensive and competitive employment package that offers adequate compensation, appealing benefits, and non-monetary incentives can distinguish an organization from the competition in a candidate's eye. Design your benefits package according to an attractive work-life balance that offers flexible hours if reasonable and appropriate for your operations.

CONCLUSION & RECOMMENDATION

In the ever-changing world scenario, addressing challenges and issues related to recruitment and retention of human resources in manufacturing sector is extremely difficult. However, with the advent of new technologies/new processes/systems and new area of operations with a focus on the sustainable development, the present scenario also opens new vistas of opportunities for recruitment of relevant & skilled workforce. It is most imperative that the education system in the technical institutions must be aligned with the changes/technological advancements in the manufacturing sector so that the students coming out of these institutions become employable, i.e. they could be put on the jobs with minimal induction/orientation in the industry. Besides, we may adopt above solutions/strategies to overcome major challenges/issues faced in recruitment/ retention of Skilled manpower for manufacturing industries for Vision-2022 - a way forward towards sustainable development.

REFERENCES

1. Human Resource Management – Gaining a competitive advantage – R.A. Noe, J.R. Hollenbeck, B.Gerhart

ISSN 2394 - 7780

2. Sustainable Manufacturing – Trends and Research Challenges – M. Ganetti, M. Taish
3. International Journal of Human Resource management, 1993 – Taylor and Francis
4. Major Challenges to the Effective Management of Human Resources – Training and Development Activities – H. Abdullah
5. The Small Business of Developing People – International Small Business Journal – A. Kerr, M. McDougall
6. Management Challenges for 21st Century – P. Drucken
7. How to Overcome Common HR Challenges in Manufacturing – Steven Brand
8. Goodwin College eNews (https://www.goodwin.edu/enews/what-is-green-manufacturing/)
9. United States Department of Labour - Bureau of Labour Statistics (https://www.bls.gov/green/)

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GROWTH AND FUTURE OF SOCIAL MEDIA MARKETING IN INDIA

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ABSTRACT
Last 9 years – from 2010 till 2019 – has been an eventful period for social media. Several new networking sites became popular (such as WhatsApp, Google Plus, Instagram and so on), the user base grew by leaps and bounds, and Facebook bought over some of its competition. The growth of social media along with the rapid growth of smartphone usage has also made a great impact on various facets of our lives. At a top level, with the growing internet population in India, the importance of Digital Marketing will become even stronger for all kinds of organizations. It's evident, looking at the digital media spend projections by various sources. For e.g., according to a recent study by ASSOCHAM-KPMG, digital media spend in India has crossed 13,000 Crores by 2018. This will continue to fuel the demand for skilled professionals and create new jobs in the industry.

As in the past, we will continue to see the emergence of newer digital media channels, especially for Mobile. With the growing adoption of smartphones and increasing internet speeds, rich media such as videos will dominate in terms of consumption of content.

Index Terms: Future, Impact, Marketing, Social Media, Digital Media

INTRODUCTION
Social media- a product of the Internet that has grown even bigger than the Internet itself. And now the social networking sites have evolved from a niche to a mass online activity. The growth in the usage has been as such that the stats are now measured in usage per hour. With inflation in the usage of social media, tremendous development has been observed in the social media marketing sector. SMM- Social Media Marketing uses social media as a platform for creating tailored content to the context of each individual's social media page in order to drive user engagement and sharing. It has now become a low cost or no cost platform to connect with the target audience.

Since 2010, India has observed a surge in the social media industry and so has developed social media marketing. Sites like Facebook, Twitter, and LinkedIn are influencing the way users- establish, maintain and grow a range of social relationships, from close friendships to casual acquaintances. On the basis of this and additional data provided the marketeers develop product related contents that connect with the desired audience and henceforth, help their products to go viral within the community. Social Media Marketing is said to rule the roost as far as India is concerned. But then, how will social media marketing evolve in the future?

Well, to give an idea, according to research carried out, it has been estimated that the number of users of the social media platform in India will be 258.27 million. It is a steep ascent from roughly 168 million users in 2016!

India is experiencing a rise in the number of mobile users; in any case, it contains only 16% of the country's average population having access to the internet. And the power of this 16% population has forced the marketers to allocate 7.6% of their budgets to social media. The number is even expected to rise by 18.8% in the next five years.

WHY IS SOCIAL MEDIA MARKETING A MUST HAVE?
- **Internet all around**

There has been a tremendous increase in internet utilization by the global populace from 1993 till 2015. According to the recent stats, 40% of the populace is utilizing the web. When taken globally, there are 3.42 billion active internet users.

If compared with the year 1995, when hardly 2% of the total population was using the internet, this growth is a convincing statement that social media marketing will have a bright scope in the near future.

- **Smartphones in every hand**

Being trendy and convenient to use, mobiles have become the first choice of users. Low price and easy access to the internet has definitely boosted the mobile industry and according to a report by 2019, the number of mobile users will reach a whopping 5.07 billion!

Furthermore, the vast majority of the mobile phones now are smartphones that enable users to get associated with their business anyplace and whenever they wish to.

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- **Targeting an audience**

Conventional marketing requires the implementation of marketing strategies and then a long wait for the customers' response. Hence making it difficult to focus on the particular target audience with demographics and details. Are you in agreement with this? Certainly, yes. The marketing of any product went for mass marketing before.

Be that as it may, today with the invention of digital marketing, there are such a significant number of customized strategies to target the desired crowd. with the introduction of social media marketing now one can implement their marketing strategies,and can actively follow up.

- **Low investment and high ROI**

Social media marketing is a stage which gives high ROI with low investment.

This is the reason numerous small and medium scale organizations depend on social media for their marketing strategies; thus offering ample career opportunities.

GOVERNMENT'S "DIGITAL INDIA" INITIATIVE BACKS UP

The Digital India initiative has brought a major change in the use of social media for business and marketing. In order to transform the entire ecosystem of public services through the use of information technology, the Government of India has launched the **Digital India** program with the vision to transform India into a digitally empowered society and knowledge economy.

Now, the opportunities are not only available in metro cities but also in small towns. The government has also come up with the application for Employment programs. Everything is going digital these days.

The government's e-marketplace is also seeing a considerable rise in its e-marketplace analytical graphs. All the registrations have gone up with minor fluctuations. The fluctuations happen at every place. People in India are getting to technology slowly and it is going to take some time to get acquainted with it.

Indian Prime Minister announced that by 2020 on the digital space there would be more than 20 Lakhs available to students. Moreover, during the launch of Digital India week many industries joined hands with the government to make e-India a reality. This will not only boost the Indian economy in many ways but will also help in the growth of every small and big business through social media marketing.

SOCIAL MEDIA MARKETING PRESENT AND FUTURE

Social media is everywhere we go, it's everything we see around us. It symbolizes where we are as a society: Interconnected and it is here to stay. Social media is a marketer' dream. It allows your audience to watch you as a brand to develop, grow, and evolve. Whether an entrepreneur or corporation, social media provides multiple low cost or no cost platforms to connect with your target audience. They follow your companies, your brands, your experiences, through all times. Your audience get to understand you and build trusting relationships with you.

The most recent facts on social media indicate that not only is social media the latest, greatest phenomenon: but, it is also predicted to remain a part of our lives for decades to come. Some facts about social media are:

1.	Currently, marketers allocate 7.6 percent of their budgets to social media. CMOs expect that number to reach 18.8 percent in the next five years.
2.	Marketers spend an average of 4-6 hours a week on social media
3.	Seventy-nine percent of marketers have integrated social media into their traditional marketing activities.
4.	Social media is the top driver for relationship building
5.	Thirty-seven percent of brands would like to use social media engagement to create customer tailored marketing campaigns
6.	Thirty-three percent of consumers cite social networks as a way they discover new brands, products or services.
7.	Fifty-one percent of the top 20 percent of B2B marketers are generating leads through social media use social tools, compared to the industry average of 39 percent.

These days, business decision-makers are becoming more savvy about how best to see into the future and use their visions to adjust their actions in to now. They're looking through the lens of social media monitoring tools,

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analyzing behavior online to predict desires, fortune, fate and destiny. Here, are four ways that social media data to make better business decisions.

DESIRES: WHAT YOUR CONSUMER WANTS?

Social media monitoring tools are becoming the norm in companies that want to stay ahead of the competition and anticipate customer demands. With large number of people now documenting and sharing their lives openly on social media, it is becoming easier to identify trends, and with a good social listening tool, brands can quickly access a vast amount of specific online mentions about a certain topic, analyse these mentions and then use them to make predictions. However, given the immediacy of social media, businesses must react fast to capitalize on the insight they gain from social media analytics, in order to stay ahead of the demand and meet the desires of their consumers before their competitors.

DESTINY: WHAT YOUR CONSUMER WILL DO NEXT?

Business intelligence is not just based on what people say, but also what they do. Translating social intelligence into actionable information for your brand involves finding out what your consumer will buy, where they will buy it and how you can target the consumer to get yourself top of mind when they make this purchase. This is where some social media monitoring tools fall short, as brands need to know about the search behavior of their consumer on sites like Google in order to get a true idea of the customer's next move. This means analyzing what customers are searching for most in relation to their brand and seeing the search results they are presented with, so that they can ensure their online reputation and SEO is good enough to keep their brand or product top of mind. Furthermore, when combined with customer mentions, search engine behavior enable brands to target their marketing content more effectively, resulting in improved ROI, increased sales and greater customer retention.

FORTUNE: THE SUCCESS OF A PRODUCT LAUNCH, MARKETING CAMPAIGN OR EVENT

Market forecasts are already an integral part of the business process, as brands constantly strive to stay one step ahead and keep driving their profitability. Social media analytics that focus on sentiment as well as the potential audience of mentions are in fact extremely useful when it comes to anticipating the success and profitability of products, marketing campaigns and events. In the build up to a launch, the higher the number of positive mention sand the larger the audience of said mentions, the more likely a product is to be popular. In the same way, brands can foresee if a product is headed for failure if an overwhelmingly negative sentiment relating to the product is being seen by a visit audience. Brands can react and correct the business decisions already in play in order to improve positivity, therefore, ensuring fortune and success.

FATE: PREDICT A DOWNFALL

These days, a brand's fate is dictated by what the majority of people are saying about it online. With social listening, brands can set alerts if the number of negative about them passes a certain level, in order to be able to react immediately. Social listening tools allow brands to cluster online, meaning the most impactful criticisms can be quickly located and dealt with immensely Social clairvoyance means brands are predicting downfalls before happen, and unsealing their fate with fully targeted responses.

SOCIAL MEDIA FUTURE

The importance of social media today be no means can be disputed. But, that importance is no longer simply because it is new, rather, it is because social media offers something truly useful to the world. This move from novelty to purpose will transport social media to a whole new place in society and in marketing campaigns over the next few years.

We have already seen social media change in many ways. The move away from focusing on "going viral" to creating meaningful engagement (even if with a smaller audience), the shift away from a seemingly sole reliance on Facebook as the cornerstone of social media marketing, the realization that "just being there" isn't enough, and the awareness that content is more than just words have all set the stage for what is to come next.

Today's consumers see social media in a new light. While it started with young generations with personal updates, we've seen new and exciting applications like a way to add dimensions of engagement with television or radio to multiple business applications. Consumers are using social media channels to amplify their voices to their own networks.

MOBILE AND ENTERTAINMENT WILL MORPH

It is a known fact that mobile is set to overtake desktop/laptop as the primary means of accessing the internet. We've moved beyond smartphones. But it’s no stopping here. Wearable technology, like Google Glass, changes

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the way we think about constant connectivity. In fact, an announcement has been made on broader distribution and sales channels of Google Glass, and it will not be long before major eyewear brands license the technology.

Time for companies to make sure all of your content, all of your sites, and certainly all of your social media platforms are ready to take advantage of this shift. For social media, this means not just posting text heavy content, for example, but utilizing video, tappable post elements, and other tools to increase the richness of the customer experience and interaction with you. In fact, you should look beyond text-focused social media platforms and consider adding some that are more visually centered to the mix. Your complete strategy should engage users in the mobile experience and encourage them to generate user content (pictures, videos, and reviews) and to share it as discussed in chapter-5.

MARKETING PROGRAMS WILL REINTEGRATE

Smart marketers have long worked to integrate marketing efforts across media vehicles and channels. Through the early years of social media, its inclusion as a marketing tool was most often an afterthought. Social media (and that is far more than just Facebook) will be a critical element to content-based marketing strategies and programs as discussed in chapter 4.

Brands will focus on mobile interactivity because that is where consumers spend more of their time. The key change seen coming is changing expectations of what consumers wants from social media. Social media needs to serve a broader purpose than just networking. Social is a layer of campaign versus a separate channel. "Mark-up" data around user generated content will become important for both platforms and brands that want to make this content more visible.

Instead of looking at social media as simply a way to communicate and sell to your customers its time to see how it connects to the customers. Though context of a layer on top of all your marketing efforts (online, offline, in-store) makes social marketing central, not separate to your brand communication. Stop promoting t

o them and start relating with them leveraging your marketing communications efforts all the while. What better way to do this than via social media?

CONTENT MARKETING WILL GROW – WITH HELP

It is no secret today that content is the currency of visibility. It is through relevant. useful, and informative content that companies can reach customers and even increase SEO results. However, the challenge for many businesses – especially small businesses – is bandwidth. The ability to easily and efficiently create and publish content has traditionally been a big stumbling block to content marketing.

Technology can help businesses facing this challenge in the form of modern content management systems. Yesterday's CMS tools were large, cumbersome, and expensive – and only for the big guys. Today's (and tomorrow's) CMS tools, on the other hand, offer a variety of sleeker, simpler, and easier-to-use options, marketing purposes.

Even better, new technologies will emerge that will help businesses automate content creation tasks by empowering and equipping employees and other customer facing entities to easily create/acquire, format and publish content actors platforms as discussed in chapter 5.

THE QUALITY OF BUSINESS-TO-CONSUMER COMMUNICATIONS WILL IMPROVE

Marketing strategies will evolve from a broadcast model (sharing internal content) to a more conversational one. With a new focus on interaction, more companies and tools will be built to use conversations to engage customers and users. The social universe would become noisier, more viral and it's harder to get your voice seen.

Trends are likely to be

- Who is real?
- Who is making interesting content?
- Who is paying attention to world events, city events, and social events and talking about them and connecting them to your brand?

Social media as a primary communication method is likely to emerge including how people ask questions and find out about new products and services.

With over 50% of all Internet browsing now happening on a mobile device, the next wave in social media marketing will be harnessing the power of location-based technologies. The natural evolution is technology that

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embeds a user's location in real-time. And when brands and social media apps understand that they must create value in order to get users to share their location, they sky is the limit. Understanding customers' location patterns will help companies better predict the behavior of their users, thus a chance to market to them in the right place at the right time.

THE POWER OF YOUR NETWORK WILL DELIVER

Brands that win in the future will be able to "power up" their network of employees, franchisers, or dealers to increase visibility and sales. We will move from the "wisdom of the crowd" to "the power of the crowd," As the internet becomes a crowded, content-filled place, it will be increasingly hard for businesses to be visible on social media. Coordinated strategies, particularly national to local marketing, will provide an advantage to businesses that can mobilize their networks first.

As you power up your network, brands will have to make important decisions on where they will send to privacy and how they want to use it as a marketing differentiator.

These changes are not really radical so much as they are a logical evolution of social media today. They are happening in part because fads come and go but also largely social media has finally found its place in the smart marketer's tool belt.

CONCLUSION

Social Media has a great impact on the marketing strategies in both benefits and challenges. The advantages are massive, especially for marketers for their next generation campaigns.

Organizations are interested in exchanging and spreading information, tradingproducts or services, staying close to current and potential customers, acquiring abetter understanding of their customers and other benefits generated by social networking sites.

The increase of communication, the flow of information among customers together with theincreased availability of assorted communication channels is creating a new level ofcomplexity in the design and implementation of new marketing strategies. SMMdoes not replace the traditional marketing tools but can be used as a complement toexisting traditional promotional tools.

REFERENCES

[1] Kaul Asha (2017). Corporate Communication through Social Media. Sage Publication

[2] PalkarApoorva, (2015), Internet Age Marketing With Social Media. Himalya Publishing House.

[3] Kamat Nitin (2017), Digital Marketing, Himalya Publishing.

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STUDY OF THIRD VIRIAL CO- EFFICIENT FOR HARD CONVEX BODY

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ABSTRACT
The simple geometric properties of convex bodies made it possible for one to perform analytical calculations of transport co-efficients and contact radial distribution function. The Isotropic-symmetric and orientational co-relations for hard convex bodies (HCB) model, exhibit simpler behavior in the surface-to-surface than in the more customary centre-to-center co-ordinate representation. The radial wave equation of a HCB's (hard convex bodies) model coordinate system has been described and expressed for the pair intermolecular potential specified in terms of the support function h(x) for the calculation of the phase shifts.

The theoretical results for Third Virial co- efficient of helium for hard convex body have been compared with the available experimental results for hard sphere. Thus, the resulting third virial co-efficiants agree well with the available experimental data.

Keywords: Co-ordinate System, hard convex fluid, virial co-efficiant and Intermolecular potential

INTRODUCTION

The third virial co-efficiant plays an important role in defining the properties of any kind of fluid model. It is the inter molecular potential field which leads to theoretical values of the third virial co-efficiant. The third virial co-efficiant for hard convex body has been expressed by defining the intermolecular potential in terms of the support function h(x) which defines the analytical properties of this model.

The intermolecular potential has been generalized on the supposition that it is a function of the shortest distance between the surface- to- surface of the molecules retaining the Lennard-Jones potential characteristics. The expression for intermolecular pair potential for HCB model is

$$\varphi(K) = 4E\left[\left(\frac{h(X)}{k}\right)^{12} - \left(\frac{h(X)}{k}\right)^{6}\right]$$

This expression has been used for calculating the third virial co-efficiants for HCB model for helium.

These theoretical results have been compared with the Lennard- Jones potential for hard sphere model. The mathematical simplicity of our model makes it especially amenable to highly accurate numerical calculation.

Analysis of third virial co-efficiant for hard convex body

The equation of state of gases may be expressed in the form

$Pv=kT(1+B/V+C/V^2+\ldots\ldots)$

(p=pressure, v=volume per molecule, k=Boltzmann constant, T=absolute temperature), where the co-efficiants B, C … are functions of the temperature, usually are called second, third … virial coefficiants.

The potential energy of the whole system can be expressed as the total sum of terms, $\phi(r_{ij})$, each depending only on the distance r_{ij} between two molecules i and j. By means of the function

$$f(r) = \exp\left[-\frac{\phi(r)}{kT}\right] - 1$$

The expressions are

$$B(T) = -\frac{1}{2}\int f(r_{12})dr_1 = -2\pi\int_0^\infty f(r){r_{12}}^2 dr_{12}$$

$$C(T) = -\frac{1}{3}\iint f(r_{12})\, f(r_{13})\, f(r_{23})dr_1 dr_2 \ldots\ldots\ldots\ldots(1)$$

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With $dr_i = dx_i dy_i dz_i$

unfortunately, the second virial co-efficiant is not sensitive to shape of φ(r).The third virial co-efficiant is sensitive.It is therefore desirable to investigate also the third virial co-efficiant,which is in performed in this paper by the use of HCB model through Lennard-Jones potential.

For getting hard convex body Models expression in terms of surface

-to-surface co-ordinate representation along the unit vector ê and

The relative position of the atom is specified by the shortest surface-

To-surface distance K measured along the common surface normal

$\hat{k}$

The support function h(x) is defined as the projection.

$$h(x) = \hat{k}.\hat{\rho} - -(2)$$

Where $\hat{\rho}$ is the vector extending from the centre to the point on the surface to the minimum separation

$$\vec{\rho} = \hat{k}h(x) + \left(1 - \hat{k}\hat{k}\right).\hat{e}h'(X) - -(3)$$

$$X = \hat{K}.\hat{e} = \cos\theta - -(4)$$

Where x defines the orientation of HCB'S and the unit vectors $\hat{e}$ is the director axis.

The support function is

$$h(X) = b\left[1 + \in X^2\right]^{1/2} \qquad \text{Where } \in = \left(\frac{a}{b}\right)^2 - 1$$

And $$h'(X) = \frac{dh(X)}{dX} = \frac{b^2 \in X}{h(X)}$$

The center-to-center distance $\vec{r}(k)$ is

$$\vec{r}(\hat{k}) = \vec{k} + \rho_1\left(\hat{k}\right) - \rho_2\left(-\hat{k}\right)$$

To avoid the over lapping situation the expression for has been

$\vec{r}(\hat{k})$ Transformed to

$$\vec{r}(\hat{k}) = \hat{k}\left[k + h(X)\right]$$

With $h(x) = h(x_1) + h(x_2)$

The resulting expression for C(T) will be found to be more convenient for the numerical calculation in term of derivatives of the phase shifts.

The relative kinetic energy of a system of reduced mass μ

$$E = \frac{P^2}{2\mu} - \frac{\eta K^2}{2\mu}$$

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The difference in the densities of states of the interacting and non-interacting system is also known as the phase shifts and hence it may be expressed from the solution of the radial wave equation.

The third virial co-efficient(1)can be expanded into an infinite series. The integration variables of (1) are transformed as follows:

$$\iint dr_1 dr_2 = 3\iint_{r_{12}\geq r_{13}, r_{12}\geq r_{23}} dr_1 dr_2 = 3\times 4\pi \int_0^{\infty} R^5 dR \int_0^{\frac{\sqrt{3}}{2}} 2\pi y dy \int_{1-\sqrt{1-y^2}}^{\sqrt{1-y^2}} dr$$

$$R = r_{12}, (x^2+y^2)R^2 = r_{13}^2, \{(1-x)^2+y^2\}R^2 = r_{23}^2$$

Namely

$$\frac{1}{3}\iint dr_1 dr_2 = 4\pi^2 \int_0^{\infty} R^5 dR \int_0^{\frac{3}{4}} d(y)^2 \int_{1-\sqrt{1-y^2}}^{\sqrt{1-y^2}} dx$$

First we consider the integration with regard to R. By integrating by parts we have

$$-\int_0^{\infty} f(r_{12}) f(r_{13}) f(r_{23}) R^5 dr = \frac{1}{6} \int_0^{\infty} \frac{\partial f(r_{12}) f(r_{13}) f(r_{23})}{\partial R} R^5 dR \ldots\ldots(3)$$

Now the product of 3 f^s is transformed into a sum:

$$f(r_{12}) f(r_{13}) f(r_{23}) = f^{(0)} - (f^{(1)} + f^{(2)} + f^{(3)}) + (f(r_{12}) + f(r_{13}) + f(r_{23}))$$

$$f^{(0)} = \exp\left[-\frac{\phi(r_{12}) + \phi(r_{13}) + \phi(r_{23})}{kT}\right] - 1$$

$$f^{(1)} = \exp\left[-\frac{\phi(r_{12}) + \phi(r_{13})}{kT}\right] - 1$$

$$f^{(2)} = \exp\left[-\frac{\phi(r_{12}) + \phi(r_{23})}{kT}\right] - 1$$

$$f^{(3)} = \exp\left[-\frac{\phi(r_{13}) + \phi(r_{23})}{kT}\right] - 1$$

$$C(T) = -4\pi^2 N^2 \int_0^{\frac{3}{4}} \int_{1-\sqrt{1-Y^2}}^{\sqrt{1-Y^2}} \left[\int_0^{\infty} f_{12} f_{13} f_{23} r_{12}{}^5 dr_{12}\right] dx d(y^2)$$

$$C(T) = -4\pi^2 N^2 \int_0^{\frac{3}{4}} \int_{1-\sqrt{1-Y^2}}^{\sqrt{1-Y^2}} \left[\int_0^{\infty} f(0) - \left(f^{(1)} + f^{(2)} + f^{(3)}\right) + \left(f(r_{12}) + f(r_{13}) + f(r_{23})\right) r_{12}{}^5 dr_{12}\right] dx d(y^2)$$

The final expression for the third virial co-efficient In terms of HCB is

$$C(T) = -8\pi^2 N^2 \int_0^{\frac{3}{4}} \int_{1-\sqrt{1-Y^2}}^{1-Y^2} \left[\int_0^{\infty} \begin{bmatrix} e^{\left[-\frac{\phi(r_{12})+\phi(r_{13})+\iota(r_{23})}{kT}\right]} - 1 - \left[e^{\left[-\frac{\phi(r_{12})+\phi(r_{13}))}{kT}\right]} - 1 + e^{\left[-\frac{\phi(r_{12})+\phi(r_{23})}{kT}\right]} - 1 + e^{\left[-\frac{\phi(r_{13})+\phi(r_{23})}{kT}\right]} - 1\right] + \\ \left[e^{\left[-\frac{\phi(r_{12})}{kT}\right]} - 1 + e^{\left[-\frac{\phi(r_{13})}{kT}\right]} - 1 + e^{\left[-\frac{\phi(r_{23})}{kT}\right]} - 1\right][k+h(x)]^3 S(x,k) \end{bmatrix}\right] dk d\theta d\phi \ldots(4)$$

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RESULT AND DISCUSSION

The phase shift needed for the calculation of these properties of HCB fluid is the resolution of the radial wave equation described by the HCB co-ordinate system. This has already been done . The potential for HCB in terms of support function h(x)

$$\varphi(K) = 4E\left[\left(\frac{h(X)}{k}\right)^{12} - \left(\frac{h(X)}{k}\right)^{6}\right]$$ has been used.

The third virial co-efficient of HCB model have been calculated through intermolecular pair potential energy function, and a correlation equation for C*(T*)is presented.

The final expression for the third virial co-efficient(4) reduced temperature range $0.7 \leq T^* \leq 5$ have been used[Table1] and[Table2] model and plotted against temperature in [fig-1] and[fig-2].The good agreement between the theoretical and experimental results indicates that the potential model used, in this work, is very accurate. In fact it is also severe test of the potential model, since the third virial coefficient is very sensitive to the potential energy function. This shows good agreement between theory and experimental results

Table-1: Third virial co-efficiant for HCB Model

	T^*	C(T*)
1	0.7	-0.6756
2	0.8	-0.5453
3	0.9	-0.4543
4	1.0	0.3396
5	1.1	0.47562
6	1.2	0.65245
7	1.3	0.85325
8	1.4	0.54631
9	1.5	0.5233
10	1.6	0.51303
11	1.7	0.48420
13	1.8	0.46245
14	1.9	0.45563
15	2.0	0.4210
16	2.1	0.41255
17	2.2	0.40345
18	2.3	0.37742
19	2.4	0.35432
20	2.5	0.3217
21	2.6	0.3538
22	2.7	0.36737
23	2.8	0.35243
24	2.9	0.34945
25	3.0	0.3439
26	3.1	0.34842
27	3.2	0.3986
28	3.3	0.3879
29	3.4	0.39874
30	3.5	0.35643
31	3.6	0.37654
32	3.7	0.38765
30	3.8	0.35664
34	3.9	0.37654

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35	4.0	0.39876
36	4.1	0.33245
37	4.2	0.3654
38	4.3	0.3654
39	4..4	0.3765
40	4.5	0.33000
41	4.6	0.37654
42	4.7	0.38765
43	4.8	0.39876
44	4.9	0.37654
45	5.0	0.36543

Table-2: Third virial co-efficiant for HS Model

	T^*	C(T*)
1	0.7	-3.37664
2	0.8	-0.84953
3	0.9	-0.0765
4	1.0	0.42966
5	1.1	0.55762
6	1.2	0.5924
7	1.3	0.58815
8	1.4	0.56831
9	1.5	0.54339
10	1.6	0.51803
11	1.7	0.49425
13	1.8	0.47277
14	1.9	0.45376
15	2.0	0.4371
16	2.1	0.4226
17	2.2	0.40999
18	2.3	0.399
19	2.4	0.38943
20	2.5	0.38108
21	2.6	0.37378
22	2.7	0.36737
23	2.8	0.36173
24	2.9	0.35675
25	3.0	0.35234
26	3.1	0.34842
27	3.2	0.34491
28	3.3	0.34177
29	3.4	0.33894
30	3.5	0.33638
31	3.6	0.33407
32	3.7	0.33196
30	3.8	0.33002
34	3.9	0.32825
35	4.0	0.32662
36	4.1	0.3251
37	4.2	0.32369
38	4.3	0.32238
39	4..4	0.32115
40	4.5	0.32
41	4.6	0.31891
42	4.7	0.31788

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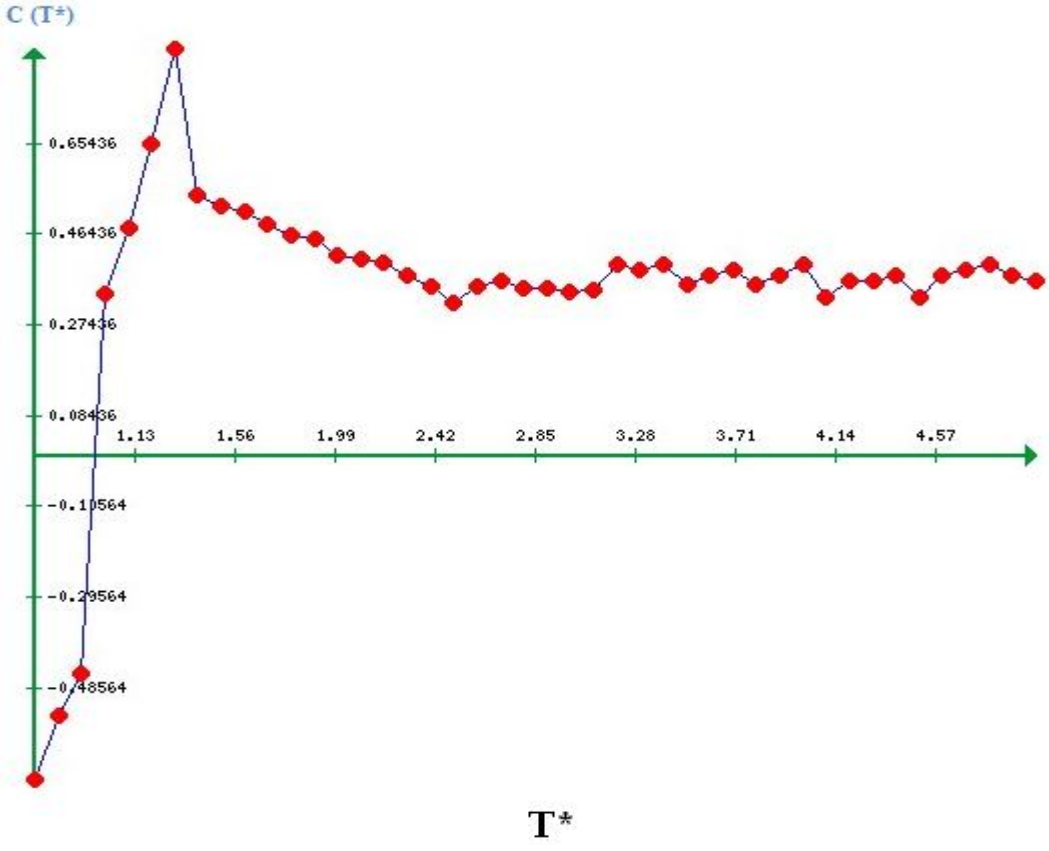
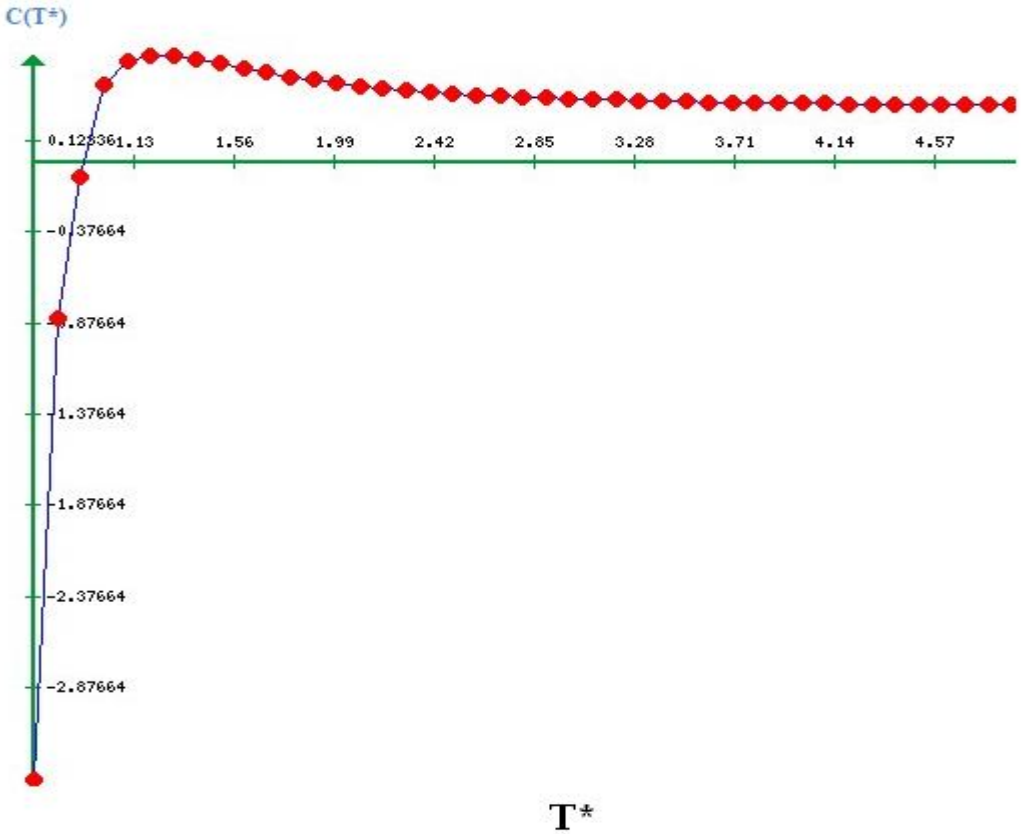
43	4.8	0.3169
44	4.9	0.3169
45	5.0	0.31508

Graph-1: Third virial co-efficiant for HCB Model



Graph-2: Third virial co-efficiant for HS Model



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CONCLUSION

The value of quantum third virial co-efficient computed for HCB fitted well with the experimental results. The expression for HCB model has been used for the computed results, which give more accurate results. So we may safely conclude that the calculation of all other parameters may be done very safely for HCB model

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REFERENCES

[1] SINHA N.K., k. Mamta and Priyadarshini Sangeeta (2016) Biospectra.vol.(2), PP 79-84

[2] SINHA N.K., GIRI V.S. and CHOUDHARY B.K. (2013) World Research Journal of Applied Physics., PP 45-48.

[3] SINHA N.K.,and CHOUDHARY B.K. (2012) World Research Journal of Applied Physics., PP 41-44.

[4] GIRI V.S. AND SINHA N.K. (2005) INDIAN J. PHYS., 79, 195.

[5] JOSEPH O., CHARLES H., CURSTISSAND F. AND BIRD BYRON R. (1966) MOLECULAR THEORY OF GASES AND LIQUIDS, JOHN WILEY & SONS INC, NEW YORK CHAPMAN & HALL LIMITED, LONDON.

[6] LEE T.D. AND YANG C.N. (1959) PHYS. REV., 113, 1165.

[7] KUMAR B., JAMES C. AND EVANS G.T. (1988) J. CHEM. PHYS., 8 11.

[8] SHE R.S.C. AND EVANS G.T. (1986) J. CHEM. PHYS., 85, 1513.

[9] KIHARA T. ADV. (1963) CHEM. PHYS., 5, 147.

[10] TALBOT J. AND KIRELSON D., ALLEN M.P., EVANS G.T. AND FRENKEL (1990) J. CHEM. PHYS., 92, 20.

[11] KILPATRICK J.E., KELLER W.E. AND HAMMEL E.F. (1955) PHY. REV., 97, 1.

[12] DE BOER J. (1940) CONTRIBUTION TO THE THEORY OF COMPRESSED GASES, DOCTORAL DISSERTATION, UNIVERSITY OF AMSTERDAM.

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BIOCHEMICAL CHARACTERISATION OF *TRITICUM DURUM* AND *T. DICOCCUM* GERMPLASM FOR QUALITY TRAITS

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ABSTRACT
Triticum durum and T. dicoccum is one of the most important cereal crop in the world .It is cultivated in semi-arid regions of the world such as North Africa and Mediterranean Europe. Its Kernel size, hardiness and golden amber colour make it most suitable for manufacturing a unique and diverse range of food products. The trend worldwide is to increase the consumption of T. durum wheat product. Pasta, bread and all other foods from grains are a major group of healthy, balanced and nutritious foods. The grain quality of wheat are determined mainly by various parameters such as moisture content, hectolitre weight, gluten content, sedimentation value, falling number, protein content. Breeders, pathologists, cereal chemists and molecular geneticists should continue to work as a team to insure high yielding, good quality T. durum wheat for the international market.

Keywords: Triticum durum. T. dicoccum, Germ plasm, Protein Content, Gluten content

Triticum. aestivum L. also known as bread wheat is one of the staple cereals of human kind and is usually eaten in the form of baked products. *T. durum* is used to produce semolina which is the main raw material for pasta making. Some of the ancient wheat(s) such as *T. dicoccum* have a unique composition including secondary components such as carotenoids and starch which may play a role as functional food ingredients. These are grown in very specific area and used locally. Grain quality is essentially a relative term and generally defined in context of the purpose. However, what constitutes desirable quality depends on the intended use of the grain. For example, higher protein concentration, alkaline water retention capacity (AWRC), and dough strength are desired for breads but not for cakes and cookies. Wheat grains are important sources for carbohydrates, proteins, amino acids, lipids and minerals (Shewry, 2009), which determine the nutritional dietary value and important end-use quality characteristics. The processing and end-use characteristics of the grain, collectively known as quality traits, are under genetic and environmental control. Among wheat quality tests, Test weight also known as Hectolitre weight is the most widely used and simplest criteria of wheat and rough index of flour yield. Test weight is a measure of soundness of wheat, free of damage.

There is a positive correlation between test weight and flour yield (Dexter et al., 1987). 1000 kernel weight is function of kernel size, shape, dryness, purity and density and also is an index of potential milling yield (Matsuo and Dexter, 1980). The protein composition of the wheat grain is central to the assessment of quality. Wheat seed proteins can be classified as gliadin and glutenins (storage or gluten proteins) as well as albumins and globulins (metabolic proteins). While glutenins are responsible for the elastic properties of the dough, gliadin and gliadin types have specific water-retaining capacities important for dough viscosity (Mac Ritchie, 1999). The Zeleny and sodium Dodecyl sulphate (SDS)-sedimentation tests exploit the positive correlation between protein quality (expressed as quantity and composition of water-insoluble glutenins) and the settling volume of a shaken whole-meal suspension in a solution of lactic acid and SDS, respectively. Falling number is associated with pre-harvest sprouting in the field under prolonged periods of moisture during harvest. Under these conditions, an enzyme called alpha amylase becomes active and uses starch as a substrate to convert it to sugars also known as sprouting damage. These tests provide small-sample predictors of loaf volume, which may be measured directly along with other parameters in later breeding generations when larger grain samples are available for a baking test. The present studies quality traits of *T. turgidum sp. durum* and *T. turgidum sp. dicoccum* have been analyzed.

MATERIALS AND METHODS

Germplasm material
The wheat accessions used in the study were received from Germplasm Evaluation Division, NBPGR, New Delhi.

Moisture content
Moisture content is loss in weight of sample when heated under specific conditions to produce constant weight. It was determined by automatically calibrated instrument known as moisture meter from INDOSAW, Cat No. S2000 and Sr. No. 1/13/1216.

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Test weight or Hectolitre weight
Grain weight per unit volume describes the test weight which is also known as hectolitre weight. It is a function of the shape, uniformity of kernel size and moisture level of the wheat. It was determined with hectorlitre weight instrument.

Protein content
Near Infrared Transmittance (NIT) instrument was used to analyze the wheat samples for protein content. The measurements are based on the fact that the main constituents in the grain such as protein, moisture, fat and others absorb electromagnetic radiation in the near infrared region of the spectrum.

Sedimentation value
The sedimentation value determines the strength of dough by recording the swelling of the flour in a lactic acid solution which depends on the protein content and quality. The sedimentation value can be correlated with the gluten strength. More the strength of the gluten more is the swelling and so more is the SDS sedimentation value.

Protein
The concentration of total proteins is an important economic factor as it is a crucial determinant of bread making quality. In wheat it ranged from 8-29 percent. Wheat seed proteins can be classified as gliadin and glutenins (storage or gluten proteins) as well as albumins and globulins (metabolic proteins). While glutenins are responsible for the elastic properties of the dough, gliadin and gliadin types have specific water-retaining capacities important for dough viscosity (Mac Ritchie, 1999).

Protein content varies from 8-29 percent depending on variety and class of wheat. The quantity and quality of endosperm proteins are the major factors responsible for baking and nutritional value of wheat (Wrigley and Bietz, 1988). Durum protein content is important for both nutritional and functional reasons. There is a general agreement that protein is a fundamental durum wheat quality factor influencing the mixing, processing and cooking characteristics (Autran et al., 1986). As a result improving protein content in durum varieties has remained a primary goal of durum wheat breeders. Durum protein content ranges from 6% to 20%, depending on variety, environmental conditions and cultural practices during growth (CWC, 2005). For quality pasta products, the protein level should be between 12% and 16 % (at 14% mb). Protein content less than 11% will result in poor quality pasta, while protein levels greater than 16% may be related to lower test weight. The modern pasta manufacturing requires durum semolina to contain over 14% db protein, which corresponds to 15% db grain protein content (Landi and Guarneri, 1992).

Carbohydrates
Starch is the major C pool in grains. As wheat grains contain 60–70% starch and provide excellent energy rich foods for humans. Many observations reveal that grain protein concentration responds directly to the variation in assimilate supply from remobilization while starch is not very sensitive to alterations in supply of metabolites within normally observed limits (Jenner et al., 1991). Although non-starch polysaccharides constitute less than 3% of the total flour mass, they are important in the bread making process as a contributor to the distribution of water in dough as well as a supplier for sugar required by yeast. Sugars are also reported to be important for taste and quality of grains. In addition, accumulation of sugars may be correlated with osmotic stress resistance (Loescher and Everard, 2000).

Lipids
Also lipids, representing minor components with 1–1.5% of the grain mass, affect baking performance. Wheat physical condition is the most important factor determining wheat milling potential and end-product quality (Dexter and Edwards, 1998). There are fundamental differences between milling common wheat and durum wheat. While common wheat is milled to produce flour, the main objective of milling durum wheat is to produce semolina and minimize the production of durum flour. The importance of the various tests used in the present study is described below:

Moisture content
Determining moisture content is an essential first step in analyzing crop grains or flour quality since this data is used for other tests. Millers adjust the moisture to a standard level before milling. Moisture content of 14 or 12 per cent is commonly used as a conversion factor for other tests in which the results are affected by moisture content

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Test weight

Test weight is the most widely used and simplest criteria of wheat and rough index of flour/semolina yield. Test weight is a measure of soundness of wheat, free of damage. There is a positive correlation between test weight and flour/semolina yield (Dexter et al., 1987). 1000 kernel weight is function of kernel size, shape, dryness, purity and density and also is an index of potential milling yield (Matsuo and Dexter, 1980). The acceptable test weight and 1000 kernel weight for durum wheat is 78 kg/hl and 30-35 g db, respectively.

Gluten content

The protein composition of the wheat grain is central to the assessment of quality. Wheat is unique among cereals in containing large quantities of gluten, a complex of proteins giving dough the capacity of retaining the CO2 bubbles that allow leavened bread to rise. Gluten may be chemically partitioned into gliadin, important in dough viscosity and extensibility, and glutenins, considered to affect dough strength and elasticity and thus loaf volume. While studies have suggested the involvement of most wheat chromosomes in control of protein or processing quality. The gliadin/glutenin ratio is widely used as an indicator for dough strength. It ranges from 1.5 to 3 in most wheat cultivars. Lower ratios indicate high resistance to extension and low extensibility; high ratios correspond to weak and extensible dough's.

Monomeric gliadin and large disulphide linked polymeric glutenins together are called gluten proteins, which form a viscoelastic network when wheat flour is mixed with water and give volume to bread during rising (Weegels et al., 1996).Lower softening and compressibility values imply better gluten strength properties. Previous studies have revealed a direct relationship between the concentration and quality of gluten proteins to structural and rheological properties of wheat dough (Shewry, 2009).

In *T. aestivum*, HMW glutenin and gliadin seed storage proteins have provided the genetic markers easiest to assay, most predictive of bread making quality, and consequently the subjects of most genetic studies of quality. Fractionation and electrophoresis of protein extracts from aneuploid stocks and substitution lines showed the gliadin to be products of genes lying on the short arms of chromosomes in wheat homologous groups 1 and 6. Individual electrophoretic gliadin bands have been associated with dough strength .Association of bread making quality with HMW glutenin subunits encoded by genes on the long arms of chromosomes 1D and 1B has been well established and individual bands detected with SDS Polyacrylamide gel electrophoresis (PAGE) are used as selection criteria in conventional breeding programs. Protein content of durum wheat (*Triticum turgidum* L.) influences pasta cooking quality. Recent studies indicate that gluten quality and not gluten content is the major contributor to pasta quality in traditional drying processes (Kovacs et al., 1997), while protein content is a major contributor for pasta dried at high temperatures (De Marchi, 1994). Some pasta processors use the dry gluten content of semolina, which is related to protein content, as a guide to evaluating quality or to calculate 'Pasta Value' (De Marchi, 1994; Landi and Guarneri, 1992).

Early studies showed that gliadin band 45 was strongly associated with high gluten strength and band 42 was associated with low gluten strength in durum wheat cultivars (Kovacs et al. (1998) used *T. dicoccoides* 6B substitution which is a source of high protein for introgression into two high yielding but lower protein Canadian lines of durum wheat. The introgression had no detrimental effects upon pasta cooking quality. The poor qualitative gluten composition has restrained the use of emmer of *T. dicoccum* to a limited number of food products, such as biscuits and traditional cakes.

Sedimentation Value

During the sedimentation test gluten proteins of ground wheat or flour swells and precipitate as a sediment. The sedimentation test provides information on the protein quantity and the quality of ground wheat and flour samples. Positive correlations were observed between sedimentation volume and gluten strength or loaf volume attributes. The sedimentation test is used as a screening tool in wheat breeding as well as in milling applications. Sedimentation volumes of 25 to 35 cm^3 indicate moderate gluten-strength varieties, and volumes greater than 35 cm3 indicate strong-gluten varieties. The recently released varieties Saturn 1 and Neptune 2 are ã--gliadin 45 type, whereas the old varieties released in the 1980's are gliadin 42 type (Stoyanova et al., 2000).

Falling Number

Falling number is associated with pre-harvest sprouting in the field under prolonged periods of moisture during harvest. Adverse effect of pre-harvest sprouting in wheat is well clarified FN values of the order of 250-500 sec are considered acceptable. A FN of 300 and above is desirable (CWC, 2005).

RESULTS AND DISCUSSION

In case of *T. turgidum* sp. *durum*, moisture content ranged from 7.9-12.9 percent, test weight also known as hectolitre weight ranged from 68 to 84 Kg/hl and protein content ranged from 7.56-17.84 percent. The accession wise details are listed in the Table 1.

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Table-1: Quality characteristics of *T. turgidum* ssp. *Durum*

S. No.	Accession No.	Moisture	Hectolitre weight	Protein content
1	IC549466	7.9	78	14.38
2	IC535726	7.9	79	13.74
3	IC535760	9.9	72	12.13
4	IC535730	9.6	76	11.29
5	IC542614	9.9	75	14.88
6	IC113731	10.2	77	12.52
7	IC539231	9.4	78	14.17
8	IC535745	10.7	73	16.01
9	IC542917	10.6	77	13.86
10	IC138442	9.5	71	16.44
11	IC535880	11	80	12.83
12	EC699556	9.6	70	12.37
13	IC535846	10.4	77	12.52
14	IC443677	9.4	84	11.95
15	IC535818	10.2	80	13.91
16	IC539331	9.9	78	11.71
17	IC539254	9.8	70	12.77
18	IC309869	9.8	80	12.77
19	IC549469	9.3	81	11.93
20	IC539385	10.2	73	7.56
21	IC535828	9.9	78	16.94
22	IC535868	11.1	77	14.44
23	IC539609	10.3	77	16.26
24	IC535849	9.7	77	15.18
25	IC582905	10.3	76	14
26	IC535870	9.9	75	15.24
27	IC296359	8.8	80	11.14
28	IC535824	9.9	83	12.19
29	IC443645	10.3	72	17.3
30	IC445071	9.8	75	13.26
31	IC539330	9.4	70	13.72
32	EC113728	9.8	71	13.59
33	IC535732	10.2	79	13.05
34	IC539359	9.5	78	12.95
35	EC509382	9.8	77	14.82
36	IC539615	10.1	78	13.42
37	IC539230	12.9	74	16.02
38	IC539252	9.5	78	14.65
39	IC535766	10.5	75	14.33
40	IC539362	10.1	75	12.89
41	IC539249	10.5	73	17.23
42	IC443644	10.2	78	12.78
43	IC402058	9.4	71	17.76
44	IC539624	10.3	79	15.34
45	IC296574	9.7	77	15.62
46	IC539230	10	80	11.37
47	IC535821	10.1	80	12.95
48	IC296756	10.4	78	12.24
49	IC296483	10.3	75	13.06
50	IC078838	9.6	73	12.71
51	IC128158	10.4	80	14.26
52	IC241545	9.7	78	14.54
53	IC535875	9.7	70	17.84

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54	IC535820	9.5	79	13.26
55	IC539634	10.5	81	14.97
56	IC535815	9.6	80	12.74
57	IC549475	10	80	12.38
58	IC304899	10.1	78	12.84
59	IC535770	10.5	79	15.17
60	IC75208	9.7	76	13.41
61	IC549435	9.5	68	17.83
62	IC53808	10.2	76	12.26
63	IC539235	9.9	76	17.53
64	IC543020	10.6	79	11.82
65	IC535539	9.8	77	13.95
66	IC47481	9.3	72	15.29
67	IC539635	9.5	77	14.93
68	IC535805	10	77	12.08
69	IC542820	10.5	74	12.77
70	IC542618	9.8	81	12.83
71	IC535788	9.6	81	12.9
72	IC549487	9.9	75	15.5
73	IC542814	9.7	74	11.93
74	IC535866	9.9	74	15.95
75	IC539617	9.8	77	14.51

In case of *T. turgidum* ssp. *dicoccum*, moisture content ranged from 9.5-11.3 percent, test weight also known as hectolitre weight ranged from 70 to 83 Kg/hl and protein content ranged from 9.38-18.24 percent. The accession wise details are listed in the Table 2.

Table-2: Quality characteristics of *T. turgidum* ssp. *Dicoccum*

S. No.	Accession No.	Moisture	Hectolitre weight	Protein content
1	EC027747	10.9	79	12.83
2	PAU6051	10.8	73	18.24
3	EC276885	10.5	80	12.3
4	EC445771	10.7	80	11.09
5	IC416299	11	83	12.14
6	IC416330	10.1	79	10.88
7	IC445399	10.5	81	11.82
8	EC277008	10.8	78	11.5
9	IC416301	11	80	12.67
10	IC277025	10	79	11.72
11	IC416302	11.2	81	11.14
12	IC416388	10.8	83	11.42
13	EC274121	9.5	70	13.2
14	IC445346	10.5	77	12.08
15	EC277151	10.4	82	12.47
16	IC416306	10.2	80	12.12
17	EC445346	10.5	77	12.24
18	IC536521	10.2	79	12.31
19	EC445356	9.6	78	14.01
20	EC574123	10.1	78	14.38
21	IC416324	10.6	80	11.62
22	EC445241	10.8	82	11.32
23	IC416323	10.2	82	11.96
24	EC276881	10.5	81	13.13
25	IC416372	11.3	80	10.26
26	EC277051	10.6	75	13.3
27	EC445257	10.1	82	10.63

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28	EC276861	10.7	78	10.96
29	EC575368	10.5	80	14.7
30	EC276938	10.9	82	9.38
31	IC416343	10.5	77	10.47
32	EC276867	10.5	81	10.64
33	IC416379	9.8	75	11.5
34	IC401962	9.8	82	11.73
35	IC416309	10.2	82	11.24
36	IC416344	9.9	81	10.51
37	EC276887	10.2	82	11.52
38	EC277229	10.6	82	12.59
39	EC445379	9.9	80	12.26
40	EC276924	10.7	79	12.34
41	IC416391	10.2	81	11.16
42	IC416371	9.5	78	14
43	TAU9659	10.1	80	11.25
44	IC053246	10.2	82	11.85
45	IC542773	10.1	80	14.31
46	IC335582	10.9	81	11.64
47	EC277004	10.5	82	11.34
48	IC416289	10.5	79	12.93
49	IC416294	10.3	80	10.93
50	EC445350	10.6	75	11.83
51	EC445298	10.3	75	10.53
52	IC416411	11.3	78	10.9

MOISTURE CONTENT

Determining moisture content is an essential first step in analyzing crop grains or flour quality since this data is used for other tests. Millers adjust the moisture to a standard level before milling. Moisture content of 14 or 12 per cent is commonly used as a conversion factor for other tests in which the results are affected by moisture content.

Test weight

This test is widely used in trading. Lots with higher test weight fetch a higher price. Immature and shrivelled wheat's are usually low in test weight and give correspondingly poor yield of flour. In case of *T. turgidum* ssp. *durum*, test weight ranged from 68 to 84 Kg/hl. The acceptable test weight for durum wheat is 78 kg/hl (Petrova, 2007). So, 32 accessions had test weight $\geq$78Kg/hl. Similarly, in case of *T. turgidum* ssp. *dicoccum*, 44 out of 52 accessions had test weight $\geq$78 Kg/hl as shown in table 2. A single test cannot tell whether these will be suitable to produce a particular product such as semolina, the main raw material of pasta making, but a combination of various quality tests is required. Higher test weight ensures the higher flour yield.

Protein content

Protein content ranged from 7.56-17.84 percent in durum wheat and 9.38-18.24 percent in case of *T. dicoccum* wheat which can be divided in to various categories such as <11% required for biscuits, 10-12% for noodles, 12-13% for chapatti, >12% for bread making and >13% for pasta making. Protein content is a key specification for wheat and flour purchasers since it is related to many processing properties such as water absorption and gluten strength. Protein content can also be related to finished product attributes such as texture and appearance. Low protein content is desired for crisp or tender products such as snacks or cakes. High protein content is desired for products with chewy texture, such as pan bread and hearth bread. Bakers use protein content results to anticipate water absorption and dough development time for processes and products because higher protein content usually requires more water and a longer mixing time to achieve optimum dough consistency.

But beside protein content some other quality parameters are also required for development of various products such as soft grain texture and weak gluten strength for biscuit making, soft grain texture and medium gluten strength for noodles, hard grain texture and medium gluten strength for chapatti, hard grain texture and strong gluten strength for bread and pasta making. So, keeping in view these points we also learnt various quality tests as mentioned below:

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Gluten content
The wet gluten test provides information on the quantity and estimates the quality of gluten in wheat or flour samples. Gluten is responsible for the elasticity and extensibility characteristics of flour dough. Wet gluten reflects protein content and is a common flour specification required by end-users in the food industry.

Sedimentation test
During the sedimentation test gluten proteins of ground wheat or flour swells and precipitate as a sediment. The sedimentation test provides information on the protein quantity and the quality of ground wheat and flour samples. Positive correlations were observed between sedimentation volume and gluten strength or loaf volume attributes. The sedimentation test is used as a screening tool in wheat breeding as well as in milling applications.

Falling number
The falling number instrument analyzes viscosity by measuring the resistance of a flour-and-water paste to a falling stirrer. A high falling number e.g. above 300 seconds indicates minimal enzyme activity and sound quality of wheat whereas a low falling number e.g. below 250 seconds indicates substantial enzyme activity and sprout-damaged wheat.

Based on the falling number, the baker decides whether the flour is suitable for bread making. Yeast in bread dough e.g. requires sugars to develop properly and therefore needs some level of enzyme activity in the dough. Too much enzyme activity, however, means that too much sugar and too little starch are present. Since starch provides the supporting structure of bread, too much activity results in sticky dough during processing and poor texture in the finished product. If the falling number is too high, enzymes can be added to the flour in various ways to compensate. If the falling number is too low, enzymes cannot be removed from the flour, which results in a serious problem that makes the flour unusable.

REFERENCES
1. Autran, J. C., J. Abecassis, J. and P. Feillet, P. (1986). Statistical evaluation of different technological and biochemical tests for quality assessment in durum wheat. *Cereal Chem.*, 63: 390-
2. CWC (2005). Description of durum wheat semolina quality factors. http://www. California wheat. Org.
3. De Marchi, F. (1994). Durum wheat and Pasta Quality. In European Seminar: quality of durum wheat and pasta. Poˆle Europe ´ en de Communication et d'Echanges Agro alimentaires. C/o Re´gional Rhone-Alpes 78 route de Paris F-69260 Charbonnie`res les Bains (1994 January 26–28, Montpellier, France
4. Dexter, J. E., R. R Matsuo. And D. G. Martin (1987). The effect of test weight on durum wheat quality. *Cereal Foods World,*. 32: 772-777.
5. Dexter, J.E. and N.M Edwards (1998). The implications of frequently encountered grading factors on the processing quality of durum wheat. Association of Operative Millers Bulletin, October: pp. 7165-7171
6. Jenner, C.F., Ugalde, T.D., Aspinall, D. (1991). The physiology of starch and protein deposition in the endosperm of wheat. *Aust. J. Plant Physiol*. 18, 211–226.
7. Kovacs, M.I.P., Poste, L.M., Buttler, G., Woods, S.M., Leisle, D., Noll, J.S. and Dahlke, G. (1997) Durum wheat quality: comparison of chemical and rheological screening test with sensory analysis. *Journal of Cereal Science* 25 65–75.
8. Kovacs, M.I.P., Howes, N.K., Clarke, J.M. and Leisle, D. (1998). Quality characteristics of Durum wheat lines deriving high protein from a *Triticum dicoccoides* (6b) substitution. J cereal Sci. 27: 47-51.
9. Landi, A. and R. Guarneri, (1992). Durum wheat and pasta industries: Twenty years of achievement in science and technology. In: Cereal Chemistry and Technology: A long past and a bright future. Proceeding of 9th Int. Cereal and Breed Congress, 1-5 June Paris 1992, pp. 139-142.
10. Loescher, W.H., Everard, J.D. (2000). Regulation of sugar alcohol biosynthesis. In: Everard, R.C., Sharkey, T.D., von Caemmerer, S. (Eds.), Photosynthesis: Physiology and Metabolism. Kluwer Academic Publications, Dordrecht, The Netherlands, pp. 275–299.
11. Mac Ritchie, F. (1999). Wheat proteins: characterization and role in flour functionality. Cereal Food World 44, 188–19
12. Matsuo, R. R. and J. E. Dexter, J. E. (1980). Relationship between durum wheat physical characteristics and semolina milling properties. *Can. J. Plant Sci.*, 60: 49-53.
13. Petrova, I. (2007) End-use quality of Bulgarian Durum Wheat. *Bulgarian J. Agril. Sci*. 13:161-16

ISSN 2394 - 7780

14. Shewry, P.R. (2009). Wheat. J. Exp. Bot. 60, 1537–1553.Stone, P.J., Savin, R., 1999. Grain quality and its physiological determinants. In: Satorre, E.H., Slafer, G.A. (Eds.), Wheat: Ecology and Physiology of Yield Determination. Food Products Press, New York, pp. 85–120.
15. Stoyanova, S. D., St. Tsvetkov and K. Tsvetkov (2000). Gliadin proteins in relation to some quality properties of new selected durum wheat cultivars. *Bulg. J. Agric. Sci*., 6: 423-426.
16. Weegels, P.L., Hamer, R.J., Schofield, J.D., (1996). Critical review: functional properties of wheat glutenin. *J. Cereal Sci.* 23, 1–
17. Wrigley, C.W. and Bietz, J.A. (1988). In: Y. Pomeranz (Ed.) Wheat chemistry and Technology. 3rd edition, vol. 1 AACC, St Paul, Minnesota. pp. 159-275.

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A STUDY BASED UPON SMALL COARSE GRAINS AS A TOOL FOR CONSERVATION AGRICULTURE

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ABSTRACT
With the onset of climate change and gradual change in soil environment, conservation agriculture is gaining importance with each coming day. Small coarse grains which are also known as millets can be a great instrument for conservation agriculture .These grain can not only contribute in transforming barren land into a productive field but also can yield in nutri-cereals that are gluten free,rich in iron ,calcium , zinc etc.Millets are slowly gaining popularityas they are easily digestible, pest resistant and are capable of revolut ionising the agri-economic scenario in the coming years.

Keywords: Nutri-cereals, Transformation, Coarse, Gluten–Free, Barren land.

INTRODUCTION
There is an old saying ; "One who eats rice is weightless like a bird , but the one who eats Jowar is strong as a wolf ''.Well Jowar is considered a millet which was yesterday's coarse grain that is becoming today's nutri-cereal.In today's world millets are becoming a solution to many lifestyle disorders. For farmers and producers with a very little input millets are be comingeconomically viable option if marketing avenues are created.Earlier farmers were exhorted to go in for cash crops, oilseeds etc. in place of millets .Till recently these were called Coarse grains but now they are referred as Nutri–cereals.They are naturally rich in iron, zinc calcium in ample amount.Last year (2018) was declared as "Year of millets". For the next few year's millet mission is expected to be rolled out.

NUTRACEUTICALS OF NATURE
In the Indian agrarian landscape after decades of negligence these nutrition rich cereals are making a comeback .These cereals were neglected in favour of staple food crops like rice ,wheat, oilseeds etc. They not only can grow in less water, without fertilisers& pesticides but can also withstand high temperature.On the irrigational front if one kg rice needs 5000litres of water millets can yield in 250-300 litres . Growing millets could be a potential new tool for the socio economic issues such as mid – day meals, to combat malnutrition and also rural poverty. Conservation agriculture relates to sustain the potentialities of fertile land year after year using natural resources so that we can cut down on the pollution factor.It can be of immense help as food security for the environmentally challengedareas.In the year 2016 – 2017,it was recorded that area under millet cultivation has come down to 14.72 million hectares only whereas it used to be approximately 38-39 million ha during 1960's (which is prior to green revolution).

REASONS FOR LESS POPULARITY
There has been a considerable change in the dietary lifestyle across the country. This is one such reason to understand why millets are less popular among all age groups. Farmers were discouraged from growing kutki,jowar etc. instead farmers were encouraged to grow oilseeds and rice and wheat .There has been an incredible increase in the conversion of irrigated area towards rice and wheat. The production of jowar, bajra, ragi has been volatile largely due low productivity and less advertising. People are suffering from diabetes , cholesterol ,blood pressure and obesity as well because of lifestyle disorder and also now a days they are more inclined towards lip smacking items rather than healthy options. Government also did not bring minor millets under the ambit of crop insurance.

WHY MILLETS SHOULD BE ADVOCATED ?
Keeping a healthy lifestyle in mind and also an ailment free life , millets should be encouraged to go beyond being fashionable for the urban elite class and also the commoner. Atleast to begin with a part of rice or wheat should be replaced with small coarse grains.Farmers who are worried about the availability of rain and abundance of irrigable water may relax as these minor coarse grains need price support as there is a social dimension associated with these cereals. Moreover these grains need no support of pesticides ,tons of water etc. With govt. support like bringing harvestors ,destoners and processors etc. of millets can bring down the cost of production and encourage local value – addition. They are not only gluten free but also has low glycemic index and also micro nutritional composition better than rice or wheat. Millets are not only a good tool for conservation agriculture. Millets can be incorporated to mid day meals for small children as they are malnourished and always hunger struck. They are mostly from poorer section of society and mostly are on the verge of getting attacked by many kinds of diseases.

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CONCLUSION

For a sedentary westernized lifestyle where health is wealth in every sense , awareness about the inclusion of millets is necessary.Millets have high amount of lecithin, niacin,folic acid,vit.B6 ,etc.so it is a good idea to utilize its potential in conservation agriculture.If there is inclusion for millets into soil productivity there will surely be prosperity and welcoming impact of new methods on the conservation agriculture front.

REFERENCES

1. United States Department of Agriculture
2. Badal, P.S and Singh, R.P (2010) –Technological changes in millet production.
3. Millets Net in India (MINI)
4. Season and millet crops reports from 2001-2012.
5. Sen, S.R,1967, Growth and instability in Indian agriculture.Journal of the Indian Soceity of Agricultural Statistics, 19(1) :1 -30.

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IMPACT OF CLOUD COMPUTING BATTLE OF TELECOM GIANTS

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ABSTRACT
The Internet has become a primary resource to access Cloud Computing. In other way we can say Cloud Computing made Internet more demanding and usable. Now a day users are using cloud computing in various methods for Entertainment, Education, Gaming, Communication, Business, Traveling and other. There for people needs high speed Internet and huge amount of data in lesser price. Indian Telecom industry got effected for these demand or we can say telecom industry made changes in their technology to provide high speed internet services. Many Giants of Indian Telecom Industry got effected because of the demand and technology change to provide cloud services. This study explored the transformation in telecom giants and fight to survive in Industry. Some players knocked out in competition. In this war of Technology change Reliance Jio declared the battle by launch of 4G internet services and he dragged every player into the battlefield. This research is to see the change in telecom industry because of Cloud Computing.

Keywords: Telecom Industry analysis, Cloud computing, 4G Internet, Cloud Services.

1. INTRODUCTION

The Internet has left a large impact on our life. Since the internet services started, it's brought information on our fingertips. Internet has brought positivism in our life and has created it simple and easy. The Internet has left a large impact in our standard of living. Earlier we tend to wont to visit libraries in search of information, data and knowledge on one thing however currently we tend to get that information in barely some clicks. The internet provides us with helpful information, information and knowledge that is useful for social, personal and economic development. It is up on us to utilize our time on the web with a helpful and productive method. The Internet is a revolution in information technology. While there are various uses of the Internet. We can use the internet for getting an online education. We can use the Internet to promote your business online. We can do online courses and improve our writing, communication, business and online marketing skills. Online shopping, social media, emails, chatting square measure common things that we tend to do daily. We are free to use the Internet. The Internet is a magical tool that will help you to become successful in your career and business. But only the positive and productive use of the Internet.

People needs high speed Internet and huge amount of data in lesser price. Indian Telecom industry got effected of these demand or we can say telecom industry made changes in their technology to provide high speed internet services. Many giants of Indian Telecom Industry got effected because of the demand and technology change to provide cloud services. To understand these changes, we did All India Telecom Industry wireless subscriber analysis. We collected data of las 3 Years and compared them and tried to find out trend of Indian telecom industry.

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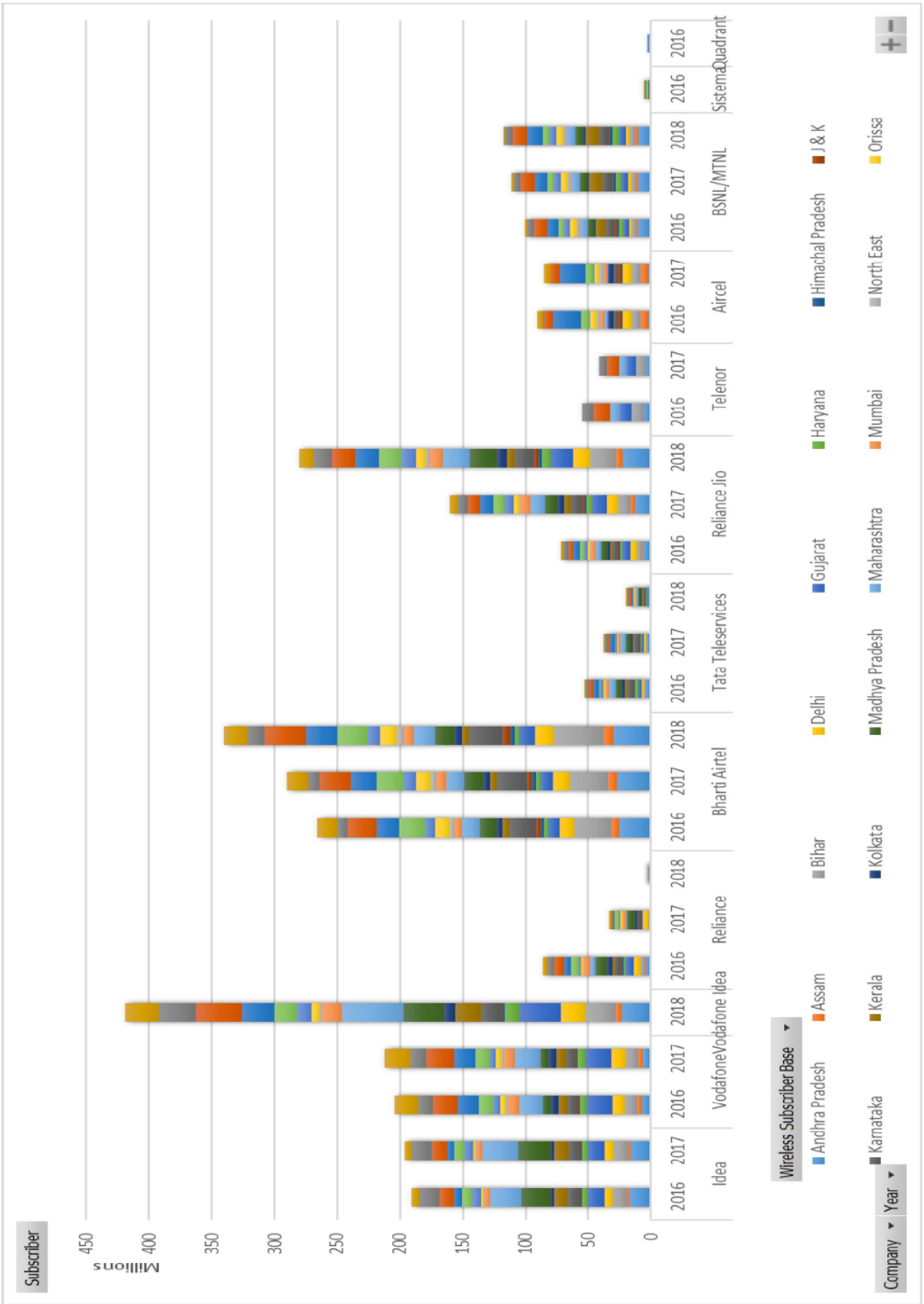

Figure-1

Telecom operator and state wise all India wireless subscriber base of last 3 Years

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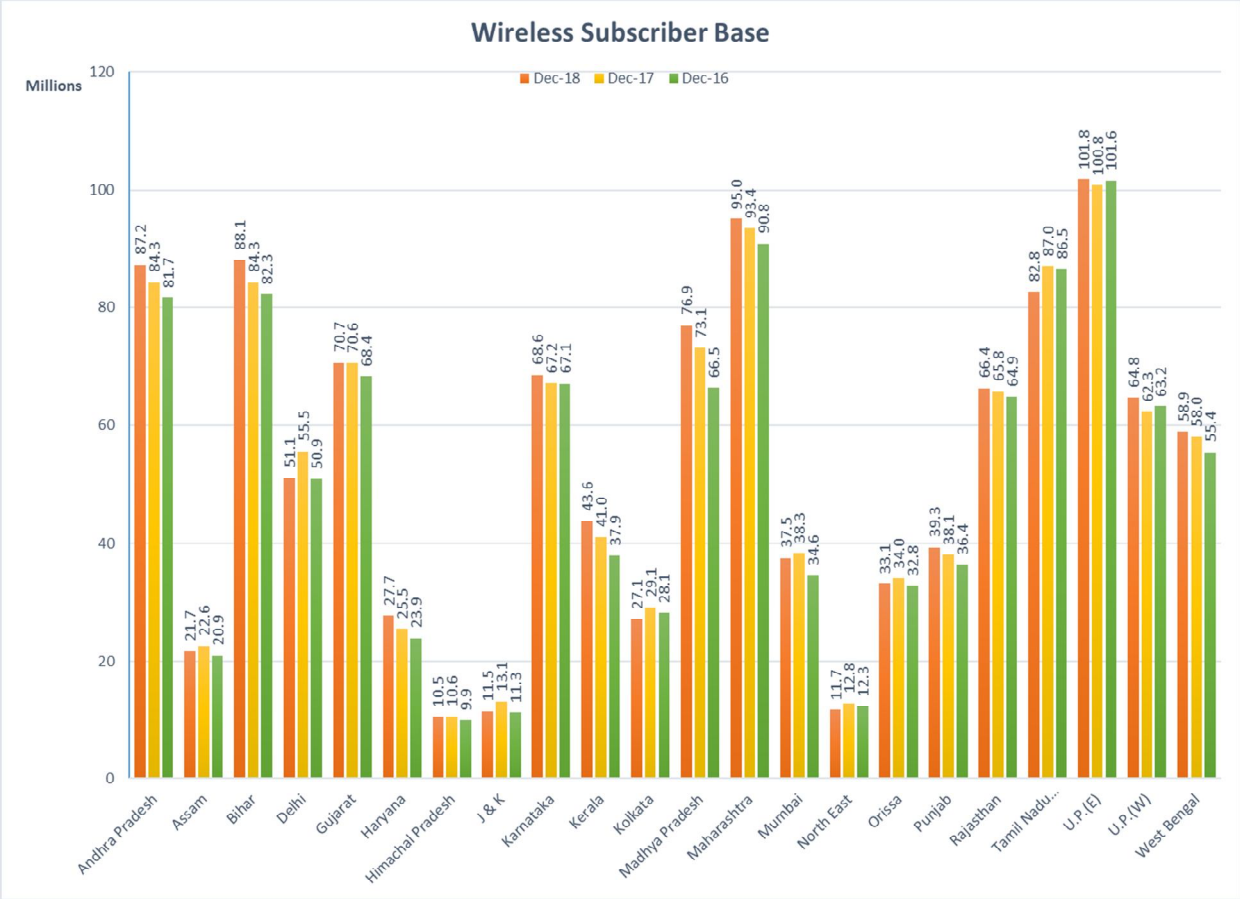

Figure-2

State wise wireless subscriber base

Attached 2 figure says that subscribers are more or less same over the year but subscribers changed from one service provider to another to get high speed data in lesser price. In last few year cloud services became more popular among the people of India which created huge demand of internet data. Now a day people wants to make video calls in place of voice call. They want online TV and Game their phones. People wants high speed data in their mobile phone for online shopping, chatting, travel ticketing, hotel booking, money earning, and many more. People don't want to depend on their desktop computer with is in home with broadband service. Broadband and wireline services are also improving their technology and it is important for offices and many other places but in last few year telecom industry is becoming a warzone because of wireless services and demand of cloud services by people of India.

2. RESEARCH

2.1. Beginning of battle by Reliance Jio

In 2005, Reliance Industries Limited split and there was one major de-merger of note for Mukesh Ambani. His dream project- Reliance Infocom became a part of Anil Dhirubhai Ambani Group. Mukesh Ambani went on to acquire Infotel Broadband Services Limited. The company was the only successful bidder for Pan-India 4G network. Reliance then worked on establishing base for high-speed optical fibre 4G network. It is actually capable of much more than 4G.

Then slowly and steadily, Lyf phones made foray into the market with Jio preview offers. Free unlimited data for 3 months and free voice calls and sms was the way they entered the market. Lyf phones seemed a decent deal, but it was Jio sim that caught people's eyes. Rs. 90,000 cr is being spent by Reliance to set the Jio 4G network across the length and breadth of India, which is the 7th largest country in the world. So one can imagine the efforts that have gone into putting up the network which is not a temporary one but planned for the present 4G and the future 5G. They are still enrolling subscribers and plan to give 4G data, voice calls over Data Packets using VoLTE technology, high speed broadband across India. An enterprise meant for next twenty to thirty years of existence cannot be preoccupied for review thus early. The other mobile service providers are here around for a long time including BSNL and none of these networks are 4G only but providing the basic mobile services and data services of 3G and now 4G too only in select telecom circles. Jio's success or failure can solely be set within the long-standing time, once the freebies and offers go away and they get into real

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business. As of now customers won't mind call drops/slow internet as they are getting unlimited calls/data for very nominal charges. Providing good services takes much more than funds. It requires an organizational culture of giving importance to customers' day to day concerns. Reliance doesn't have that organizational culture. They feel by throwing cash and providing free network they're going to achieve success in long-standing time. But it'll be terribly troublesome for Jio to beat Airtel as a result of it's a service centered culture. No wonder 2016-17 has been the best years for the Internet Surfers in India, who love to spend their time on the phone and the Internet because of Reliance Jio. Youngsters can talk for hours and parents can stay in touch with their children who live in other cities without fretting for cost charges, video calling becomes best-loved practices, late night internet surfing, downloading movies and songs and the list goes on and on. When Reliance Jio (the subsidiary of Reliance Industries) launched on fifth September 2016 formally, Indian users especially youngsters started thanksgiving Reliance Jio even in their dreams. Today, every house has Reliance Jio user. Reliance Jio has been recorded because the final strategy within the Indian telecommunication business. Reliance Jio has recommended nightmares to fellow telecommunication suppliers like Bharti Airtel and Vodafone for his or her survival. With the population of one.2 billion where there are 800 million mobile connection and 200 million Internet users, out of which 63% of the population under the age of 35 years, Reliance Jio aims to change the transformation by making a robust and powerful broadband network.

2.2. Merger of two giants Vodafone & Idea

Facing intense competition from cash-rich Reliance Jio, the Aditya Birla Group and British telecom giant Vodafone Plc announced the merger of their Indian wireless telephony businesses, creating the largest telecom operator in the country. In a news conference in Mumbai, Vodafone Group Plc Chief Executive Officer (CEO) Vittorio Colao and Aditya Birla Group Chairman Kumar Mangalam Birla said the merger would create a new champion of digital India. As the first step of the merger, Birla-owned Idea Cellular and Vodafone India would merge their operations at a swap ratio of 1:1. Then, Birla's holding companies would buy a 4.9 per cent stake from Vodafone at Rs 110 per share, investing close to Rs 3,900 crore. This will increase Idea's stake to 26 per cent and bring down Vodafone Plc's stake to 45.1 per cent. The Birlas would have the right to acquire another 9.5 per cent stake from Vodafone in the next four years, so that both partners eventually hold an equal stake in the company (about 35.5 per cent each). "India was earlier the jewel in our crown. Now with this merger, we have got a bigger jewel," Colao said, adding: "This is our Make in India initiative." At present, Vodafone and Idea together have a customer base of 400 million. Their joint revenue share is likely 41 per cent, after the merger is complete at the end of 2018. Bharti Airtel, which used to be the biggest market player till now, is distant second, with 268 million customers in India. Revenue-wise, too, Airtel is on the second spot with a market share of 35.6 per cent, along with Telenor.

2.3 Survival of Airtel

Telecom power Sunil Mittal, Chairman of Bharti Airtel, is fighting one among the toughest battles of his life. The telecom sector has been upturned since the entry of Mukesh Ambani-controlled Reliance Jio which is offering disruptive prices -- it has shaken the once-sturdy business models of telcos like Airtel and Vodafone. So far, Jio looks to be moving one step earlier than its competitors. The competitors have not just misjudged Jio's capability to rake in a large subscriber base in such a short time but have also undervalued its strength to keep the tariffs war going. Whenever Airtel (or any major operator) begins to feel that the worst is over, Jio fires another salvo that produces their survival even tougher. The data customers' area unit essential for Telco's; they contribute additional to the revenues than voice-only customers. The telco claims that nearly 90 per cent of its total subscribers (304 million) have 4G SIMs but the number of data customers is actually much lower - at 86 million - than Jio's 186.6 million. The data customers are primarily acquired from the churn in the existing 4G customer base, or people shifting from 2G to 4G. The limited potential to poach data subcribers from each other has turned the focus of telcos to upgrades. Airtel, as an example, has Project Jump wherever it focuses on upgrading subscribers from 2G to 4G, and offers free information for the primary month. Bharti Airtel is the only operator that was able to withstand the onslaught of Reliance Jio in the Indian market. While the number two and three players — Vodafone and Idea Cellular — decided to merge operations, both Reliance Communications and Tata Teleservices had to shut shop.

What makes Airtel resilient to competition? It is a combination of Airtel's geographical and operational diversification besides network advantages that are helping the company offset the decline in revenues from the mobile business. In FY17, only 55 per cent of the company's revenues came from the Indian mobile business while over 21 per cent was contributed by the African mobile operations. The rest came from its tower infrastructure, digital TV and other services. Moreover, being the first Pan-India player has given Airtel almost life-long advantages. "It has consumers who are early adopters of technology and high-end ARPU (average revenue per user) generators. It has good-quality subscribers — a first-mover advantage," says Kolla. Airtel also

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has more spectrum in the higher quality 900 MHz band. In contrast, Vodafone and Idea had to settle for the 1800 MHz band, which is less efficient and requires more capex. “In terms of network resources, Airtel, unlike Vodafone or Idea, has its own robust backhaul connectivity crisscrossing the country.

2.4. Elimination of Telenor

The company Unitech Wireless restricted, a subsidiary of Unitech cluster, was incorporated in 2008. The same year, the corporate was awarded wireless services licenses for all 22 medium circles. Subsequently, Unitech Group and Telenor Group agreed to enter a joint venture where Telenor would inject fresh equity investments of ₹ 61.35 billion into Unitech Wireless to take a majority stake in the company. This was capital invested with directly in Unitech Wireless by Telenor cluster. Telenor cluster conducted these investments in four tranches, subsequent to approvals from the Foreign Investment Promotion Board (FIPB) and the Cabinet Committee of Economic Affairs (CCEA) took 67.25% ownership of Unitech Wireless. In September 2009, Unitech Wireless announced its brand name as Uninor. The Economic Times reported that Bharti Airtel had entered into discussions with Telenor India to acquire the latter. On 23 Feb 2017, Airtel announced that it had entered into a definitive agreement with Telenor South Asia Investments Pte Ltd to acquire Telenor (India) Communications Pvt. Ltd. As a part of the deal, Airtel will acquire Telenor India's assets and customers in all seven telecom circles that the latter operates in - Andhra Pradesh, Bihar, Maharashtra, Gujarat, Uttar Pradesh (East), Uttar Pradesh (West) and Assam. Airtel can gain 43.4 MHz spectrum in the 1800 MHz band from the Telenor acquisition. In 2017, Bharti Airtel received regulatory approval from CCI, SEBI and the stock exchanges. The deal was approved by the National Company Law court (NCLT) in August 2017. On 21 2017, Airtel received its shareholders’ approval for acquisition of Telenor. NCLT approved the merger in March 2018. Airtel plans to retain around 4,000 of Telenor India and Tata Teleservices employees. Supreme Court allowed sale to Airtel by dismissing medium department's order to Airtel to furnish a bank guarantee. Department of medium approved the merger of Telenor Asian country with Bharti Airtel on fourteen could 2018 paving the manner for final business closing of the merger between the 2 firms.

3. CONCLUSIONS

The Internet has become a primary resource to access Cloud Computing. Telecom service subscribers are more or less same over the year but subscribers changed from one service provider to another to get high speed data in lesser price. In last few year cloud services became more popular among the people of India which created huge demand of internet data. Last few year telecom industry is becoming a warzone because of wireless services and demand of cloud services by people of India. Many Giants of Indian Telecom Industry got effected because of the demand and technology change to provide cloud services. This study explored the transformation in telecom giants and fight to survive in Industry. Some players knocked out in competition. In this war of Technology change Reliance Jio declared the battle by launch of 4G internet services and he dragged every player into the battlefield. This research is to see the change in telecom industry because of Cloud Computing.

REFERENCES

- Telecom Regulatory Authority of India https://main.trai.gov.in/, Accessed on 20 Feb 2019
- Amazon EC2, http://aws.amazon.com/ec2, Accessed on 20 Feb 2019
- AWS Cost Calculator http://calculator.s3.amazonaws.com/calc5.html
- Microsoft Azure, http://azure.microsoft.com, Accessed on 20 Feb 2019
- Google Compute Engine, https://cloud.google.com/compute/, Accessed on 20 Feb 2019
- HP Enterprise Converged Infrastructure, www8.hp.com/in/en/business-services/, Accessed on 20 Feb 2019
- IBM SmartCloud Enterprise, http://www.ibm.com/cloid-computing/in/en/iaas.html, Accessed on 20 Feb 2019
- Rackspace Open Cloud, www.rackspace.com/cloud/openstack/, Accessed on 20 Feb 2019

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A STUDY ON USER'S PERCEPTIONS TOWARDS DIGITAL PAYMENT MODES THAN CASH AFTER DEMONETISATION

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ABSTRACT
Studied Digital transaction in India with special reference to post demonetisation period. Study is based on primary and secondary data. There are various means of Digital payment such as NEFT (National electronic fund transfer), RTGS (Real time gross settlement), IMPS (Immediate payment system), NACH (National automated clearing house), and CTS (Cheque truncation system) etc. Government of India has taken initiative for Cashless economy through Digital India campaign. Cashless transaction maintains more transparency and with this corruption and illegal activities can be avoided for e.g. Illegal activities in real sector by avoiding stamp duty. Government has introduced BHIM app to digitally empowered rural India. It is necessary to frame strong legal framework to resolve cyber-crime issues in Digital transaction. Government is trying level best to empower economy digitally strong.

It is a Digital Financial Inclusion in India. Majority of population in India is using Internet through Mobile phones. Affordable price of mobile phones and decreased cost of Internet connection increases use of Internet. Even low income group population in India is using Mobile phones with internet. There is easy access of Internet enabled mobile phones. E- Commerce Boom, Significant advancement in Information and Communication Technology (SMAC, API Technology), Provision of Wi-Fi connection in cities promotes parallel App economy and created perfect platform of Digital Banking. SAMWAD is the award winning Digital Financial literacy programmed by CDFI (The Centre for Digital Financial Inclusion). Banks need to work on grass root level digitalisation of banking

Keywords: Post demonetisation, digital banking

INTRODUCTION
Government of India announced demonetisation of Rs. 500 &Rs. 1000 notes to stop Black money transaction. Scarcity of notes currency emerged due to demonetisation and this is the period where people felt importance and started using net banking and plastic money at great source. The main aim of converting Traditional Banking into Digital Banking is to maintain Transparency and convenience. Transparent Banking functions develop more authentic transaction record. Digital Banking is facing certain challenges to be worked on such as Up- gradation of technology, Sustainability, App perfection, Attaining Speed quality, Innovative services, Cyber-crime etc. To overcome these challenges expert technician, Digital strategy and instructions to customers is the requirement. Indian banking sector is rapidly transforming into Digital Banking. Government of India has introduced Unified Payment Interface (UPI) to assist Digital Banking. To avoid Black money transaction Government of India initiated to promote Digital Banking, as we can notice Creation of universal identification number, Integration of Adhar card, BHIM app , UPI based Mobile payment app, Introduction of CDFI (The Centre for Digital Financial Inclusion) etc.

Electronic Transaction of money is involved in Digital payment. Economy is moving towards cashless eco system. Constructive economic system is the requirement to conduct operations of Payment banking such as Technical eco system, Regulatory eco system and social eco system. Technical eco system has introduced E-wallets/ Digital wallets, AadharPay, Payment through Mobile App, Mobile Applications like BHIM (Bharat Interface for Money), Whats App pay etc. Regulatory eco system works under RBI's guidelines and initiatives by Government of India, further it has been noticed that lack of education and low income or poverty is the main obstacle to adopt Digital payment banking. Adoption of payment banking operations can reduce flat money in the economy. Proper auditing procedures and technical standards involvement is the necessity of getting suitable access of mobile based banking or cloud technology.Study tried to find out customer perception towards computer banking. Maximum used functions of Internet banking are online shopping and online bill payment by the customers. Lack of knowledge, Privacy concern, Preference to paper money, did not feel necessary, high cost; Fear of Internet banking and Network connectivity issues restrain customers for adoption of Internet banking. Bank need to resolve the restrain factors faced by the customers to increase use of Internet Banking.

Digital campaign of India focuses on Digital Ecosystem , which is progressing over last few years.(especially after demonetisation). Internet users in India not only using Internet just to Searching, web surfing and using

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social media but also using Internet beyond this for Online shopping, online banking, online courses, online business and online movies. Digital India programme given the platform for economics with banks, as everything will be having one form of all the services such as Adharcard link, applying for driving licences, Bharatbill payments system, India stack, NOC, all types of agreements, even the Regional Transport offices are digitalised and insisting online services.

REVIEW OF LITERATURE

Neelabh Kumar (2018) focused on future India: Digital banking vision 2022.Strategy in Digital Banking will have advancement in Fin –Tech technology, Decentralised asset economy, Block chain infrastructure, Digital becomes contemporary, Importance to customer Intelligence ,Innovation in robotics, Public Cloud, Threat of Cyber security, Regulatory advancement. There is a rapid change in Banking Industry. The most dominant emerging areas of future banking is Artificial intelligence and Robotics software, with this certain challenges are ahead for Indian banking structure such as re-assessment and systematic changes in digital strategy and processes to maintain international standards , increased competition, maintenance of digital banking in reasonable and economical manner, taking utmost care of cyber-crime, educating customer , pressure of spreading strong network connection and Digital orientation to grass root level including rural areas and lower income group people.

Deepak Kapoor and MuskanKaura (2018) examined Impact of Digital payment on banking customers in Ludhiana. The most prefer way of adopting Digital Banking is adoption of ATM cards for cashless transaction. Awareness is increasing regarding other E- banking channels.

S. Venkataganesh and S.Chandrachud (2018) digital campaign of India focuses on Digital Ecosystem , which is progressing over last few years. Internet users in India not only using Internet just to Searching, web surfing and using social media but also using Internet beyond this for Online shopping, online banking, online courses, online business and online movies. Digital India programme given the platform for economics with banks, as everything will be having one form of all the services such as Adharcard link, applying for driving licences, Bharatbill payments system, India stack, NOC, all types of agreements, even the Regional Transport offices are digitalised and insisting online services.

Shobit S. Chandak and Haresh R. (2018) studied the factor influencing Digital payment system usage. Primary data has been used. 219 college going students from the region Bangalore are selected because the students from this region are Tech- savvy and having easy access to Smart phones and Fast Internet Services, which is the requirement of Digital payment mechanism. Study of this paper concludes that, Digital payment ratio is increasing due to use of fast Internet access and Smartphones. Study focuses on two factors such as Product / Service features and Product / Service Marketing. Product / Service features mainly includes fast acceptance, Ease to use, Reasonable price, Security and Privacy, Efficiency, Good Customer Services, Accuracy. Product / Service Marketing Includes Brand Image and Brand Loyalty .Product / Service features awareness has more preferences and increases Digital payment system. Students have started increasing Digital Payment due to variable Product / Service features.

Raghunandan G, at.al (2018) identified need of Electronic customer relationship management an effective tool in the Banking Sector. Indian Banks are using Electronic means over traditional Banking in the form of Information and Communication technology where easy communication can take place with bank customers, such as Internet / online banking, Electronic mail, Electronic fund transfer, Tele – Marketing, Chat online, ATM'S Mobile Banking and Call centres. Customers are getting fast banking services and easy follow up of transactions. Banks are customer centred having quick feedback and can solve customers' query as earliest. Through Electronic means Banks are maintaining Good relationship with customers, which is today's world need.

L.Priya (2018) identified the use of Digital technology in banking sector and measures the factors influencing consumers to adopt computer technology. Banks need to have communication with consumers. To get success and adoption of computer technology, banks should provide easy to understand technology, convenience in operating, secure and fast service. Computer technology is the sophisticated Banking technology. Transaction security and cost effectiveness is the priority of consumer's satisfaction.

OBJECTIVE

- To find out customers perceptions towards digital payment modes after demonetisation.
- To find out difficulties faced by banking customers while operating digital mode of payment.

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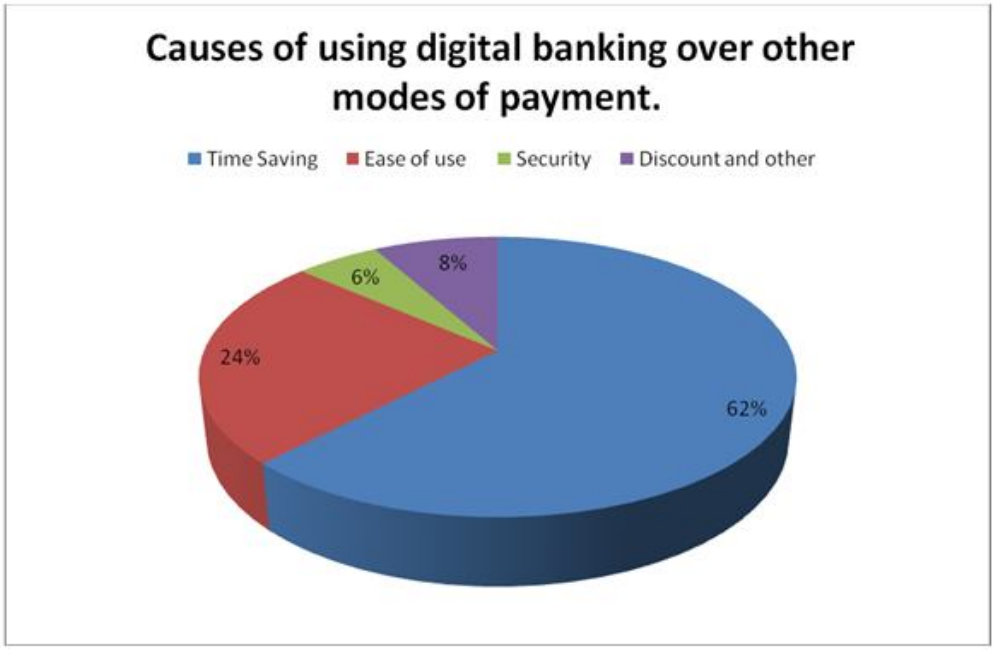
RESEARCH METHODOLOGY

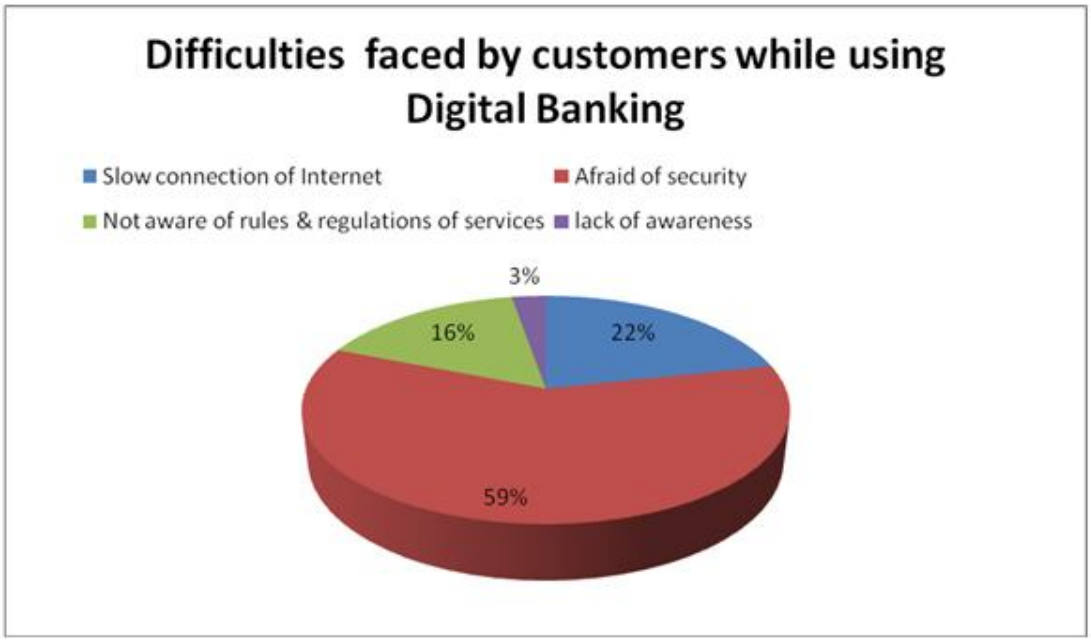
The population of the present study consist of customers who avail E-banking delivery channels in Thane district of Maharashtra. Both primary and secondary data are collected for the study. The sample size of the study is 100.The sample is selected by using convenient sampling method. Online questionnaire method is used for collecting primary data. Secondary data are collected from various journals and articles.

CAUSES OF USING DIGITAL BANKING



Changing lifestyle of customers demanding and adopting sophisticated technology of Banking.Customers' demands user friendly features, convenience, cost effectiveness and security alert banking services.There are various factors which influenced customers to use Electronic Banking such as convenience, anytime- anywhere, banking with figure tip, No cash transaction, Fast, Easy to Operate etc. but at the same time with respect to Sustainability ATMs required continues service maintenance. Mobile banking and Internet banking service is in need to train and guide Bank officials, Staff and customers regarding Mobile applications, Mechanism for handling customer grievances, Dealing with changing computer software technologies, encouragement and motivation to customers to adopt Electronic banking transaction usage. Strong communication network in the form of SMS, Feedback of customers, E-mail, Toll free number, Well knowledge Bank staff, Instructions to customers play important role in sustainability development of Electronic Banking.

DIFFICULTIES FACED BY BANKING CUSTOMERS



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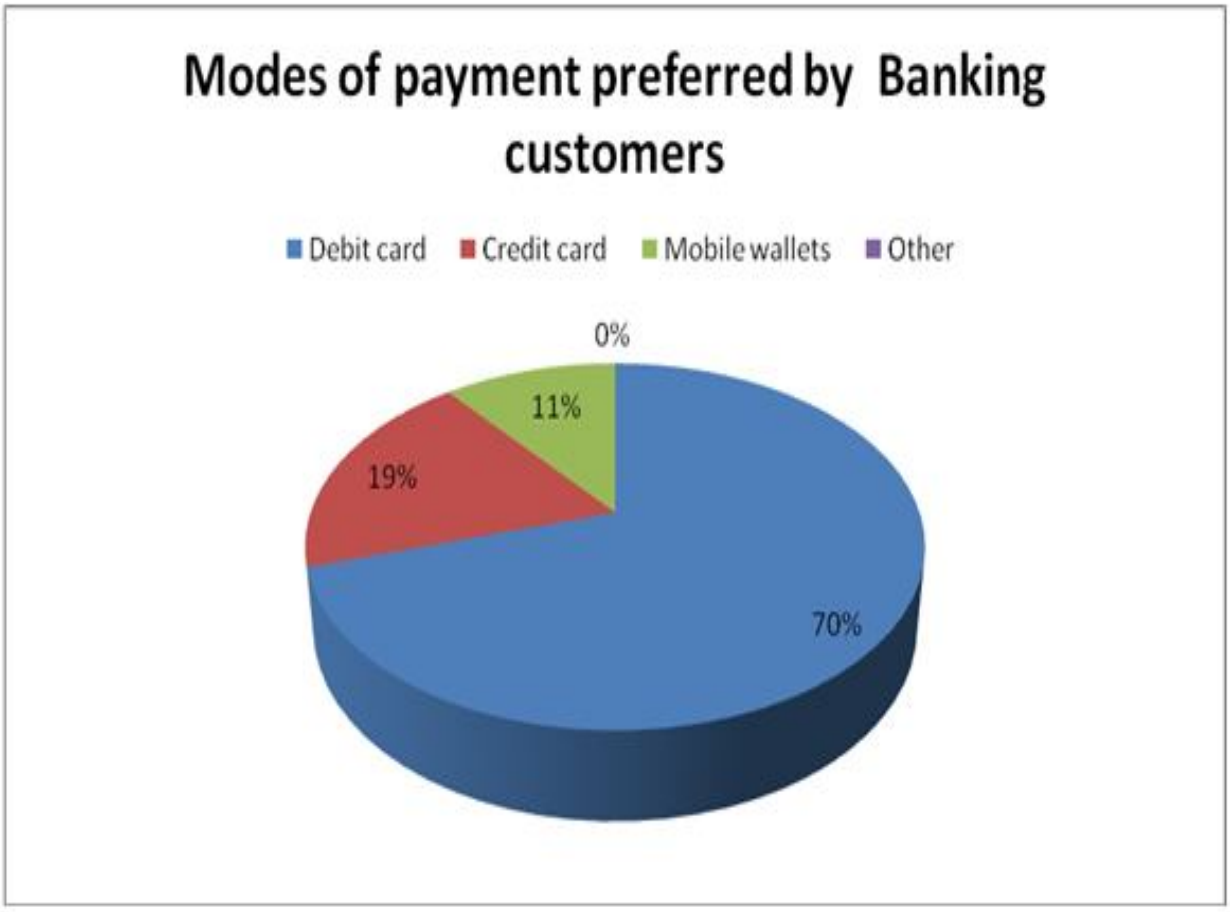
Though Indian banking sector is transforming from traditional banking to electronic banking people are still following traditional banking as there is a fear of security and lack of knowledge of technology usage. It has been revealed that banks need to perform tough role to induce customers to adopt technology in banking services. Instruction, education, orientation programme, seminars must be organised by the banks to win the confidence of customers. Banking sector cannot have growth without communication with customers. Only introduction of technology is incomplete task. To adopt any technological change in banking sector people must be aware and educated, it requires two- way communications that is why customers must be well aware and instructed for technology usage.

Customers faced many difficulties in the operation of Electronic Banking services such as Inconvenience at personal level of customer, Privacy issues, Technical problem, Security issues and Lack of awareness. It is also found that, Bank customers from Urban and rural areas are facing different level of obstacles while using Internet / Electronic banking services. Difficulties in Electronic banking services can be resolved. It is the responsibility of both E- banking service customers and service providers to unite themselves to follow instructions for getting fruitful services of Electronic banking. Electronic banking service providers need to initiate Customer awareness and orientation programme.

MODES OF PAYMENT



The most prefer way of adopting Digital Banking is adoption of ATM cards for cashless transaction. Awareness is increasing regarding other E- banking channels. Nowadays public sector banks are active in ATM's, debit card, credit cards, Electronic clearing service, Electronic funds transfer etc. Public sector banks are progressing towards centralised digitalisation. Entire range of Government payment, subsidies and welfare schemes are transferred through Banks.

Electronic Transaction of money is involved in Digital payment. Economy is moving towards cashless eco system. Constructive economic system is the requirement to conduct operations of Payment banking such as Technical eco system, Regulatory eco system and social eco system. Technical eco system has introduced E-wallets/ Digital wallets, AadharPay, Payment through Mobile App, Mobile Applications like BHIM (Bharat Interface for Money), Whats App pay etc. Regulatory eco system works under RBI's guidelines and initiatives by Government of India, further it has been noticed that lack of education and low income or poverty is the main obstacle to adopt Digital payment banking.

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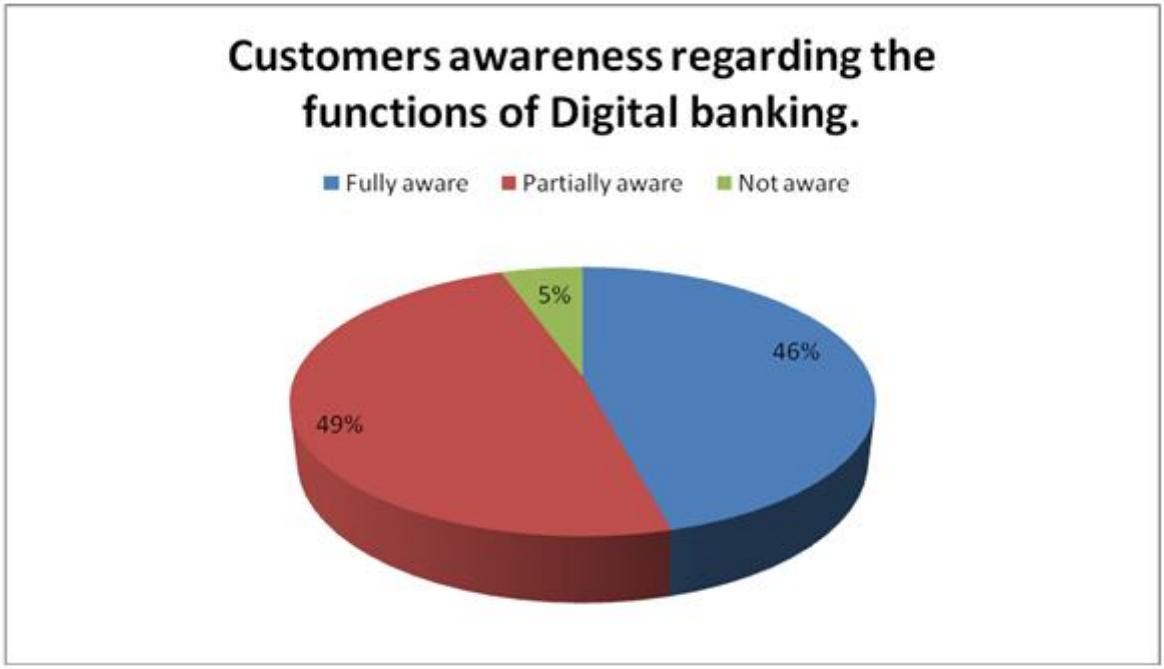
CUSTOMER AWARENESS



It was found that, various problems are faced by Bank costumers while using electronic banking services such as No face- to - face communication, No personalised touch, Poor network ,Computer illiteracy, Complicated process, Hacking of password, Privacy issue, Frequently changed password and Fear of security etc. Besides this there is a variation in Internet Banking usage as per Persons Age, Gender, Education, Income level, Customer perceptions, Occupation and Type of Bank etc. Very important finding are Private sector and foreign banks are more efficient in handling problems regarding Internet Banking. Banking Industry needs to take step towards solving Problems faced by customers to become a cashless economy. Digital Banking is now not an option, but it is the necessity of country's development to face global digitalised economy.

CONCLUSION

Income status, educational level, gender and standard of living of people have strong impact on adoption of electronic banking. Customers are using ATM's without hesitation. Customers are induced by the factors, such as fast transaction, easy access, reliability, social influence, self -service, convenience etc. In addition to ATM's customers are using e- technology for payment of various bill, insurance payment, Dish TV, Mobile bill recharge, online food order, online tickets booking etc. However at the same time customers are with presence of fear of transaction risk, privacy issue and high cost of e- banking services.Mere introduction of Electronic technologies in Banks are not enough. E- Banking technology should be more customer centric not service centric. Awareness programme should be introduced to make awareness of E- banking technology.

REFERENCES

- Abbas, S. 2015, Internet banking services quality and its impact upon customer satisfaction in Pakistan, International Review of Basic and Applied Sciences,vol,3 Issue 7, pp. 72-78
- Addai, B at.al. 2015, Electronic Banking and Customer satisfaction: Empirical evidence from Ghana, British Journal of Economics Management and Trade, vol., 9, Issue -3, pp., 1-8.
- Ahmed , at.al. 2010, Security issues on banking system, International Journal of Computer science and Information Technologies, vol. 1 (40, pp. 268- 272.
- Andrea Schaechter, 2002, Issues in electronic banking: An overview'' IMF policy discussion paper no. 02/6 (Washington: International Monetary Fund)
- Anton, G (2014), The impact of internet banking on the use of banking services, Kyiv School of Economics.
- Black, at.al 2001, The adoption of Internet financial services: A Qualitative study. International Journal of Retail & Distribution Management, 20 (8), 390-398.
- Barnes, at.al.2003, Mobile banking: concept and potential. International Journal of Mobile Communication, 1 (3), 273-288.

ISSN 2394 - 7780

- CHANDANA GOSWAMI at.al. , 2018 Technology based banking behaviour of urban customers : An empirical study in kamrup metro districts of Assam, India , Asian journal of research in banking and finance. vol. 8, no.4, pp. 20-47.
- D. C. AGRAWAL ,at.al 2017 , A comparitive study of E- banking in public and private sectors banks (With special reference to sbi and hdfc bank in haridwar) Asian journal of research in business economics and management, vol.7, no.8,pp. 370 – 389.
- Gupta P.k. at.al.2008, Internet banking in INDIA: Consumer concerns and banking strategies, Global Journal of Business Research, vol.2, no.1, pp.43-51.
- HARMAN PREET SINGH,at.al, 2011, Marketing of E-Banking Services : A Critical Analysis on lifecycle Demographics, Enabling and Disabling factors. Zenith International Journal of Multidisciplinary Research, 1(7), 20-38
- Hamid , A. 2010 An empirical investigation of Internet Banking in Taiwan , Global Journal of Business Research , vol.4 (2), pp.39-47
- John O.A. at.al 2014 ,Analysis of electronic banking and customer satisfaction in NIGERIA, European Journal of Business and Social Sciences , vol.3, no.3 pp.14-27
- JYOTSNA SHARMA , at.al. 2018, A study of obstacles faced by customers using Electronic banking service, Zenith International Journal of Business Economics and Management Research ZIJBEMR , vol. 8 (3), pp. 85- 95.
- Ling at.al. 2015, Understanding customer satisfaction of Internet Banking: A CASE STUDY in Malacca, Procedia Economics and Finance, vol.37 pp. 80-85.
- Malika Rani 2012, A study on the customer perception towards E-Banking in FEROZPUR district, International Journal of Multidisciplinary Research 2.1, 108-118.
- Morad, U.S.B. 2013, A research proposal on the impact of internet banking on customer satisfaction, Independent University and School of Business.
- Muhammad ShakilAhmed 2011, E-BANKING ; A case study of Askari Commercial Bank Pakistan : Journal of Management and Marketing. IX.II 243-255
- Malika Rani 2012, A study on the customer perception towards E-Banking in FEROZPUR district , International Journal of Multidisciplinery Research 2.1,108-118.
- Morad, U.S.B. 2013, A research proposal on the impact of internet banking on customer satisfaction, Independent University and School of Business.
- Muhammad ShakilAhmed 2011, E-BANKING ; A case study of Askari Commercial Bank Pakistan : Journal of Management and Marketing. IX.II 243-255
- NeetuJain 2012, Factors Affecting Consumer Attitude Towards Internet Banking in INDIA , International Journal of Research in IT and Management, 2.12 ,68-79.
- NEHA DIXIT at.al. 2010, Acceptance of E- Banking among Adult Customers : An Empirical Investigation in India. Journal of Internet Banking and Commerce,15 (2).
- OsunmuyiwaOlufolabi 2013, Online Banking and the Risk Involved , Research Journal Of Information Technology, 5(2), 50-54.
- Rajesh kumarsrivastava (2007). Customer Perception on Usage of Internet Banking.Innovative Marketing 3 (4).

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THE VISION OF BIG-DATA FOR SEARCH ENGINE

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ABSTRACT
It is very interesting and challenging to us as most of citizens in the world are creating piece of information in the form of data through their daily life by using electronics gazettes and they expect that most of the information which they needs that may be found from the web portal when it need. Therefore it was necessarily built such an engine which can store a single piece of information and the information may be retrieve when it required. The traditional relational database management system has a great challenge to manage eccentrically enormous amount of data which is being generated by common people in every second throughout the world in the form of Big Data.

A novel concept is build for caching big Data which uses Map-Reduce Framework which expedite the search result through search engine. When the tasks submit, their intermediate results to a component known as cache manager which enhances the working capacity of Google's Map-Reduce and Apache's Hadoops where these applications produce lots of intermediate results. The vision of search engine in respect of Big Data is expected highly efficient with accurate search result reducing the all risk factors for valuable information for future generation. The Big Data analyzing leadership visions now helping data and analytics leaders, and other IT leaders, to succeed in the coming digital era .

Keywords: Big data, Map reduce Frame work, Cache manager, Search Engine

1. INTRODUCTION

All the large volume of data now a day is called "Big data". A few years ago, few software developers worked on distributed systems with dozens of nodes. Now a day, after introducing of the cloud concept, most of the software has made such systems increasingly common, and developers are responding by developing systems tuned for their workloads. New systems for large-scale data storage and processing in large network are announced regularly. Each packet of data is the asset and hold value for the organization. Now the organizations have a duty to all stakeholders to manage them effectively in order to maximize profit, control cost, and ensure the vitality of the organization. The effective records management ensures that the information needed is retrievable, authentic, and accurate through the search engine.

When we consider an organization that has data it is need to find things (rows, cells, files) inside the data, and we should load that data into a search engine and make it searchable. Here we should consider "online analytical processing" (OLAP), and Multi-dimensional hyper cubes. There is no reason to use RDBMS technologies. Search engines have made OLAP for business intelligence and business analytics, the search engines can execute searches for dashboards, business reports, exploratory analysis, online responsive analysis, and self-service analytics which is much faster and much more user-friendly manner than any other technology.

The scalable distributed systems over a wide network can be formidably complex. They challenge in the current engineering practice in several ways. This has driven the growth of the big data support industry. Cloud-era is one such support provider, which is selling support for the Hadoop ecosystem it includes some of today's most **widely deployed "big data" systems**. This article describes the causes of failures seen by Cloud-era supporters.

2. OBJECTIVE OF RESEARCH

Due to technological advancement, Big Data has become popular in various scientific and technological fields, including social sciences and management. In connection with the Big Data, it is possible for further research and analysis to identify human intentions, feelings and thoughts which are allowing us to identify not only individuals but also the intentions of communities and society as a whole . However, the analysis of Big Data differs from traditional methods of data analysis.

During the time of analysis of Big Data is has found the gap between the object of observation and the object of analysis. In this case, if the objects of observation are user accounts, it is not always obvious whom each account represents. The account can also be used by family members, friends or outsiders for transferring money. For analyzing Big Data some assumptions are usually made about the nature of the object of observation, which are often violated in practice. Another problem that leads to the difference between the

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object of observation and the object of analysis is the trade-off between information and confidentiality. Since confidentiality restricts access to data at the individual level, then analysis may be done based on the indirect data.

The other important issue in analyzing Big Data is a possibly false conclusion that an object of observation can be considered an average presence of large population than a sample actually covered. For example, it can get a false conclusion if it is analyzing data from online sources in countries where less than half of the country men have access to the Internet.

In this case the important issue that arises with collecting publicly available data from any enterprise websites. There is not always information about which groups of people the available Big Data represents, how it was sampled, whether it was pre-processed, etc. Such data is also less likely to include detailed demographic information for confidentiality reasons. As a result, the inference from the analysis of Big Data to wider groups than those from which this data was obtained is uncertain.

However, the very possibility of such an inference is called into question. For example, while social media is a popular source of Big Data among researchers, even if it can view social media data as a random sample, social media users are different from the average representative of the population as a whole - they may be younger and have a specialist or higher education.

The grouping concept is also a serious problem when Big Data is obtained using web scraping though scraping provides more control over the collection process, there are many unknowns relationship between the information available on the website and information that the website owner does not provide. In addition, server problems, network load, website update policies, poor web page design, and the non-random nature of search results are also just some of the factors that lead to sampling errors when collecting Big Data.

4. METHODOLOGY

The multi clustering procedure is designed for dividing the data into groups of similar objects according to maximizing the similarity between objects in the same group and minimizing the similarity between objects in different groups by the continuous increase in the amount of data, traditional clustering methods have reached their limits, which have led to the development of methods for parallel clustering.

The very popular model for Big Data processing is Map-Reduce. This model is used at Google, for various purposes. The strengths of this model correlate to the fact that it allows automatic parallelism and distribution. In addition to a fault-tolerant mechanism which helps to overcome failures of operations, it also provides the various tools for state management, monitoring and load balancing. The optimization of data distribution is provided by storing them on local disks to avoid excessive consumption of network bandwidth.

The cluster analysis procedure of MapReduce consists of two steps: ―Map and ―Reduce. At the ―Map‖ step data is filtered and sorted, while at the ―Reduce‖ step the results of the previous step are summarized. The Map function takes records from the input files as key-value pairs and creates intermediate key-value pairs. The Reduce function works with the values of a certain intermediate key and produces one final value for the same key.

There are several software are available for implementation the MapReduce model. The most famous framework is Hadoop, implemented in the Java language. It is developed by the Apache Software foundation this project includes a set of open source modules that enables reliable and scalable distributed computing. The features are most for its organized architecture, scalability, cost-effectiveness, flexibility and resilience.

During the execution task of user verification is solved in two stages. The segmentation (clustering) allows us grouping the indirect data about the behaviour of unauthorized users on the network in such a way that each segment or cluster corresponds to a specific individual. After that, the data in these segments can be searched, retrieved on demand, analyzed and visualized. Here a special tools are used for these tasks; most common tools are the following. The Sphinx is a full-text search engine with a distinctive feature of high indexing and searching speed. It is integrated with existing database management systems like MySQL, PostgreSQL and API for common web programming languages which officially supports PHP, Python. It supports advanced search capabilities, including ranking and stemming for various languages, distributed search and clustering support. For our large volumes of data the Delta index scheme can be used to speed up indexing. In addition to that, Sphinx supports Real Time indexes, filtering and sorting of search results and searching for wildcard conditions.

Now Apache Solr is an extensible search engine which support full-text search on the open source platform, based on the Apache Lucene. Its peculiarity is that it is not just a technical solution for searching, but a platform

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which can easily be expanded, changed and customized for various needs from the usual full-text search on a website to a distributed system for storing, receiving and analyzing text and other data with a powerful query language which does not make duplicate in the database.

The Xapian is a search engine library. This packages are available for Ubuntu and Red Hat, can be compiled for OSX, and can also run under Windows via CygWin. The Xapian is less common and flexible than the above mentioned search engines. It has no morphology, but there is stemming for a number of languages. The implemented features include spell check in search queries, incremental index, updated in parallel with the search, operating with several indexes and in-memory indexes for small databases.

The elastic search was initially developed as a system for full-text search in large volumes of unstructured data. Now, Elastic search is a full-fledged analytical system with various capabilities. The data in Elastic search is stored in an inverted index format based on Apache Lucene. The Apache Lucene is the most famous search engine, besically focused specifically on embedding in other programs. The Lucene is a library for high-speed full-text search, written in Java which provides advanced search capabilities, a good index building and storage system that can simultaneously add, delete documents and perform optimization along with the search, as well as parallel search on a set of indexes combining the results. The disadvantage is comparatively low indexing speed in comparison with Sphinx.

The elastic search allows us dividing the data between several machines, which makes it possible to support high-performance operations. The parts between which data is divided are called shards. The Shards come in two types one is master and is replica. The master allows both read and write operations, while the replica is read only, and is an exact copy of the master. This structure ensures the stability of the system, if the event of a master failure, the replica becomes a master. As the replicas are exact copies of the master, different queries can be processed at the same time from both the master and the replica. Thus, customer requests for the index are executed in parallel on all shards, after which the results of each shard are collected and sent back to the client that increases system performance.

5. CONCLUSIONS

The search engine for big data applications reduces execution time, CPU utilization, and alters the MapReduce programming model. The search engine has many parameters which keywords should we target, which part of pages should optimize. A strategy for finding the right keywords is a direct association with the closest competitors. The keywords are found with the competitor receives a lot of traffic. This is also an attractive search term for us but it is worth it to work on these pages. The trust Rank is one of the methods for improving rankings in complex linking schemes as because the Big Data is complex data with different variety and volume.

The vision of Search Engine in Big data analytics to analysis the hidden patterns, market trends and other business related information. The findings using Big data analytics can be used to improve the marketing performance and other business activities. In this work big data analytics and Search Engine keywords are combined. By combining Search Engine keywords and big data analytics new strategies are explored and implemented in the business. The Search Engine like Google do analyses but many marketers don't realize the real impact of big data on Search Engine. The Big data is making it easier for search engines to analyze content and deliver results that are the most relevant to the expected result needs. As a consequence, Search Engine which focus on creating the true content people are searching for which will be uniquely positioned to benefit from the impact of big data on Search Engine.

6. REFERENCE

1. Yaxiong Zhao, Jie Wu, and Cong Liu, “Dache: A Data Aware Caching for Big- Data Applications Using the MapReduce Framework” , TSINGHUA SCIENCE AND TECHNOLOGY ISSN 1007-0214 05/10 Volume 19, Number 1, pp 39- 50, February 2014
2. http://vision.cloudera.com/top-reasons-why-search-engines-and-big-data-go-hand-in-hand-part-1/
3. www.ijarcsse.com
4. International Journal of Advanced Computer Science and Applications, Vol. 8, No. 12, 2017
5. http://vision.cloudera.com/top-reasons-why-search-engines-and-big-data-go-hand-in-hand-part-1/
6. https://www.inc.com/aj-agrawal/4-ways-big-data-is-changing-seo.html
7. Elastic search Available from < https://www.elastic.co/products/elasticsearch>

ISSN 2394 - 7780

8. Shmueli G., Yahav I., 2014, "Tackling Simpson's paradox in Big Data with classification and regression trees", Proceedings of the European Conference on Information Systems (ECIS) 2014, Tel Aviv, Israel, June 9-11, 2014, ISBN 978-0-9915567-0-0 Wzoroeeodedpr435
9. Lamari Y., Slaoui SC Clustering categorical data based on the relational analysis approach and MapReduce, Journal of Big Data. 2017. https://doi.org/10.1186/s40537-017-0090-7

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CHALLENGES AND ISSUES IN MANAGING HUMAN RESOURCES

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ABSTRACT
Organizations face challenges and issues almost on a regular basis. If one is settled, another emerges. At present, the major challenges and issues faced by organizations are remaking of organizational culture, provision of all amenities and facilities and social status through employment, allaying suspicions and fears, employees increasing role in management and resolution of emerging or perpetual conflicts.

Keywords: Organizational culture; Social status; Facilities; Gender parity; Managerial role; Change and resistance; Living standard; Perpetual conflict; Commitment.

INTRODUCTION
In an organizational setup, issues and challenges are not always segregatable. Every challenge becomes an issue and every issue is a challenge. In pursuance of organizational goals all emerging issues must be settled and all challenges must be met. While timely attention to them is necessary, it is desirable that they are foreseen and their resolutions preplanned so that the issues do not turn into problems.

Together with human resources, an organization has to manage other resources viz. technical, financial, material, environmental and so on. Managing human resources is most important and yet the most intricate of them all because human beings are the ones who not only solve all other problems but happen to be complicated problems in themselves.

Howsoever complicated a machine is procured, to obtain the desirable results, knowledge and skill of an operator will still be required which lie in his mind and fingertips. Whereas well managed finances of an organization may yield wonderful results, the ill managed finances may lead to disaster. In both cases the management lies with human beings. Those responsible for management of materials are to be aware that the inventory has to be balanced, procurements have to be properly timed and timely supplies to be ensured so that the plant operation is not adversely affected. It is again the man who handles the materials, managing them according to the needs of the organization. Thus howsoever important the other resources are, the importance of human beings behind them all can never be underemphasized.

In order that all other resources are properly managed by them, human resources themselves must be so managed that they perform their task as assigned and expected of them. The major issues and challenges currently faced by the organizations in managing human resources can be enlisted as:

1. Change in organizational culture
In recent past, the problem of adaptation to new organizational culture started with nationalization of the country's coal industry when hundreds of different cultures viz. Birla Culture, Dalmia Culture, Singhania Culture, Jhunjhunwala Culture, Sonthalia Culture, Agarwal Culture, Jharia Culture, Raniganj Culture, etc. (to name only as samples) were suddenly brought to one single frame. The employees overnight fell between utter shock and high satisfaction. It took them quite some time to adapt to the new culture- Coal IndiaCulture. The new management had a tough time in explaining to them the change in situation and getting them to respond to the situation positively. The phenomenon continues till date and galore of merger of organizations and takeover of one organization by the other are noticed in almost all fields of business operations like Akashika Foods taking over Maiyas only yesterday. Making the concerned human beings adapt suddenly to a new culture is becoming a massive challenge towards managing human resources.

2. According Social Status
All human beings are possessed with an inherent desire to acquire higher and higher social status generally through employment and take legitimate pride in them. It becomes a challenge for the organizations to fulfill such urges at a pace desired by the employees. However, by providing a systematic officiating and promotion arrangement may clearly let them know how and when they could acquire higher positions within the organization and enhance their social status. Since the issue is of regular nature the remedy also has to be of regular nature.

3. Amenities and Facilities
As a group the employees are getting quite conscious day by day and demand more and more amenities and facilities at the workplace. Cost conscious managements tend to avoid such demands as much as possible. The

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demands, specially in safety and wellfare areas cannot and should not be avoided too long to keep the employees continually involved in performance of their duties. Pressing demands, for improvement in the provisions both quantitatively and qualitatively often keep the managements hard pressed.

4. Gender Parity

One of the latest challenges in managing human resources is coming from women seeking adequate share at the workspace. Although women have started occupying positions in many fields so far dominated by men such as aviation, management, education, computer application, army and so on, but their urge to find larger volume and space is facing several hurdles. The Trade Unions may not cooperate as opening opportunities for women may restrict employment for male candidates forming their major strength at present.

While some employers like TATA Steel have already contemplated to double the population of women employees in the next 4 years, from 9% to 18% with a view not to miss out on a major part of the talent pool[1], it must be noted however that many employers hesitate in employing larger number of women because of their lesser availability for the work place owing to legislative limitations (Factories Act and Rules). Satisfaction of this growing urge will depend upon employers getting more and more liberal on the one hand and legislative amendments on the other to facilitate opportunities for them.

According to a recent International Monetary Fund study, Indian GDP can expand by 27% if the number of women workers increase to the same level as that of men.[2]

5. Fears and Suspicions

At times foreign materials are dumped in the local market on a large scale adversely affecting local productions. Managements resort to cost control methods to deal with the situations but employees start fearing about their job loss and even withdraw their regular efforts towards normal production. Unwarrantedly a delicate situation is created. Whereas such dumpings cannot be controlled unilaterally as they are governed by international trade agreements, the fear and suspicions so generated must be allayed to ensure employees performance at a normal rate.

6. Employees increasing role in Management

Employees sustain an urge to have greater and greater say in the affairs of management. They want to play important and effective roles in the process of decision making instead of being only the implementators of decisions taken by others. Many employees do not favor this idea because of the knowledge gap between the two cadres. This cannot be avoided for too long. Since the country is being managed democratically, industries and institutions cannot work differently. Later if not sooner this will have to be conceded. Accepting and conceding greater role of employees in management will go a long way towards harmonizing industrial relations and satisfying their political urges.

7. Living Standards

Modern employees are essentially socioeconomic beings. They tend to compare between what they have and what their neighbors have. They sustain the strong urge to excel others without lagging behind and see in employment the means to fulfill such desires. This prods them to demand more and more almost all the time. Since organizations are run by systems and not by individual desires, a proper collective bargaining system shall be able to take care of such aspirations of employees as a group. The system may leave the employers to rest and relax in peace for a specified period. Otherwise they may be facing demands at a vexatious frequency.

8. Resistance to Change

Employees observe a tendency to resist any change by the management unilaterally in relation to work like new method, procedure, condition, etc. and both directly and indirectly pressurize the management to come to the negotiating table. Managements are required to rely upon participative system of managing human resources as it is expected that a joint decision is likely to go through without resistance. Change is inevitable not only for organizational survival but also for desirable progress. Before being implemented therefore, it has got to be made acceptable by all concerned. Any change is meaningful only if it has the approval of all those who are affected thereby.

9. Perpetual Conflict

The nature of perpetual conflict between managements and employees can be illustrated as below:

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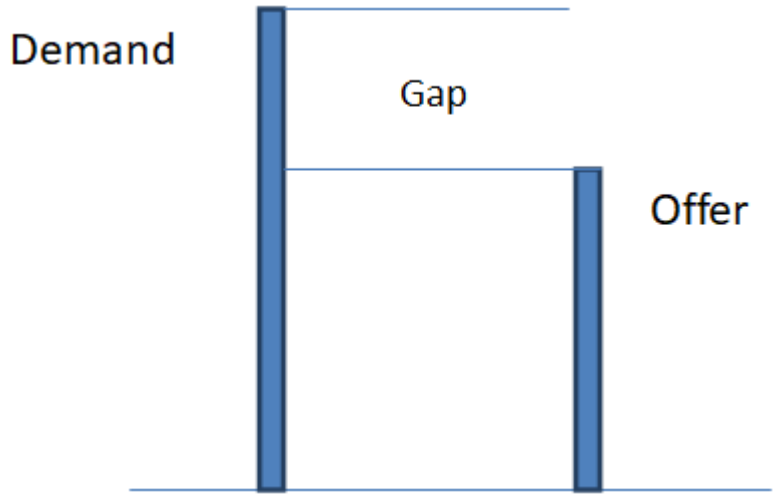

The demand emanating from the desires of the employees always keep on increasing whereas offer by the managements are kept at minimum leaving an obvious gap between them. It would be in the best interest of the organizations to reduce this gap to a minimum if not getting them eliminated altogether. A wider gap will keep the human resources from flowing appropriately towards organizational goal, leading to conflicts and even withdrawal of normal human efforts. The gap management should obtain top priority in the organizational programmes.

CONCLUSION

It would be only unrealistic to expect that the issues and challenges in managing human resources shall ever be fully settled and realized. Human beings are possessed with higher mental processes such as thinking, reasoning, imagining and characteristic impulses like feelings and emotions. At times their dispositions are unpredictable. Only imagination and ingenuity on the part of the management can make them perform at a normal level and fulfill organizational needs.

REFERENCES

1. S.D. Tripathy, V.P.(H.R.M.). TATA Steel Gender Diversity Programs. Economic Times. 10th November, 2015.
2. KalpanaKochar, Dy. Director, IMFs Asia and Pacific Department. Report on Gender Parity to boost India's growth. October 2016.

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INSURANCE INDUSTRY: SURVIVAL OF FEMALE EMPLOYEES

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INTRODUCTION

With 136 cores and ever increasing population , we as an individual have just one life. JUST ONE ! That's also comes with an " IF", factor in it. Ie. LIFE. This gave birth to concept of Insurance in the world which later got governed by " Law of Large Numbers".

Initially hundreds of private players were there in the Industry which later on taken up by the Govt. of India in 1956 which gave birth to Life Insurance Corporation of India and other GICs. But again in 1999 the Malhotra committee decided get the Industry privatized with a governing body called IRDA (Insurance Regulatory Development Authority) and that was the time when lot many youth both male and female got job opportunity in this Pvt. Playing Insurance sector and got the opportunity to serve the society .

So, let's find out, what had been the acceptance level and challenges for female employee in the Industry. And, I will be the one who can share real time firsthand professional experience with some research stuff.

There is a wide difference in development between two countries with similar resources due to differences in quality of people. Development of a country depends primarily on the skills, attitude and values of its human resource. Human Resource, along with financial and material resources contributes to the production of services in an organization. Especially in an Life Insurance Company, there is no product which is sold, it is only a promise of financial security which they sell. So, the entire team of Agents, Sales People, Agent Recruitment Department, Training Team, Operation Team as well as Claims team too along with Underwriting and Marketing Department work towards a common objective that is dispensing Insurance Coverage to the society to the deepest penetration possible and thus they fulfill their long term goal of protecting the society. If any one of the department or the team is not up to the mark, then end objective can't be met or will be met partially or will be always prone to customer complaints.

Keeping the above facts in mind, Insurance Companies need to be more focused on their recruiting efforts, developing careful recruitment process, training employees to adapt to change, providing appropriate and sufficient educational programs and accounting of their investment in recruiting, selecting and training employees of both male and female.

FEMALE AS A CONTRIBUTOR

Percentage of female population in India as per 2011 census is 48.53%. In 2012 only 27% of adult Indian female had a job or were actively looking for one ; compare to 79% of men. Worryingly, India's rapid urbanization has not yet encouraged more women to join the labor force.

Further filtering the discussion; the percentage of main workers to total female population is 25.5% which shows an increase as compared to 14.68% reported in 2001 census. As per 2011 Census; after broader categorization of different sectors where female population is employed , 47% are falling in to " others" category and this category indeed includes sectors like , Fashion, Media, Medicine, Engineering , Hotel, banking and Insurance too. Out of these " others", 23% are in corporate sector which is inclusive of Insurance as well.

At the industry level , the finding of a survey confirms that the service sector employees the higher percentage of female employees which is roughly like; Professional Services – 56%, Media and Entertainment 42% and Insurance – 60%.

Insurance 60%! Then why in my piece of write up; Survival of female employees itself is coming to question. So, I am not discussing their presence which might be higher than males collectively but I am actually projecting how their survival is a challenge for them which becomes a reason for attrition.

REASONS WHY SURVIVAL FOUND DIFFICULT

Their survival is coming into a question due to following broader reasons:

1. Demanding and prolonged working hours
2. Misselling has made the market impopular and more vulnerable for female.
3. There is no back up work force leading to no leaves mainly applicable to non sales staffs.
4. Female in sales often faces challenges where one tries to take advantage of her.

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CONCLUSION

Solution remains a simple spill over of 10 to 12 hours of work which will automatically solve half of the problem.

They will have a work life balance. Management should be considerate enough to accommodate and accept the change ; which will make things good not just for female but for entire organization as a whole. They just have to think beyond business or think taking humanity into consideration.

Trust me a single female workforce can bring a lot of decorum in the organization.

REFERENCES

1. www.statisticstimes.com
2. www.worldbank.org
3. Statically profile on women labor 2012-13, labor bureau, Ministry of labor & Employment , Govt. of India
4. www.ijsr.net/nov161540

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WASTE MANAGEMENT FOR ENVIRONMENTAL SANITATION

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ABSTRACT

In modern age with advancement of Science and Technology, we are also accumulating different types of waste –e.g. Bio-medical waste, Mining waste and Nuclear waste which are not only spoiling the atmosphere but also are health hazardous. Their disposalby burying them is not a sustainable solution. Planning the waste management and recycling for all the rubbish produced in our country is an enormous task which involves both logistic planning and scientific knowledge and understanding the impact of same on the environment with cost effectiveness of the process.

The most important reason for waste collection is the protection of environment and health of population.Rotting garbage is also known to produce harmful gases that mix with the air and causes breathing problem.

Bio-Medical Waste: Disposal of this is one of the biggest challenges since it contains infectious material and bodily fluids like blood and other contaminants. Most of tertiary care health hospitals use Radioisotopes for diagnostic and therapeuticapplications which are vital components of hospital waste management.

Mining Waste:These are high volume material that originates from the process of excavation and chemical processing of metalliferrous and non-metalliferrous minerals.

Nuclear Waste: The Nuclear power plant structures also become radioactive during operations due to disintegration of radioactive substances such as Uranium, heavy water, etc. The nuclear waste also pollutes the ground water and surrounding area and their flora and fauna.

Waste management is the activities and action required to manage all the above waste from its inception to its final disposal-which includes collection, transport and treatment of the same.

INTRODUCTION

Wastes are broadly classified on the basisof their source of generation viz. Domestic, Hospitals & Health services , Trade and Industrial. The most hazardous waste are Nuclear mining waste and Bio-medical waste.

The approximate break up of annual solid wastes productionis stated below:

Domestic and trade wastes	8.5%
Other industries	15.2%
Thermal power stations	7.3%
Constructions	2%
Mining and quarrying	6.7%

Most solid wastes are dumped on land as soil heaps or as landfill to quarries or mine shafts or as dumps consisting of a wide range of materials as stated in the Figure (1)– Modes of waste disposal.

Most of the soil waste is dumped on land in heaps in uncontrollable manner in developing countries. The Industrial wastes are treated in treatment plants and valuable materials are recycled. The volume of wastes are reduced by Pulverization at the rate of 33% or by incineration which helps to reduce up to 90% wastes at 900 degree Centigrade. They have advantage in terms of environment free from corrosion emission of odors and also free from bacteria and wet organic matter, which can give off offensive odours and gases. The waste heat from incineration can be utilized for supplementing electrical generation or domestic heating .

BIO-MEDICAL WASTE (BMW)

These are generated by hospitals, nursing homes , clinics , dispensaries , veterinary houses , pathological laboratories and blood bank. They are highly infectious and harm people and environment. Improper disposal of bio-medical waste may also cause air , water and soil pollution. They contaminate ground water supplies exposing the entire population to the risk of diseases and parasites. (Ref : Figure (2))

Transport of toxic normal chemicals from love canal dumpsite into adjoining area. Reference –Figure- (3).

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WASTE WATER TREATMENT

Conventional sewage treatment plants are based on biological decomposition of non-toxic organic wastes , using bacteria. Such biological decomposition is conducted under aerobic conditions, i.e. in the presence of plenty of oxygen.

Organic waste Aerobic

(C,H,O,F,S) ----------→ $CO_2 + H_2O + H_2SO_4 + NH_4^+ + NO_3^-$

O_2

|----------→ Total organic load in waste water ----→ CO_2 etc

Bacteria

The above shows Biochemical oxygen demand (BOD) .

Figure (4) Showing Primary and Secondary treatment of Municipal waste water.

AEROBIC TREATMENT PROCESSES

These are secondary waste treatment methods by biological processes. After removal of insoluble matter i.e. grit, grease, scum etc. and sedimentation the resulting sludge is subjected to secondary treatments. The biodegradable organic matter is utilized by bacterial cells for growth and metabolism.

Oxidative degradation is accomplished by chemoheterotropic bacteria and cillated protozoa.

The merits of the ASP are – (i) low – retention time and (ii) BOD removal upto 95%. The demerits of the ASP are (i) low strength waste , BOD, 1500 – 2500 mg/l, (ii) energy is required for aeration , (iii) high-sludge production and (iv) disposal problem of activated sludge. (Ref : Figure (5) – showing lagooning process.

ANAEROBIC TREATMENT

95% of biodegradable carbon is decomposed into biogas and the rest 5% into biomass. Threemain steps are involved in the breakdown of organic waste under anaerobic conditions –

Hydrolytic Steps Acetogenetic Steps 35□C,pH 6-8

Organic waste ----------→ Organic acids , Alcohol ----------→ Acetic acid ,H_2, CO_2 ------

Methanogenic step 45□C,pH 6-8

----------→ CH_4 , CO_2

Anaerobic waste treatment is preferred to other processes for the reasons : (i) cheaper than aerobic process in respect of treatment of medium and high strength waste waters , (ii) biogas (energy) is produced instead of being wasted, (iii) less space is required for anaerobic plant and (iv) relatively low-cost technology in terms of equipments. (Ref : Figure 6 : Anaerobic digestion at the core of a treatment and recovery technology).

Figure 7 : shows Filtering industrial wastes by synthetic resins.

SOLID WASTE MANAGEMENT

Solid waste can be managed by bacteria and fungi which are capable of decomposing organic waste and it may be possible to produce such micro organisms by genetic engineering. On exposure tomicro organisms they metabolise glucose , biodegradable polymers break down to short carbon chains that decomposers can metabolise.

CONCLUSION

Waste Management is very important for the clean and healthy environment i.e. environmental sanitation . The waste generated from different sources are in such a huge amount that they can spoil the whole population with infectious and unhygienic bye products. The earth and its flora and fauna and the most important Mankind to be saved by Waste Management in proper manner.

REFERENCES

1. A.E.S., Green, Medical waste Incineration and Pollution , van Nostrand, New York(1992).
2. R.K. Shomashekar and M.R Iyengar (Eds.) solid Waste Management and Current Status, Strategies for Future , Allied Publishers, Mumbai (2002).
3. S.E. Manahan, Environmental Chemistry ,lewis Publishers , Florida , USA , 6th Edn. (1994).
4. W.Hagemann , W. Bishofsberger and E. Engelmem (Eds) , Upgrading Waste Water Treatment Plants, Pergamon Press , Ellmsford, N.Y. (1990).

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Figure-1

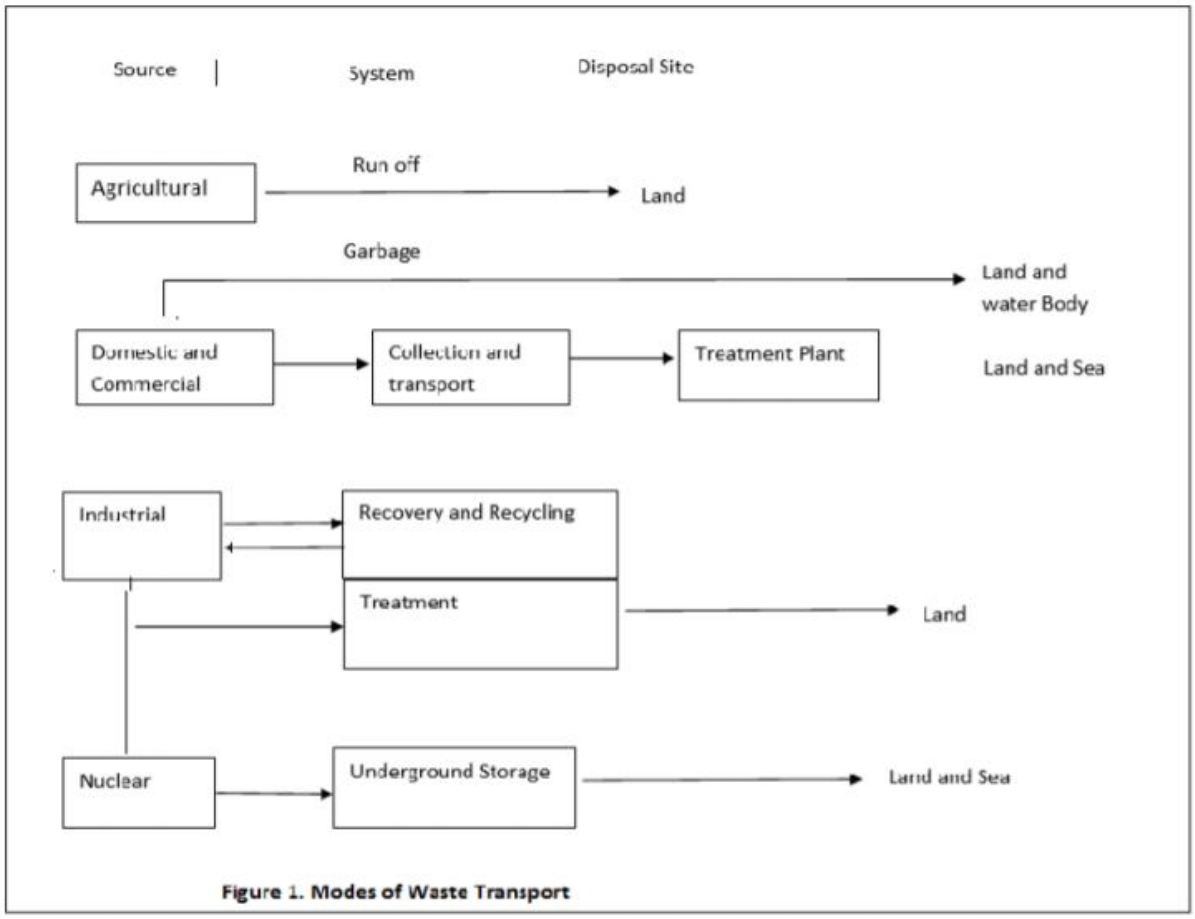

Figure 1. Modes of Waste Transport

Figure-2

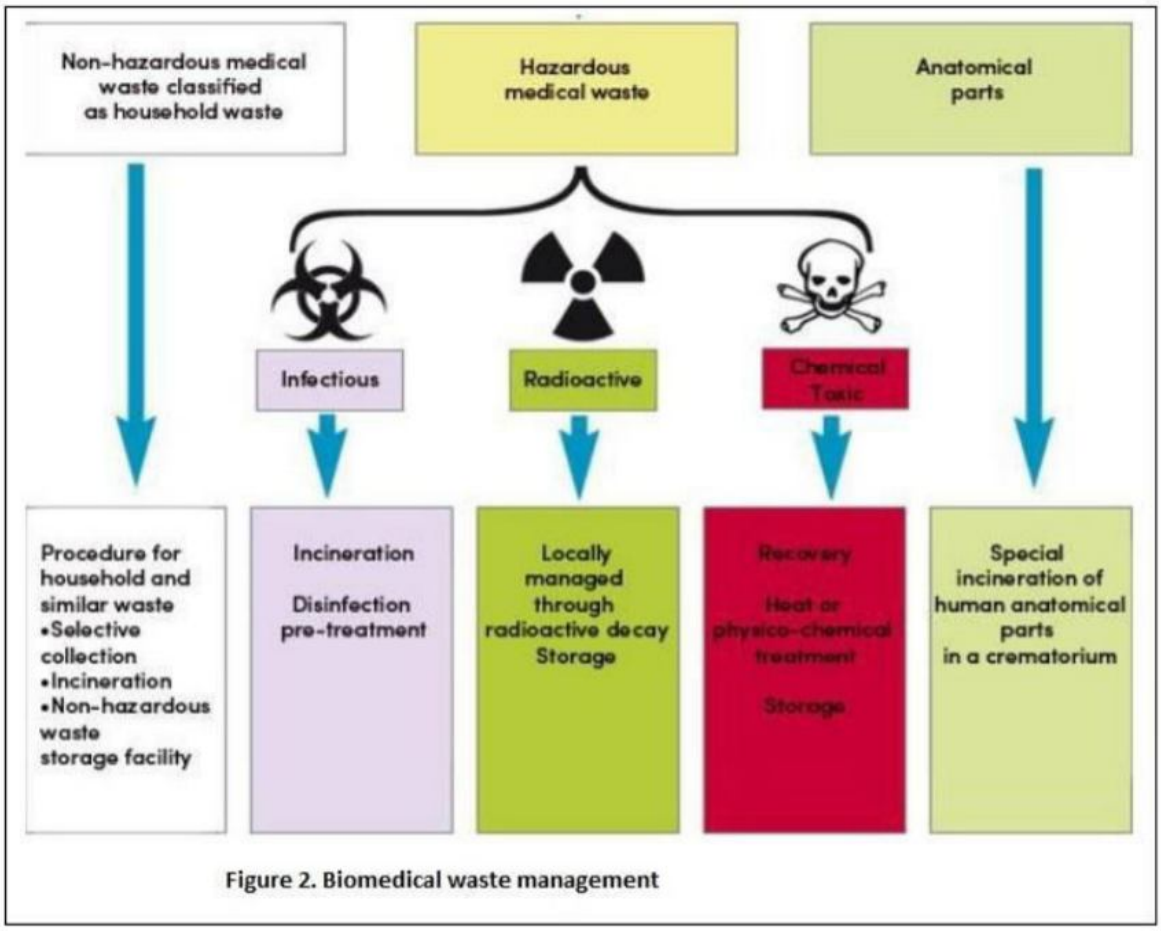

Figure 2. Biomedical waste management

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Figure-3

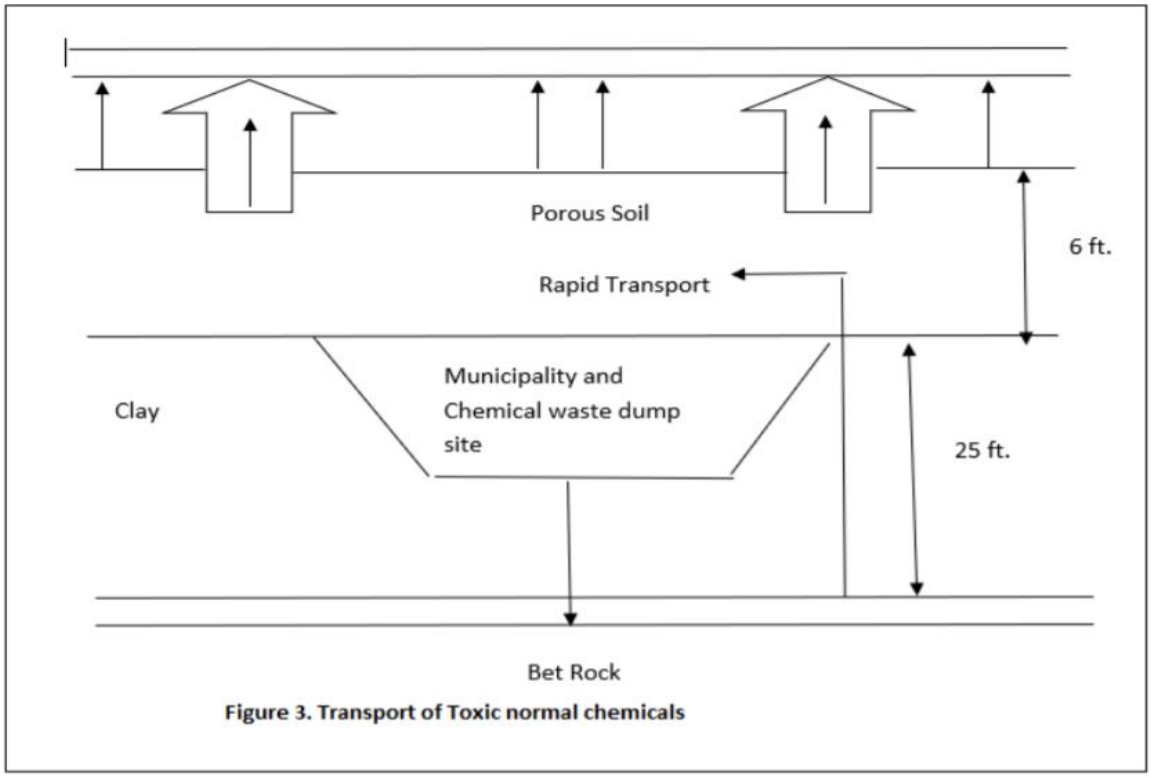

Figure 3. Transport of Toxic normal chemicals

Figure-4

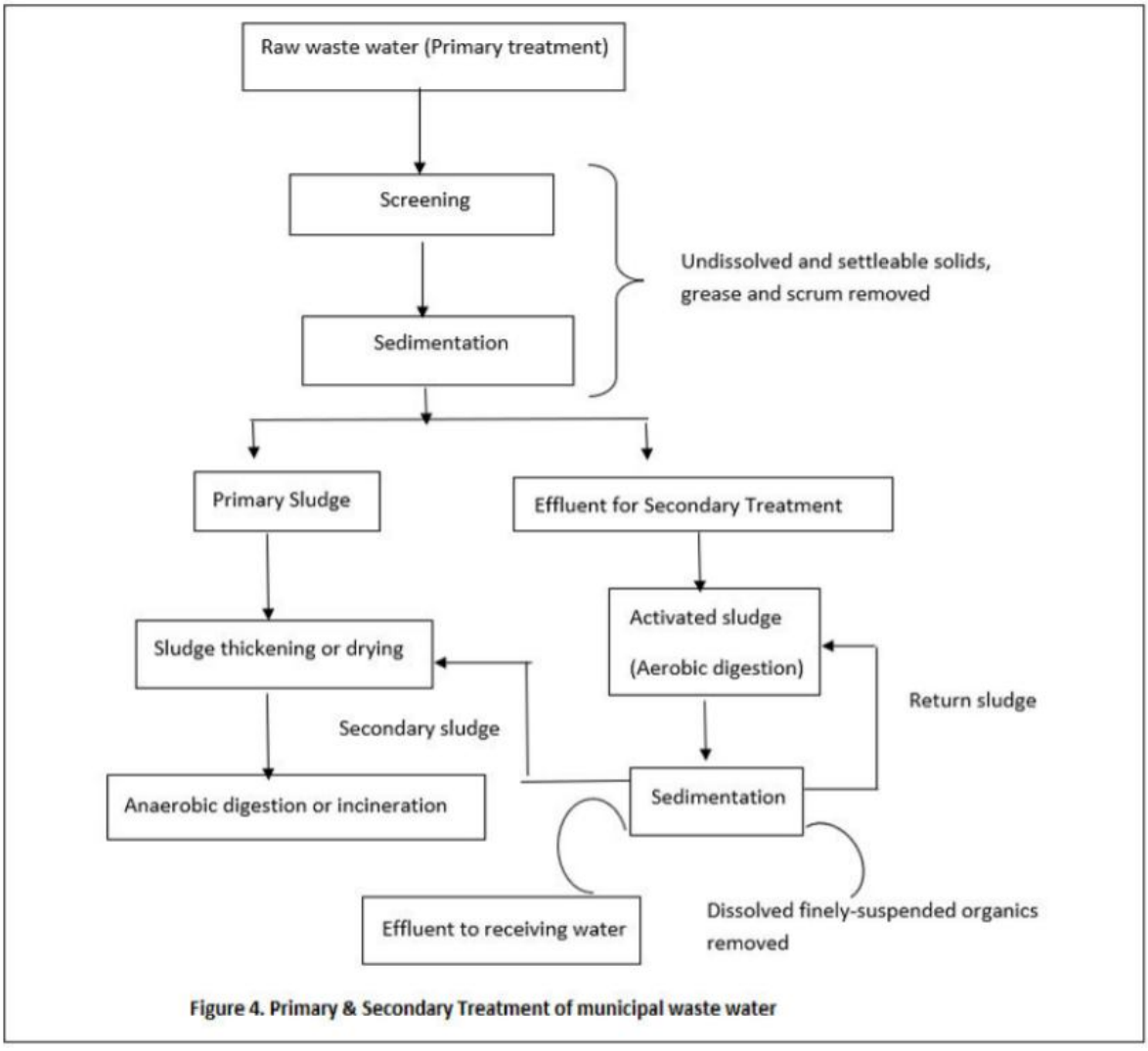

Figure 4. Primary & Secondary Treatment of municipal waste water

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Figure-5

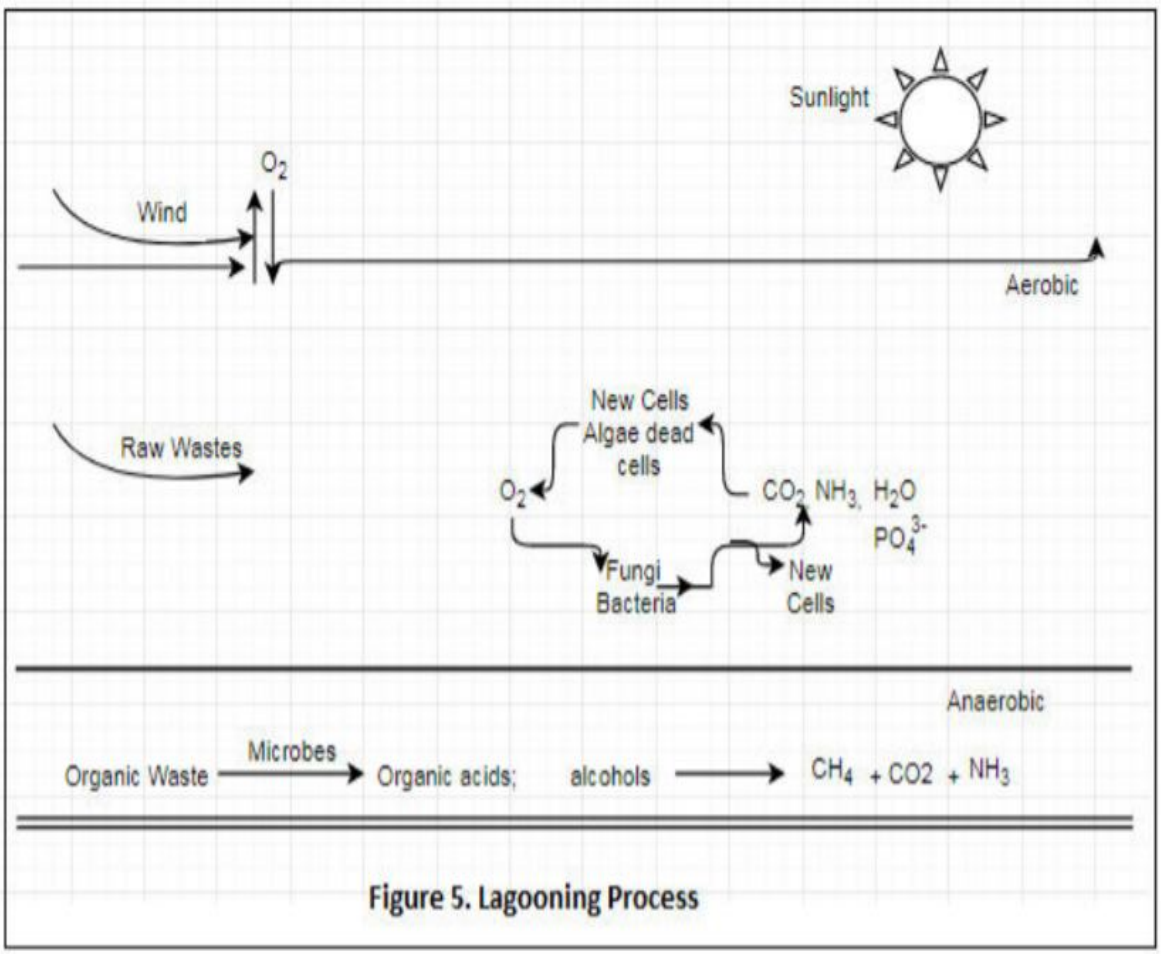

Figure 5. Lagooning Process

Figure-6

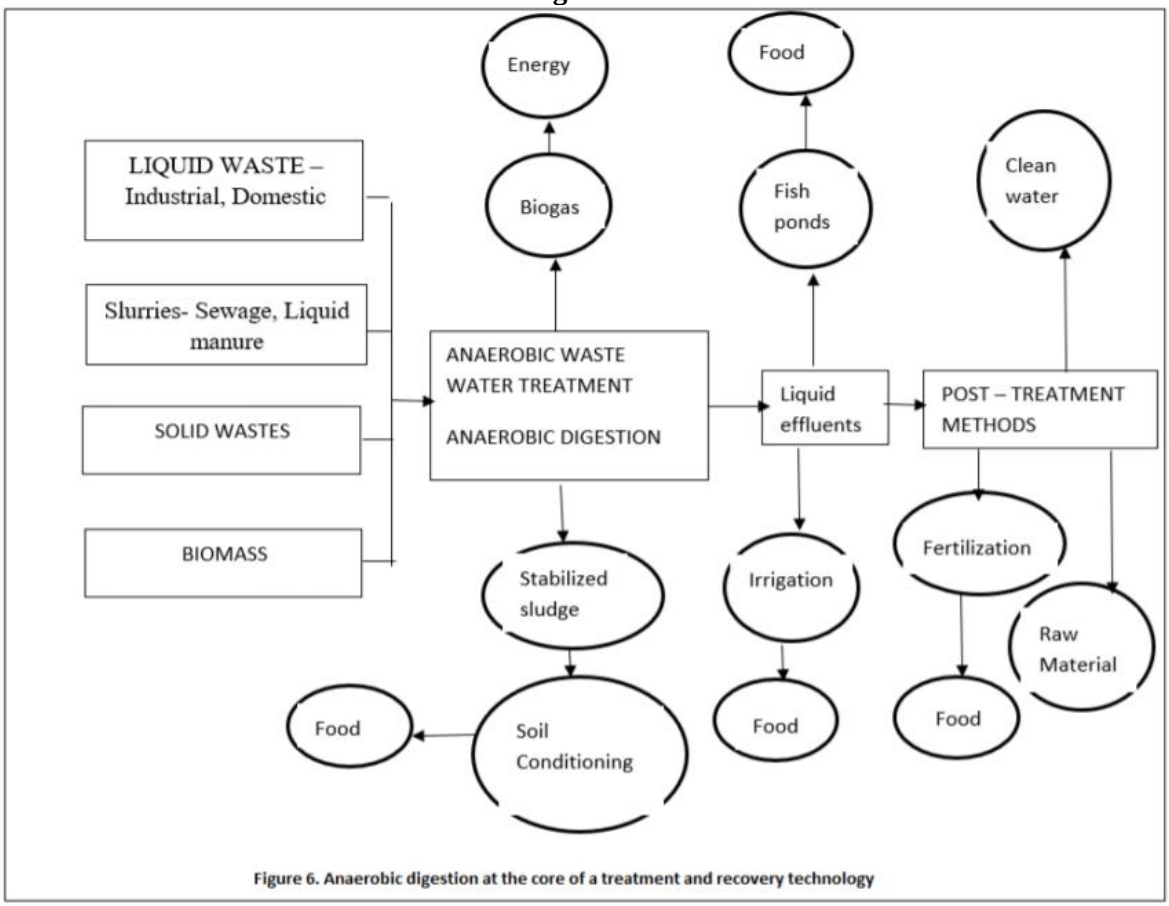

Figure 6. Anaerobic digestion at the core of a treatment and recovery technology

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Figure-7

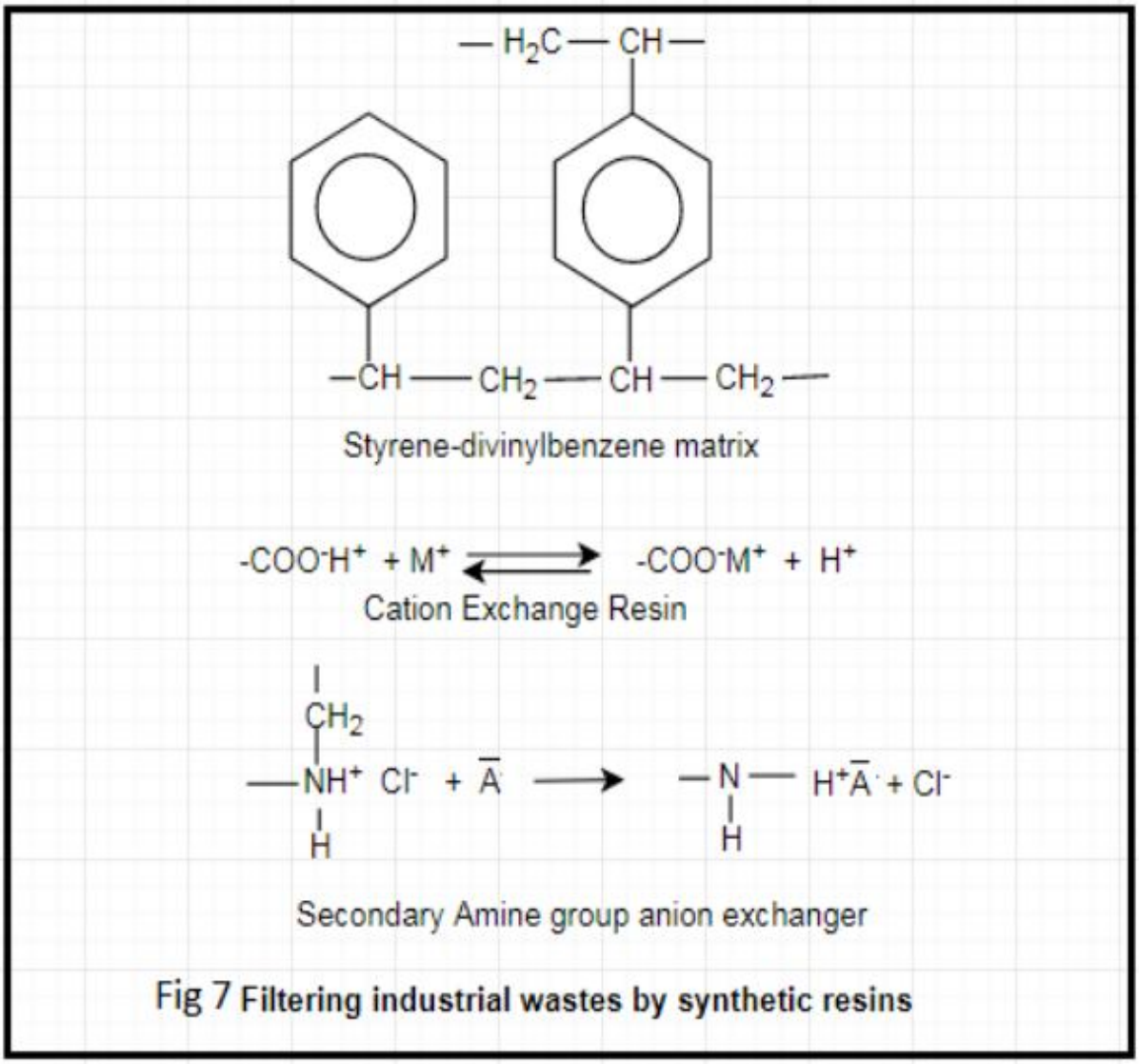

Fig 7 **Filtering industrial wastes by synthetic resins**

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ROLE OF CBI IN PRESERVATION OF RULE OF LAW

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INTRODUCTION

Rule of law: The term rule of law finds its origin in the French phrase *la principe de legalite* (the principle of legality) which refers to a government based on principles of law and not of men. Simply speaking, it means that everything must be done according to law.

The concept of rule of law is nothing new to the Indian society and its roots are very much traceable in the ancient scriptures. The Indian philosophy of life as clearly laid down in various *Smritis* and *Upanishads* regarded law (*Dharma*) as supreme and even the king was considered to be subordinate to it. The concept of supremacy of law (Dharma) was declared in *BrihadaranyakaUpanishad.* According to it, Dharma was ultimate authority, king was only penultimate authority.

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The law (Dharma) is the king of kings. No one is superior to the law (Dharma); The law (Dharma) aided by the power of the king enables the weak to prevail over the strong. Thus, under the Hindu jurisprudence, law was a command even for the king and the foremost duty of the king was to rule his Kingdom in accordance with law, so that the law reigned supreme and could control all human actions within the periphery of law. The western concept that the 'king can do no wrong' was never an accepted norm in the *Rajadharma* and even the king was subject to Dharma i.e. to the rule of law.

Our nation has had a rich legacy of following the rule of law much before the official definition was given by jurists in the west. The ancient mode of governance was replete with the idea of a just society through a benevolent monarchy and it was the duty of the king to keep his subjects happy. As per the Kautilya's *Arthashastra*,

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ukRefiz;afgrajkK% iztkukarqfiz;a fgre~AA[2]

In the happiness of his subjects lies the king's happiness; in their welfare his welfare. He shall not consider good only that which pleases him but treat as beneficial to him whatever pleases his subjects.

In the global perspective, the origin of this celebrated theory of rule of law can be traced back to the ancient Romans during the formation of the first republic. Thereafter, it was carried forward by several medieval thinkers in Europe such as Hobbs, Locke and Rousseau. The formal origin of the word rule of law is attributed to Sir Edward Coke when he said that king must be under God and law. In the 19th century, the most popular and firm description of the term rule of law was propounded by noted jurist, Alexander Venn Dicey which has three pillars:[3]

(1) Supremacy of law: - It means, in the first place, the absolute supremacy or predominance of regular law as opposed to the influence of arbitrary power, and excludes the existence of arbitratiness, of prerogative, or even of wide discretionary authority on the part of the government. Englishmen are ruled by the law, and by the law alone, a man may with us be punished for a breach of law, but he can be punished for nothing else.

[1] Justice Dr. M. Rama Jois, *Raja Dharma with lessons* on *Raja Neeti*, Universal law publication Co. Pvt. Ltd.,Chapter-2, Page 9.

[2] Kautilya, *The Arthashastra,* Edited, Rearranged, Translated and Introduced by L.N. Rangrajan,

Penguin Books,[1.19.34].

[3] A.V. Dicey, *An Introduction to the study of the law of the Constitution,* Universal Law Publishing Co. Pvt. Ltd., Tenth Edition, Chapter IV, Page 202,203,

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(2) Equality before law:- It means, again, equality before the law, or the equal subjection of all classes to the ordinary law of the land administered by the ordinary law courts; the "rule of law" in this sense excludes the idea of any exemption of officials or others from the duty of obedience to the law which governs other citizens or from the jurisdiction of the ordinary tribunals;

(3) Predominance of legal Spirit.:- The "rule of law," lastly, may be used as a formula for expressing the fact that with us the law of the constitution, the rules which in foreign countries naturally form part of a constitutional code, are not the source but the consequence of the rights of individuals, as defined and enforced by the courts; that, in short, the principles of private law have with us been by the action of the courts and Parliament so extended as to determine the position of the Crown and of its servants ; thus the constitution is the result of the ordinanry law of the land.

The theory propounded by A.V. Dicey has been further enriched by scholars such as Lon L. Fuller who have emphasised that the maintenance of the "Rule of Law requires publicly promulgated rules, laid down in advance, and adherence to at least some natural law values.

In the words of Richard Fallon, Jr.:

… Leading modern accounts generally emphasize five elements that constitute the rule of law. To the extent that these elements exist, the rule of law is realized:

(1) The first element is the capacity of legal rules, standards, or principles to guide people in the conduct of their affairs. People must be able to understand the law and comply with it.

(2) The second element of the rule of law is efficacy. The law should actually guide people, at least for the most part. In Joseph Raz's phrase, "people should be ruled by the law and obey it."

(3) The third element is stability. The law should be reasonably stable, in order to facilitate planning and coordinated action over time.

(4) The fourth element of the rule of law is the supremacy of legal authority. The law should rule officials, including judges, as well as ordinary citizens.

(5) The final element involves instrumentalities of impartial justice. Courts should be available to enforce the law and should employ fair procedures.[1]

Rule of law is a dynamic concept and takes within its Sweep the recognition and protection of civil and political rights of an individual in a free society. It is an integral part of good governance which leads to the establishment of social, economical, educational and cultural conditions under which he is able to achieve his full dignity and genuine aspirations. Considering rule of law to be an intrinsic aspect of human dignity, The universal declaration of Homan Rights (UDHR) was proclaimed by the United Nations General Assembly in Paris on 10th December 1948 (General assembly resolution 217A(iii)) as a common standard of achievements for all people and all nations. The preamble to the UDHR strongly advocates the observance of rule of law.

…… "whereas it is essential, if man is not to be compelled to have recourse, as a last resort, to rebellion against tyranny and oppression, that human rights should be protected by the rule of law[2]……..

Whereas recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world[3].

The Secretary-General of the United Nations Organization (UNO) has described the rule of law as "a principle of governance in which all persons, institution and entities, public and private, including the staff itself, are accountable to laws that are publicly promulgated, equally enforced and independently adjudicated, and which are consistent with international human rights norms and standards.[4]

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[1] Richard H.Fallon, Jr, *"The Rule Of Law" as a concept in Constitutional Discourse,* Columbia law review, vol 97, January 1997, No.1, available at weblaw.haifa.ac.il>97Columl Rev 1-Fallon last accessed on 18.08.2018.

[2] Preamble, *The Universal Declaration of Human Rights,* available at www.un.org/en/universal-declaration- human-rights/ last accessed on 17/08/18.

[3] Ibid.

[4] Report of the Secretary-General : The rule of law and transitional justice in conflict and post–conflict societies S/2004/616 available at https:// www.un.org/rule of law last accessed on 20.08.2018.

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It requires, as well, measures to ensure adherence to the principles of supremacy of law, equality before the law, accountability to the law, fairness in the application of the law, separation of powers, participation in decision making, legal certainty, avoidance of arbitrariness and procedural and legal transparency.[1]

Recognising the central place of the rule of law, the General Assembly at its 67th session, held a High- level meeting on the Rule of law at the National and international levels on 24th September 2012. This was a unique occasion for all member states, non- governmental organisations and civil society represented at the highest level, to commit to strengthening the rule of law. The High–level meeting concluded with the adoption by consensus of a Declaration in which Member states reaffirmed their commitment to the rule of law and elaborated on the efforts required to uphold different aspects of the rule of law. The declaration recognizes "that the rule of law applies to all states equally, and to international Organizations, including the United Nations and its principal organs, and that respect for and promotion of the rule of law and justice should guide all of their activities and accord predictability and legitimacy to their actions. [It] also recognize[s] that all persons, institutions and entities, public and private, including the staff itself, are accountable to just, fair and equitable laws and are entitled without any discrimination to equal protection of the Law."[2]

The World Justice Project (WJP)[3] has given a definition of Rule of Law which is comprised of the following four universal principles:[4]

1. Accountability-The government as well as private actors are accountable under the law.
2. Just Laws – The laws are clear, publicized, stable, and just; are applied evenly; and protect fundamental rights, including the security of persons and property and certain core human rights.
3. Open Government- The processes by which the laws are enacted, administered, and enforced are accessible, fair, and efficient.
4. Accessible & Impartial Dispute Resolution- Justice is delivered timely by competent, ethical, and independent representatives and neutrals who are accessible, have adequate resources, and reflect the makeup of the communities they serve.

Apart from the above working definition of the rule of law, the above four universal principles have been further developed in the following nine factors of the annual WJP Rule of Law Index. Each edition of the index is based on more than 110,000 house hold and expert surveys to measure how the rule of law is experienced and perceived in practical, everyday situations by the general public worldwide. These nine factors are[5]:

1. Constraints on Government Powers.
2. Absence of Corruption.
3. Open Government.
4. Fundamental Rights.
5. Order and Security.
6. Regulatory Enforcement.
7. Civil Justice.
8. Criminal Justice.
9. Informal Justice.

[1] Ibid.

[2] http:www.un.org/rule of law/ what-is-the-rule-of-law/last accessed on 17/08/18.

[3]The World Justice Project (WJP) is an independent, multidisciplinary organization working towards the advancement of rule of law worldwide. It was founded by William H. Neukom in 2006 as a residential initiative of the American Bar Association (ABA) and has transitioned into an independent 501 (c) (3) non – profit organization in 2009. Its offices are located in Washington, DC, and Seattle, WA,USA.

[4] Available at worldjusticeproject.org/about-us/overview/what-rule-lawlast accessed on 20.08.2018

[5] Ibid.

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The WJP released the 2017-2018 *WJP Rule of Law Index* on 31st January 2018 in Washington, DC. This index measured rule of law performance across eight factors: constraints on government powers, absence of corruption, open government, fundamental rights, order and security, regulatory enforcement, civil justice and criminal justice. The position of India is 62 out of 113 countries and jurisdictions worldwide.[1]

The Indian Constitution is heavily influenced by the Dicean concept of rule of law and article 14 of the constitution appears to be a direct import of the said concept which provides to all persons equality before the law and equal protection of the laws. All laws made by the legislative, have to be in conformity with the constitution failing which it will be declared invalid provides article 13(1) and in unequivocal terms declares constitutional supremacy. Article 21 provides a further check against arbitrary, executive action by stating that no person shall be deprived of his life or liberty except in accordance with the procedure established by law.

The Constitution is the supreme power in the land and the legislative and the executive derive their authority from the Constitution. Though the term rule of law does not find place in the constitution of India in black and white but it runs as a golden thread in the constitution which has further been strengthened and polished by the Hon'ble Supreme Court of India through various landmark judgments.

The Supreme Court relying on Dicey observed:

"[I] t is important to emphasise that the absence of arbitrary power is the first essential of the rule of law upon which our constitutional system is based. In a system governed by rule of law, discretion, when conferred upon executive authorities, must be confined within clearly defined limits.[2]

The rule of law from this point of view means that decisions……. should be predictable and the citizen should know where he is. If a decision is taken without any principle or without any rule it is unpredictable and such a decision is the antithesis of a decision taken in accordance with the rule of law".[3]

The concept of Rule of law has been invoked by the courts in India time and again as a means to check arbitrary exercise of power and to infuse some values therein. Thus in *kraipak,*[4] HEGDE, J…… observed:

……"Under our Constitution the rule of law pervades over the entire field of administration. Every organ of the State under our Constitution is regulated and controlled by the rule of law. In a welfare State like ours it is inevitable that the jurisdiction of the administrative bodies is increasing at a rapid rate. The concept of rule of law would lose its vitality if the instrumentalities of the State are not charged with the duty of discharging their functions in a fair and just manner"……..

The adoption of the concept of rule of law by the Indian Constitution was explained by the Hon'ble Supreme Court in the following words:

We have adopted under our Constitution not the continental system but the British system under which the rule of law prevails. Every Act done by the Government or by its officers must, if it is to operate to the prejudice of any person must, be supported by some legislative authority.[5]

Rule of Law was expanded by the courts with the aid of *Jennings'* definition of rule of law being an unruly horse and used as a tool to give reality to something which is inexpressible by observing that:

The rule of law postulates the pervasiveness of the spirit of law throughout the whole range of Government in the sense of excluding arbitrary official action in any sphere. "Rule of law" is an expression to give reality to something which is not readily expressible. That is why Sir Ivor Jennings said that it is an unruly horse. Rule of law is based upon the liberty of the individual and has as its object, the harmonising of the opposing notions of individual liberty and public order. The notion of justice maintains the balance between the two; and justice has a variable content[6].

[1] Available athttps://worldjusticeproject.org/our-work/wjp-rule-index/wjp-rule-law- index-2017-2018last accessed on 20.08.2018.

[2] *S.G.Jaisinghaniv U.O.I* (1967)2SCR 703, at Page 718.

[3] Ibid.

[4] *A.K. Kraipak v. Union of India*,(1969) 2 SCC 262 at page 268, Para 13.

[5] *State of M.P. v. Thakur Bharat Singh*, (1967) 2 SCR 454 at para 5.

[6] *Indira Nehru Gandhi v. Raj Narain*, (1975)Supp SCC 1 at Para 336.

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The Hon'ble Supreme Court of India went on to uphold the dignity of rule of law even in emergency. A dissenting KHANNA, J. invoked the concept of rule of law during emergency also and held:[1]

Rule of law is the antithesis of arbitrariness…Rule of law is now the accepted norm of all civilised societies…the rule of law has come to be regarded as the mark of a free society. Admittedly its content is different in different countries, nor is it to be secured exclusively through the ordinary courts. But everywhere it is identified with the liberty of the individual. It seeks to maintain a balance between the opposing notions of individual liberty and public order. In every State the problem arises of reconciling human rights with the requirements of public interest. Such harmonising can only be attained by the existence of independent courts which can hold the balance between citizen and State and compel Government to conform to the law.

It may be difficult to define the rule of law with scientific precision but it cannot be dismissed as an elusive notion or as an unruly horse. The rule of law is not a meaningless ritualistic slogan endlessly chanted at seminars and university lectures. The rule of law in essence embodies a set of lofty principle and values.[2]

The content of rule of law varies from country to country, but everywhere it is identified with the liberty of the individual. It seeks to strike a balance between the opposing notions of individual liberty and public order. The question of reconciling individual rights with the requirements of public interest has always posed a vexed problem. Such reconciling and harmonizing can be attained by adherence to the rule of law and by existence of independent courts which can hold the balance between the citizen and the state and compel both to confirm of law.[3]

In the opinion of some of the judges constituting the majority in *Kesavananda Bharati v. State of Kerala*[4] the Rule of law was considered as an "aspect of the doctrine of basic structure of the Constitution, which even the plenary power of Parliament cannot reach to amend."

…….. Kesavanand, Indira Gandhi and Habeas Corpus cases provide a distillation of Indian judicial thought on the conceptions of Rule of Law, which has evolved well over a quarter century. References to western theories and thinkers from Dicey onwards abound in these opinions; but these occur by way of rhetorical flourishes, masking the typically Indian approaches.[5]

The rule of law nation has been consistently widened to ensure that the individual has a fair dealing in almost all spheres of life. The inalienable human rights promised by the Universal Declaration of Human Rights (UDHR) can be achieved only by nurturing good governance. In the modern society, independent courts and other institutions are essential components of good governance, and only when they follow the rule of law- the promise of human rights can be accomplished.

Every act of governmental power, i.e. every act which affects the legal rights, duties or liberties of any person, must be shown to have a strictly legal pedigree.

The affected person may always resort to the courts of law, and if the legal pedigree is not found to be perfectly in order the court will invalidate the act, which he can then safely disregard.[6]

GOOD GOVERNANCE: AN INTEGRAL ASPECT OF RULE OF LAW

'Rule of Law' is the supreme manifestation of human civilization and culture and is a new 'lingua franca' of global moral thought. It is an eternal value of constitutionalism and an inherent attribute of democracy and good governance.[7]

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[1] *ADM, Jabalpur v. ShivakantShukla*, (1976) 2 SCC 521at para527.

[2] *The Rule of law: A moral imperative for the civilized world* by Soli J. Sorabjee, Senior Advocate, Supreme Court of India, (2014)6SCC J-27.

[3] *Rule of law*, by H.R. Khanna, Formerly Judge of Supreme Court of India,(1977)4 SCC J-7.

[4] (1973) 4 SCC 225.

[5] Upendra Baxi:1982, *Developments in Indian Administration law*, In A.G.Noorani ed. Public law in India, Uttar Pradesh : Vikash Publishing House,Page134, available at WWW.academia. edu> last accessed on 28.08.2018.

[6] H.W.R.Wade, *Administrative Law*, 5th edition, Oxford Publication, Page 22.

[7] I.P.Massey, *Administrative law*, 7th edition, Eastern Book Company, Page-25.

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The modern concept of the Rule of Law is fairly wide and, therefore, sets up an ideal for any government to achieve. This concept was developed by the International Commission of Jurists, Known as Delhi Declaration, 1959, which was later on confirmed at Lagos in 1961. According to this formulation, the Rule of Law implies that the functions of the government in a free society should be so exercised as to create conditions in which the dignity of man as an individual is upheld. This dignity requires not only the recognition of certain civil or political rights but also creation of certain political, social, economical, educational and cultural conditions which are essential to the full development of his personality.[1]

Governance is all about the relationship between the ruler and the ruled, the government and the governed and the true reflection of good governance is when the state empowers its citizens by providing equal opportunities and thereby ensuring social, economic, political and legal justice. Various definitions of governance have emerged in the changing socio- economic-political scenario worldwide.

The World Bank has identified there distinct aspects of governance[2]:

(a) The form of political régime;

(b) The process by which authority is exercised in the management of a country's economic and social resources for development; and

(c) The capacity of governments to design, formulate and implement policies and discharge functions.

The United Nations Development programme (UNDP) defined good governance as the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences.[3]

Good governance is reflected when there is attainment of the rule of law, through open, predictable and participatory policy making acting in furtherance of common good involving transparent process and independent Courts. The weapon of rule of law restrains the government to abuse its awesome power and obliges it to conduct the government machinery as per prescribed and publicly known rules. The concept of good governance is an unwritten ethos of our Constitution, as observed by the apex court in the following words:

Good governance is only in the hands of good men. No doubt, what is good or bad is not for the court to decide: but the court can always indicate the constitutional ethos on goodness, good governance and purity in administration and remind the constitutional functionaries to preserve, protect and promote the same. Those ethos are the unwritten words in our Constitution[4]……...

At the time of adoption of the Indian Constitution, Dr. Ambedkar had very lucidly explained that the working of the constitution is not dependent on its contents but on the people who make it work. The golden words are more relevant today;

"… however, good a Constitution may be, it is sure to turn out bad because those who are called to work it, happen to be a bad lot. However bad a Constitution may be, it may turn out to be good if those who are called to work it, happen to be a good lot. The working of a Constitution does not depend wholly upon the nature of the Constitution."[5]

The Criminal justice dispensation system forms an integral part of good governance. Every crime is supposed to be a crime against the state and as such it is the bounden duty of the state to punish the wrong doer. As per the ancient rules of governance, five fundamental duties were required to be discharged by the king (State):

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[1] Ibid at Page 35.

[2] available at https://www.ipa.government.bg>files last accessed on 17.09.18.

[3] www.parliacentre.org>Governance last accessed on 04.05.19.

[4] *ManojNarula v. Union of India*, (2014) 9 SCC 1, Para 149.

[5] *Constituent Assembly Debates*, Book No. 5,Vol.No. X-XII, Page- 975, Lok Sabha Secretariat 2003.

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vi{ikrks·fFkZ"kqjk"V~zj{kk i¥~pSo ;Kk% dfFkrku`ik.kke~ AA[1]

They were to punish the wicked, to honour (protect) the good, to enrich the treasury by just methods, to be impartial towards the litigants and to protect the kingdom- these are the five *yojnas* (selfless duties) to be performed by a king.

The true test of good governance in the 21st Century is the degree to which it delivers for the establishment of the inalienable human rights-be it civil, cultural, economical, political or social and its contribution towards the formation of a fearless society. Until and unless, there is a predictable, fair and non- discriminatory legal system, there can be no protection of the rule of law. Absence of arbitrary power is the first prerequisite of the rule of law. Rule of law posits that the power is to be exercised in a manner which is just, fair and reasonable and not in an unreasonable, capricious or arbitrary manner leaving room for discrimination.[2]

Figure-1: Relationship between Rule of Law and Good Governance

ROLE OF CBI IN THE PRESERVATION OF THE RULE OF LAW

In order to establish an orderly society, crime has to be curtailed and the guilty have to be booked, however muscled men they may be. If the criminal Justice dispensation system is not fair and impartial, the rich and mighty will always find out ways and means to scuttle fair investigation and in turn fair trial. Here comes the role of an independent investigating agency like the Central Bureau of Investigation which can ensure that investigations and trials are conducted in an impartial manner without recognizing the face of the person who is to be prosecuted. This is an essential mandate of the rule of law.

THE CREATION OF CBI

The imperial interests of the British Empire were sought to be protected by creating the Police Act of 1861. The objective was to create an agency which would be at the beck and call of the masters and would carry out the orders without delving into the legality or otherwise. During would near II, an immediate need was felt by the

[1] Justice Dr.M.Rama Jois, *Raja Dharma with lessons on Raja Neeti,* Universal law publication Co.Pvt.Ltd.,page14.

[2] *Delhi Transport Corpn. V. D.T.C. Mazdoor Congress*, 1991 Supp (1) SCC 600 at Para 202.

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Government of India to set up a law enforcement agency to cheek war time corruption as the police and other law enforcement instrumentalities were unable to cope with the same. In 1941, the Special Police Establishment Act (SPE) was set up in the war department by an executive order. In 1946, the Delhi Police Establishment Act was passed wherein all the departments were brought within its ambit and now its superintendence was the Home Department. As time passed more and more cases were given to the SPE and finally in 1963, the Government vide a resolution, renamed it as the Central Bureau of Investigation and placed it under the Ministry of perssonel.

Thereafter, the CBI has gradually transformed as the premier investigating agency of the nation and every time there is a sensational case, the popular demand is for CBI investigation. The people of India have time and again reposed confidence in this investigating agency. The agency has the record of conducting highly complicated and sensitive cases in a very effective manner like the Bombay blast case, Foodar Scam, Vyapam Scam, Illegal mining case, Sister Abhaya Murder Case, General Vaidyo Murder, Dera Sachha Sauda Case,.

If there is one major impedinent coming in the way of good governance and rule of law in our nation, it is corruption. Corruption distorts the process of law and the CBI is the key player in curbing this menace of the society. Right from Hawala scandal to coalgate, 2G sprectrum, Fodder scam, Bofors, Taj Corridor, disproportionate assets cases of Mulayam Singh and many more, the CBI has been investigating cases of bribery, kick backs, nepotism and other forms of corruption. However, barring a few cases like the Fooder scam, where the ex- Chief Minister of Bihar landed into jail, there has been a very little success rate.Taking note of the fact that the administrative authorities are public trutees of people's rights, the Supreme Court observed:

Every country feels a constant longing for good governance, righteous use of power and transparency in administration. Corruption is no longer a moral issue as it is linked with the search of wholesome governance and the society's need for reassurance that the system functions fairly, free from corruption and nepotism. Corruption has spread its tentacles almost on all the key areas of the State and it is an impediment to the growth of investment and development of the country. If the conduct of administrative authorities is righteous and duties are performed in good faith with the vigilance and awareness that they are public trustees of people's rights, the issue of lack of accountability would themselves fade into insignificance.[1]

However, with the passage of time, it was felt in many cases that whenever the CBI was dealing with the investigation pertaining to the high and mighty of the society, it was not conducting the investigations in a fair and non- partisan manner. In fact, investigations started being slowed down or sped up as per the whims and dictates of the Government at Delhi. The last man in the net was caught by the CBI but the top most who were allegedly close to power centers were left behind. The agency started changing colours as per the changing weathers in New Delhi and one such matter reached up to the Apex Court with specific allegations of the non-committal attitude of the premier investigating agency and its snail speed when investigating matters relating to the high and mighty. The Hon'ble Supreme Court reemphasized the age old maim, *Be you ever so high, the law is above you,* and taking very serious note of the matter observed:

This experience revealed to us the need for the insulation of these agencies from any extraneous influence to ensure the continuance of the good work they have commenced. It is this need which has impelled us to examine the structure of these agencies and to consider the necessary steps which would provide permanent insulation to the agencies against extraneous influences to enable them to discharge their duties in the manner required for proper implementation of the rule of law. Permanent measures are necessary to avoid the need of every matter being brought to the court for taking ad hoc measures to achieve the desired results. This is the occasion for us to deal with the structure, constitution and the permanent measures necessary for having a fair and impartial agency. The faith and commitment to the rule of law exhibited by all concerned in these proceedings is the surest guarantee of the survival of democracy of which rule of law is the bedrock. The basic postulate of the concept of equality: "Be you ever so high, the law is above you," has governed all steps taken by us in these proceedings.[2]

Everyone against whom there is reasonable suspicion of committing a crime has to be treated equally and similarly under the law and probity in public life is of great significance. The constitution and working of the investigating agencies revealed the lacuna of its inability to perform whenever powerful persons were involved.[3]

[1] *Neera Yadav v. CBI,* (2017) 8 SCC 757 at para 59.

[2] *Vineet Narain v. Union of India,* (1998) 1 SCC 226 at para 3.

[3] Ibid, para 16.

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Unless a proper investigation is made and it is followed by an equally proper prosecution, the effort made would not bear fruition.[1]

The apex court was highly disturbed by the sluggish attitude of the investigating agencies when they had to investigate matters concerning those close to the corridors of power and it went on to elaborate on the standards in public life. These Seven Principles of Public Life are stated in the Report by Lord Nolan were reiterated by the Hon'ble Supreme Court as:"THE SEVEN PRINCIPLES OF PUBLIC LIFE"[2]

Selflessness
Holders of public office should take decisions solely in terms of the public interest. They should not do so in order to gain financial or other material benefits for themselves, their family, or their friends.

Integrity
Holders of public office should not place themselves under any financial or other obligation to outside individuals or organisations that might influence them in the performance of their official duties.

Objectivity
In carrying out public business, including making public appointments, awarding contracts, or recommending individuals for rewards and benefits, holders of public office should make choices on merit.

Accountability
Holders of public office are accountable for their decisions and actions to the public and must submit themselves to whatever scrutiny is appropriate to their office.

Openness
Holders of public office should be as open as possible about all the decisions and actions that they take. They should give reasons for their decisions and restrict information only when the wider public interest clearly demands.

Honesty
Holders of public office have a duty to declare any private interests relating to their public duties and to take steps to resolve any conflicts arising in a way that protects the public interest.

Leadership
Holders of public office should promote and support these principles by leadership and example."[3]

The Hon'ble Supreme Court went on to explain that these principles of public life have to be kept in mind by every holder of a public office.

These principles of public life are of general application in every democracy and one is expected to bear them in mind while scrutinising the conduct of every holder of a public office. It is trite that the holders of public offices are entrusted with certain powers to be exercised in public interest alone and, therefore, the office is held by them in trust for the people. Any deviation from the path of rectitude by any of them amounts to a breach of trust and must be severely dealt with instead of being pushed under the carpet. If the conduct amounts to an offence, it must be promptly investigated and the offender against whom a prima facie case is made out should be prosecuted expeditiously so that the majesty of law is upheld and the rule of law vindicated. It is the duty of the judiciary to enforce the rule of law and, therefore, to guard against erosion of the rule of law.[4]

Even after the passage of twenty years of laying down principles of public life in *Vineet Narain's* case referred above, nothing substantial has changed in the pattern of functioning of the investigating agencies, particularly when they are dealing with the high and mighty of the society. Once again the Hon'ble Apex Court had to reiterate that fair investigation is a constitutional right enshrined under article 20 and 21 of the Constitution of India and very much forms part of the rule of law.

It is settled law that not only fair trial, but fair investigation is also part of the constitutional rights guaranteed under Articles 20 and 21 of the Constitution of India. Accordingly, investigation must be fair, transparent and judicious and it is the immediate requirement of the rule of law.[5]

[1] Ibid, para 50.
[2] Ibid, para 54
[3] Ibid.
[4] Ibid, para 55.
[5] *Hema v. State*, (2013) 10 SCC 192, para 10.

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Criminal justice dispensation system forms the back bone of a civilized and orderly society. All crime doers irrespective of what post, authority or power they hold have to be dealt with the same stick. However, in the recent past it was observed that investigations of crime dealing with corridors of powers were guided by those in power. Fair investigation appeared to be a thing of books only and rule of law a distant dream. Once again, the judiciary had to intervene and explain that fair criminal investigation is an important facet of rule of law.

A proper investigation into crime is one of the essentials of the criminal justice system and an integral facet of rule of law. The investigation by the police under the Code has to be fair, impartial and uninfluenced by external influences. Where investigation into crime is handled by CBI under the DSPE Act, the same principles apply and CBI as an investigating agency is supposed to discharge its responsibility with competence, promptness, fairness and uninfluenced and unhindered by external influences.[1]

The Hon'ble Apex Court explaining the relationship between fair investigation and rule of law even went to the extent of declaring that an unfair investigation amounts to breach of rule of law and in turn a violation of article 14 of the Constitution of India.

The criminal justice system mandates that any investigation into the crime should be fair, in accordance with law and should not be tainted. It is equally important that interested or influential persons are not able to misdirect or hijack the investigation so as to throttle a fair investigation resulting in the offenders escaping the punitive course of law. These are important facets of the rule of law. Breach of rule of law, in our opinion, amounts to negation of equality under Article 14.[2]

Many such matters in which investigation was being throttled by the men in power, reached the highest court of the land. Public faith started shaking and the Hon'ble Supreme Court had to take unto itself the charge of ensuring that investigation remains untainted and uninfluenced and the investigating agencies do not change their colors with the change in directions from the authorities. At times the judiciary had to face severe criticism for stepping into the shoes of the investigating agency but undeterred by any such criticisms, our courts have been issuing directions to the investigating agencies for restoring the public confidence. These court monitored investigations are the need of the day and yet another endeavor by the judiciary to uphold the rule of law.

The monitoring of investigations/inquiries by the Court is intended to ensure that proper progress takes place without directing or channelling the mode or manner of investigation. The whole idea is to retain public confidence in the impartial inquiry/investigation into the alleged crime; that inquiry/ investigation into every accusation is made on a reasonable basis irrespective of the position and status of that person and the inquiry/investigation is taken to the logical conclusion in accordance with law. The monitoring by the Court aims to lend credence to the inquiry/investigation being conducted by CBI as premier investigating agency and to eliminate any impression of bias, lack of fairness and objectivity therein.[3]

In *Taj Corridor case*,[4] peculiar things happened. The entire investigating team as well as the law officers of the CBI had recommended prosecution of the then Chief Minister of Uttar Pardesh. However, it was only the director of prosecution and senior public prosecutor who had opined that a closure report should be filed. The Supreme Court rejected the opinion of the director prosecution and senior pp and directed that the entire material collected during investigation along with the report of the SP be placed before the Special Judge concerned in compliance of the provisions contained in section 173(2) of the Cr. P.C. The court went on to express its concern over the depleting state of rule of law in the following words:

In matters after matters, we find that the efficacy and ethics of the governmental authorities are progressively coming under challenge before this Court by way of PIL for failure to perform their statutory duties. If this continues, a day might come when the rule of law will stand reduced to "a rope of sand."[5]

The matters which are entrusted to the CBI are not ordinary cases. These are matters which can be investigated only by a specialized agency and on it rests the faith of the nation that it will be investigated in the right manner. Once again the significance of fair investigation by a specialized agency was reiterated:

[1] *ManoharLal Sharma v. Principal Secy.*, (2014) 2 SCC 532, para 33.

[2] *Subramanian Swamy v. CBI*, (2014) 8 SCC 682, para 86.

[3] *ManoharLal Sharma v. Principal Secy.*, (2014) 2 SCC 532 ,para 38.

[4] *M.C.Mehta v.U.O.I*, (2007) 1 SCC 110.

[5] Ibid, para 35.

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……..Cases transferred to CBI are not run of the mill cases involving ordinary crimes or criminals nor is CBI an ordinary investigating agency. It is a specialised agency which has on account of its dispassionate and sustained hard work earned for itself a certain amount of credibility in the minds of the people of this country. Whenever cases of public importance apart from cases of corruption against the Central Government employees and people in high places come to occupy the centre stage of public attention, people cry for a CBI investigation in the hope that the investigation would unravel the truth regardless of the influence or clout, political or otherwise, of those being investigated. Courts have also reposed confidence in the fairness of investigation of CBI despite accusations that are at times made that even CBI can be misused. What is important is that CBI is today a premier investigating agency handling a considerably large number of cases of significant public importance. Saradha Chit Fund Scam is just one such case apart from many others which are currently in the courts or under investigation. The question is whether indifference or apathy can be allowed to frustrate either the cause of justice or become an instrument of oppression and injustice implicit in an unduly delayed completion of investigation. Our answer is in the negative. We say so because quick and effective investigation has been recognised by this Court in a series of judgments delivered over the past few decades to be a part of right to life guaranteed under the Constitution.[1]

Mankind's eternal quest has been the quest for justice and this aspiration was embedded by our constitutional makers in the preamble itself which speaks about justice: social, economic and political and hence justice is a constitutional mandate. The dynamics of this preambular goal is further spelt out in article 38 of the Constitution of India wherein the state shall strive to promote the welfare of the people by securing and protecting as effectively as it may a social order in which justice, social, economic and political, shall inform all the institutions of the national life.[2]

However, the recent trends reflect that we have fallen short of the preambular aspirations of securing justice. Scams have become part and parcel of the modern life. Public money is embezzled and the tax payer looks up to the investigating agency with great hope that the guilty would be booked. But as the investigation proceeds, there is pick and choose, the higher a man in power, the farther he is from the clutches of law. Investigations advance in ascending order but never reach the top. The lower strata who are the executors are often booked but the masterminds and the order givers are shielded by virtue of their being influential. This fact was very succinctly explained by KRISHNA IYER J. in the following words:

The greatest trauma of our times, for a developing country of urgent yet tantalising imperatives, is the dismal, yet die-hard, poverty of the masses and the democratic, yet graft-riven, way of life of power-wielders. Together they blend to produce gross abuse geared to personal aggrandizement, suppression of exposure and a host of other horrendous, yet hidden, crimes by the summit executives, *pro tem*, the para-political manipulators and the abetting bureaucrats. And the rule of law hangs limp or barks but never bites. An anonymous poet sardonically projected the social dimension of this systemic deficiency:

"The law locks up both man and woman

Who steals the goose from off the common,

But lets the greater felon loose

Who steals the common from the goose"[3]

Nothing distinguishes more clearly a free country from a country under arbitrary government than the observance in the former of the great principles known as the Rule of Law. Stripped of all technicalities, this means that government in all action is bound by rules fixed and announced beforehand, rules which make it possible to foresee with fair certainty how the authority will use its coercive power in given circumstances and to plan one's individual affairs on the basis of this knowledge.[4] A free nation as per the above referred definition is bound by the rule of law. Rule of law is no more a branch of administrative law but an effective tool of good governance and has now assumed the status of the dynamic legal principles of political, economic and social

[1] *Subrata Chattoraj v. Union of India*, (2016) 2 SCC 1, para 68.

[2] Article 38(1) of the Constitution of India.

[3] *Special Courts Bill, 1978, In re*, (1979) 1 SCC 380,para106.

[4] The condensed version of *THE ROAD TO SERFDOM,* by F.A.HAYEK as it appeared in the 1945 Edition of Reader's Digest at Page 57, available at https://mises.org>sites>default>files last accessed on 20.09.2018.

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system for the enjoyment of Universal Human Rights. Though the term does not find place in black and white in the statute but is embedded as an unwritten code in the constitutional principles which in unequivocal terms lays down that the three indicators of good governance are liberty, democracy and the rule of law and all the institutions have to strive to achieve this trinity. However, many a times, we have seen that institutions have failed in their duties for one reason or the other and then the last recourse left is the courts and this is also an indicator of the rule of law.

The institutions of governance fashioned by the founding fathers of our Republic has served as well over the last few decades. However, it is fair to state that many of the institutions have been of late showing signs of stress and today, the efficiency and effectiveness of many of these institutions are being questioned. There is grooving dissatisfaction regarding the functioning of the executive and the legislature and their ability to deliver effective governance to meet the needs and challenges of our times. In this background, it is a matter of great satisfaction that the public at large continues to hold our judiciary in high esteem. The judiciary, as custodians and watch dogs of the fundamental rights of the people, has discharged its responsibility very well indeed[1].

Our abiding commitment to the rule of law is the very bedrock of our civilization. It is what makes all else possible, from the flowering of the arts to the steady advance of the sciences. The idea that men must govern themselves not by the arbitrary commands of a ruler but by their own considered judgment is the means whereby chaos is replaced by order. Balanced by the peaceful resolution of differences, the rule of law and the institutions of representative democracy are what stand between civilization and barbarism. It is through law-governed liberty that mankind has been able to achieve so much.[2]

Rule of law establishes a uniform pattern for the harmonious existence of all individuals in the society and is strictly averse to the idea of discrimination and arbitrariness. It is the basic rule of good governance of any civilized polity and with the changing times, the concept of rule of law has been widened enormously and has been closely linked with the protection of human rights. Today it is an integral part of good governance and the most effective weapon to achieve constitutional objective of Justice, Equality and liberty. In particular reference to the criminal justice dispensation system, rule of law assumes great significance demanding fair play at every stage. Fair investigation has been declared to be a fundamental right and hence the role of the CBI assumes significance as a major law enforcement agency responsible for the preservation of rule of law and a clear message has to be imparted by the CBI through fair investigations that however high and mighty one may be, he is under the Constitution.

CONCLUSION

We are living in dangerous times. The institutions of democracy are weakened and in the recent past, much of the dirty linen has been washed in the public which has eroded the faith of the people at large in the functioning of this premier investigating agency. However, when systems collapse, it is not entirely their fault. Somewhere, down the line we have to admit that there is absolute lack of probity in public life and the sense of righteousness has to be incorporated in every walk of life, as beautifully explained by Dr. A.P.J.Abdul Kalam through this beautiful hymn:

"Where there is righteousness in heart,

there is beauty in the character.

When there is beauty in the character,

there is harmony in the home.

When there is harmony in the home,.

there is order in the nation.

When there is order in the nation,

[1] Address by Shri Manmohan Singh, PM , India at Conference of Chief Minsters of State and Chief Justices

of High Court, published in (2004) 7 SCC J-7.

[2] Mary Ann Glendon, quoting Margaret Thatcher, in the *Rule of law in the Universal declaration of Human Rights,* published in Northwestern Journal of International Human Rights(2004), volume 2/ Issue 1, Article 5 available at https://scholarlycommons.law.northwestern.edu/hjhr/vol2/issi/5last accessed on 17.08.18.

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there is peace in the world."[1]

The opinion of our former Late President advocates for righteousness in every walk of life which was the mandate of the ancient Indian philosophy of *Dharma* i.e. the modern rule of law and was the guiding principle of good governance. The most premier investigating agency, the CBI is one of the hopes of the people of India and before this little hope of the people vanishes, it is high time the agency starts functioning in the righteous manner, so that the rule of law is preserved at every cost.

The basis postulate of rule of law is equality and fairness. A welfare state like ours bound by the constitutional ethos is wedded to the rule of law, which is an arm of good governance and good governance envisages that laws should be fair, just and equally applicable. Criminal justice dispensation system is an integral part of good governance which ensures that the citizenry is governed by law and those who break the law are booked. Here comes the role of investigating agencies like CBI. If this premier agency fails in conducting fair investigation, it will lead to boosting the moral of the offenders and at the same time erode the confidence of the common man and shake his belief in the rule of law and in turn on democracy.

The common man's mind is slowly being poisoned by the present states of affairs, when he has this feeling that there are separate set of laws for the *Mango People* and separate for the *khas.* This feeling has slowly crept in with the debacle of prosecution in cases relating to people in power, which though create fizz in the beginning fail to get hold of the collar of the *high creased Shirts or Kurtas.* The belief system in the rule of law is fast depleting but it has not completely eroded. The CBI has the great responsibility of restoring back this faith of the people by shunning the "show me the man and I will show you the law" syndrome by resorting to effective, unbiased and impartial investigations and then only the rule of law can be preserved.

Whenever, rule of law shakes by arbitrariness, discrimination or unfairness, the courts have intervened and today it is a viable and dynamic concept and forms the core of an orderly and well governed polity. It is reflective of a society where law rules and the basic values of liberty, equality, accountability, fairness and justice remain intact. The Judiciary is doing its bit, the other institutions like the CBI have to be more cautious and less indifferent or the concept of rule of law will die…….as apprehended by V.R.KRISHNA IYER, J.

…….But some day,…….not a distant day ……. this indifference will backlash and the rule of law will meet with its waterloo if our national leadership turn the Nelson's eye too long on the militant masses, now taken for a periodical ride through eloquent election manifestos and inspirational National Plans littered with statistics, since the human condition of the little Indian is left untouched. This pathos is poetized poignantly by William Blake;

"Bowed by the weight of centuries --he leans

Upon his hoe and gazes on the ground,

The emptiness of ages on his face,

And on his back the burden of the world."[2]

[1] A.P.J Abdul Kalam, His Excellency, the President of India, Address at the National Seminar on delay in Administration of criminal justice organized by the Indian Law Institute, New Delhi, published in[(2007) 4 SCC J-1.

[2] *The judicial system -has it a Functional future in our Constitutional Order ?* By Justice V.R. Krishna Iyer, published in (1979) 3 SCC J-1.

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RADIATIVE HEAT TRANSFER ON MHD NANO-FLUID FLOW PAST A STRETCHABLE SURFACE WITH MELTING

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ABSTRACT
MHD stagnation point flow of a viscous, incompressible, electrically conducting, and heat radiating nano-fluid past a stretchable surface with melting is investigated. Using adequate similarity transformations non-linear partial differential equations, governing to the problem, are transformed into non-linear ordinary differential equations and then solved using bvp4c (Matlab's boundary value problem solver). To validate accuracy of results, the numerical results obtained in the present paper have been compared with the existing literature and found to be in an excellent agreement. Numerical results of velocity $f'(\eta)$*, temperature* $\theta(\eta)$*, and species concentration* $\phi(\eta)$ *are depicted graphically. Numerical values of skin friction coefficient, rate of heat and mass transfers are presented in tabular form. Such nano-fluid flows find applications in heat transfer processes, pharmaceutical processes, domestic refrigerators etc.*

Keywords: Nano-fluid, MHD Stagnation point flow, Melting heat transfer, Radiation.

1. INTRODUCTION
In recent years, rapid advancement in industrial and thermal engineering processes requires more compact and efficient heat transfer systems. Liquids are being used as cooling/heating agent in such heat transfer systems. Due to their low thermal conductivity, such liquids badly affect the rate of heat transfer or cooling/heating process. This attracts researchers and scientists to find a way to enhance the liquid's thermal conductivity. Choi and Eastman [1] initiated in this direction and introduced the term "*nano-fluid*" to refer fluids with suspended nanoparticles. These fluids have unique thermo-physical properties. Choi et al. [2] encountered that thermal conductivity of the base fluids (conventional fluids) is being enhanced (around 40% to 150%) significantly by mixing a small amount (<1% volume fraction) of nanoparticles in the base fluid. After this pioneer work, many researchers [3–5] carried out their research studies involving the flow of nano-fluids to examine different aspects of the problem. Applications of nano-fluids appear in accelerating the capability of heat transfer of computer's microchips, transportation, fuel cells, microelectronics, food processing, solid state lightening, biomedicine and manufacturing.

The study of stagnation point flow was pioneered by Hiemenz [6]. Bhattacharyya et al. [7] investigated slip effects on boundary layer stagnation-point flow and heat transfer towards a shrinking sheet. The relevance and significance of this study attracted Motsa et al. [8] to work on two-dimensional stagnation flow towards a shrinking sheet. They have analyzed the flow behaviour extensively using similarity variables together with successive linearization method. Stagnation point flow has also been investigated by Makinde and Charles [9], Nadeem et al. [10], Makinde [11], Mahapatra and Nandy [12]. All these intellectual properties and many related published articles has widened the knowledge of fluid flow with microstructure and heat transfer near stagnation regions.

In construction industries, the phenomenon of radiative heat transfer has its own significance (for representation of gas turbines, reliable stuff, and many propulsion tools for aircraft, missiles, and space vehicles) [13]. The effect of non-linear thermal radiation on the stagnation point nanofluid flow towards a stretching sheet in the presence of homogenous-heterogeneous reactions was considered recently by Das et al. [14]. They used a numerical technique called spectral local linearization method to apply on the volume fraction model which was used to describe the nanofluid model. Mustafa et al. [15] presented a numerical solution using shooting technique for the problem of natural Convection flow of a nanofluid over a plate with non-linear thermal radiation effects. The thermal boundary layer was found to be thickening with increasing effects of Brownian motion and thermophoresis diffusion. Many researchers [16-18] studied fluid flow problems on heat transfer over stretching/shrinking surfaces.

Melting heat transfer has wide industrial applications (e.g. casting, melting of permafrost, welding and magma solidification, thawing of frozen ground and in the process of silicon wafer etc.) [19]. Many research papers have been published on the effect of melting heat transfer. Tien and Yen [20] have examined the effect of melting on convective heat transfer between a melting body and surrounding fluid. They found that melting

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retards the rate of heat transfer. Then after, Epstein and Cho [21] discussed the usefulness of melting phenomenon in the laminar flow over flat surface. Stretched flow of viscous nano-liquid with stagnation point, considering melting heat transfer and inclined magnetic field into the problem has been investigated by Gireesha et al. [22]. Hayat et al. [23] scrutinized the effect of melting parameter in the flow of a chemically reacting fluid. A comprehensive study of heat transfer phenomenon in nano-fluid flow was made by many researchers [24-26]. Recently, Ibrahim [27], in the year of 2017, carried out a research study on the melting effects and heat transfer of a nano-fluid past a stretching sheet.

Motivated by aforementioned research studies, our aim is to analyze the effects of radiation on steady flow of a viscous, incompressible, electrically conducting nano-fluid over a stretching sheet, with melting, in the presence of an applied transverse magnetic field under different conditions and configurations. The heat absorption phenomena play an important role in many fluid engineering devices and affect the heat transfer characteristics in the flow-field. There is no study in the literature that provides an insight into the combined influences of radiation, and melting heat transfer on the MHD stagnation point flow of a nano-fluid under the conditions of the present problem.

2. MATHEMATICAL MODEL

Consider a two-dimensional steady state MHD stagnation point boundary layer flow and heat transfer of a viscous, incompressible, electrically conducting, and heat radiating nano-fluid past a stretching sheet which is melting at steady rate into a constant property is examined. The flow is subjected to a uniform transverse magnetic field (parallel to y - axis) of strength $B = B_0$. A coordinate system has chosen such a way that x-axis is extending along the stretching surface and y - axis normal to it (as shown in figure 1). Temperature of the sheet is T_m, concentration C take constant value C_w. The ambient value of T and C are denoted by T_∞ and C_∞, respectively, where $T_\infty > T_m$. Free stream velocity takes the form $U_\infty = bx$ and velocity of the sheet is $u_w = ax$, where a and b are positive constants. Figure 1 represents geometrical model of the flow. It is further assumed that there is no applied or polarized voltages exist so the effect of polarization of fluid is negligible. Also the magnetic Reynolds number of the fluid is very small therefore induced magnetic field effects are neglected in comparison to the applied one. Both (nanoparticles and base fluid) are in a state of thermal equilibrium and there is no slip between them.

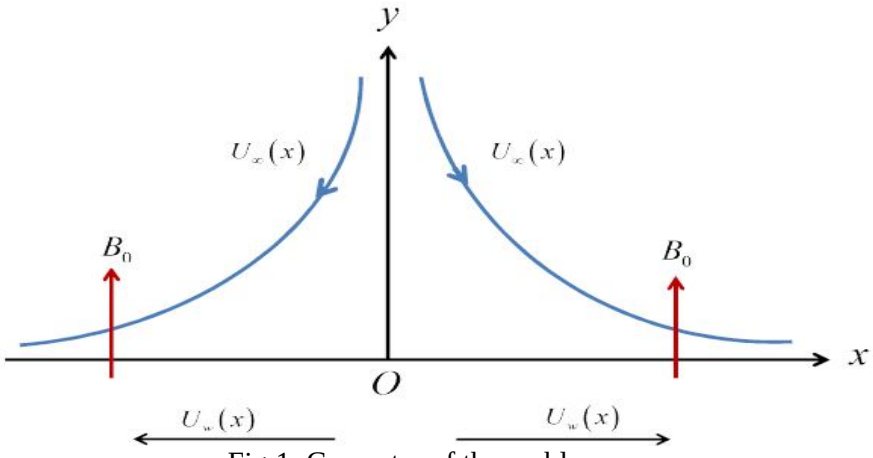

Fig-1: Geometry of the problem

Under the assumptions made above equations governing the conservation of mass, momentum, energy, and species concentrations, are given by

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0 \tag{1}$$

$$u\frac{\partial u}{\partial x} + v\frac{\partial u}{\partial y} = \upsilon\frac{\partial^2 u}{\partial y^2} + U_\infty\frac{\partial U_\infty}{\partial x} + \frac{\sigma B_0^2}{\rho_f}(U_\infty - u) \tag{2}$$

$$u\frac{\partial T}{\partial x} + v\frac{\partial T}{\partial y} = \alpha\frac{\partial^2 T}{\partial y^2} + \tau\left\{D_B\frac{\partial C}{\partial y}\frac{\partial T}{\partial y} + \frac{D_T}{T_\infty}\left(\frac{\partial T}{\partial y}\right)^2\right\} - \frac{1}{(\rho c)_f}\left(\frac{\partial q_r}{\partial y}\right) \tag{3}$$

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$$u\frac{\partial C}{\partial x}+v\frac{\partial C}{\partial y}=D_B\frac{\partial^2 C}{\partial y^2}+\frac{D_T}{T_\infty}\frac{\partial^2 T}{\partial y^2} \tag{4}$$

where $\alpha=\dfrac{k}{(\rho c)_f}$, $\tau=\dfrac{(\rho c)_p}{(\rho c)_f}$

The boundary conditions are:

$$\left.\begin{aligned} &u=u_w=ax,\ v=0,\ T=T_m,\ C=C_w && \text{at} && y=0\\ &u\to U_\infty=bx,\ v=0,\ T\to T_\infty,\ C\to C_\infty && \text{at} && y\to\infty\\ &\alpha\left(\frac{\partial T}{\partial y}\right)_{y=0}=\rho\left[\lambda+C_s\left(T_m-T_0\right)\right]v(x,0) \end{aligned}\right\} \tag{5}$$

where u and v are the components of velocity along x and y axes, respectively. Furthermore, $\upsilon,\sigma,\rho_f,\rho_p,\alpha,k,(\rho c)_f,(\rho c)_p,q_r,\lambda$ and C_s are respectively the kinematic viscosity coefficient, electric conductivity, density of base fluid, density of nanoparticle, thermal diffusivity, thermal conductivity, heat capacity of the base fluid, heat capacity of the nanoparticle material, radiative heat flux, latent heat of the fluid, and heat capacity of the solid surface.

The similarity and dimensionless variables are introduced as follow:

$$\left.\begin{aligned} &u=\frac{\partial\psi}{\partial y},\ v=-\frac{\partial\psi}{\partial x},\ \eta=y\sqrt{\frac{a}{\upsilon}},\ \psi=\sqrt{a\upsilon}xf(\eta)\\ &\theta(\eta)=\frac{T-T_m}{T_\infty-T_m},\ \phi(\eta)=\frac{C-C_w}{C_\infty-C_w} \end{aligned}\right\} \tag{6}$$

With the help of above transformations, equation (1) is identically satisfied, and equations (2) - (4) along with boundary conditions (5) take the following forms:

$$f'''+ff''-f'^2+A^2+M\left(A-f'\right)=0 \tag{7}$$

$$(1+4R)\theta''+\Pr\left(f\theta'+Nb\phi'\theta'+Nt\theta'^2\right)=0 \tag{8}$$

$$\phi''+Le\,f\phi'+\frac{Nt}{Nb}\theta''=0 \tag{9}$$

The corresponding boundary conditions are:

$$\left.\begin{aligned} &f'(0)=1,\ B\theta'(0)+\Pr f(0)=0,\ \theta(0)=0,\ \phi(0)=0,\\ &f'(\infty)\to A,\ \theta(\infty)\to 1,\ \phi(\infty)\to 1. \end{aligned}\right\} \tag{10}$$

Here the governing parameters are defined by:

$$\left.\begin{aligned} &M=\frac{\sigma B_o^2}{\rho_f a},\ Le=\frac{\upsilon}{D_B},\ \Pr=\frac{\upsilon}{\alpha},\ A=\frac{b}{a},\ B=\frac{C_f\left(T_\infty-T_m\right)}{\lambda+C_s\left(T_m-T_0\right)},\\ &Nb=\frac{(\rho c)_p D_B\left(C_\infty-C_w\right)}{(\rho c)_f\upsilon},\ Nt=\frac{(\rho c)_p D_T\left(T_\infty-T_m\right)}{(\rho c)_f\upsilon T_\infty},\ R=\frac{4\sigma^* T_\infty^3}{3\alpha^* k}. \end{aligned}\right\} \tag{11}$$

where f',θ and ϕ are the non-dimensionless velocity, temperature and concentration respectively. M, Le, Pr, A, Nb, Nt, R and B are respectively, the magnetic parameter, Lewis number,

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Prandtl number, velocity ratio parameter, Brownian diffusion coefficient, thermophoretic diffusion coefficient, heat radiation parameter and melting parameter. Dimensionless melting parameter (B) is the combination of Stefan numbers $\frac{C_f\left(T_\infty - T_m\right)}{\lambda}$ (for liquid phase) and $\frac{C_s\left(T - T_0\right)}{\lambda}$ (for solid phase).

Physical quantities which are of much interest in view of the engineering applications, are local skin friction coefficient C_f , the local Nusselt number Nu_x and the local Sherwood number Sh_x . These quantities are defined as:

$$C_f = \frac{\tau_w}{\rho u_w^2},\ Nu_x = \frac{xq_w}{k\left(T_\infty - T_m\right)},\ Sh_x = \frac{xh_m}{D_B\left(C_\infty - C_w\right)} \tag{12}$$

where the wall shear stress τ_w , the wall heat flux q_w and wall mass flux h_m are given by

$$\tau_w = \mu\frac{\partial u}{\partial y},\ q_w = -k\left(\frac{\partial T}{\partial y}\right)_{y=0},\ h_m = -D_B\left(\frac{\partial C}{\partial y}\right)_{y=0} \tag{13}$$

By using the above equations, we get

$$C_f\sqrt{\mathrm{Re}_x} = -f''(0),\ \frac{Nu_x}{\sqrt{\mathrm{Re}_x}} = -\theta'(0),\ \frac{Sh_x}{\sqrt{\mathrm{Re}_x}} = -\phi'(0) \tag{14}$$

where Re_x , Nu_x *and* Sh_x are local Reynolds number, local Nusselt number and local Sherwood number, respectively.

3. RESULTS AND DISCUSSION

The non-linear ordinary differential equations (7) - (9) with boundary conditions (10) have been solved using by the bvp4c routine of Matlab. In order to investigate the effects of various parameters viz. velocity ratio parameter A , magnetic parameter M , Thermal diffusion parameter $\Pr$, Brownian motion parameter Nb , thermophoresis parameter Nt , radiation parameter R , Levis number Le , and the melting parameter B , the profiles of nano-fluid velocity, nano-fluid temperature and nano-particle concentration are depicted graphically in Fig. 2 - Fig. 24 while the values of skin friction coefficient $-f''(0)$, local Nusselt number $-\theta'(0)$ and local Sherwood number $-\phi'(0)$ are tabulated in table 1.

Figures 2 to 9 represent the effects of velocity ratio, magnetic field, thermal diffusion, Brownian diffusion, thermophoretic diffusion, radiation, Levis number and melting of the sheet on the nano-fluid velocity. It may be concluded from figures 2 to 9 that velocity ratio parameter, magnetic field and Levis number have the tendency to enhance the nano-fluid velocity while thermal diffusion, Brownian motion, thermophoresis parameter, radiation and melting parameter have the tendency to reduce the nano-fluid velocity.

Figures 10 to 17 demonstrate effects of pertinent flow parameters on the fluid temperature. It is observed from figures 10 to 17 that velocity ratio parameter, magnetic field, Brownian motion and radiation induce the nano-fluid temperature, while thermal diffusion and melting parameter reduce the nanofluid temperature. In the boundary layer region, thermophoresis parameter induces the fluid temperature while it has reverse effect outside the boundary layer region.

Figures 18 to 23 show the effects of flow parameters on fluid concentration. It is evident from these figures that velocity ratio parameter and magnetic parameter have the tendency to enhance the nano-fluid concentration while thermal diffusion, Brownian motion, radiation and melting parameter have reverse effect on it. Levis number is caused to reduce nano-fluid concentration in the boundary layer region while it has reverse effect on nano-fluid concentration outside the boundary layer region.

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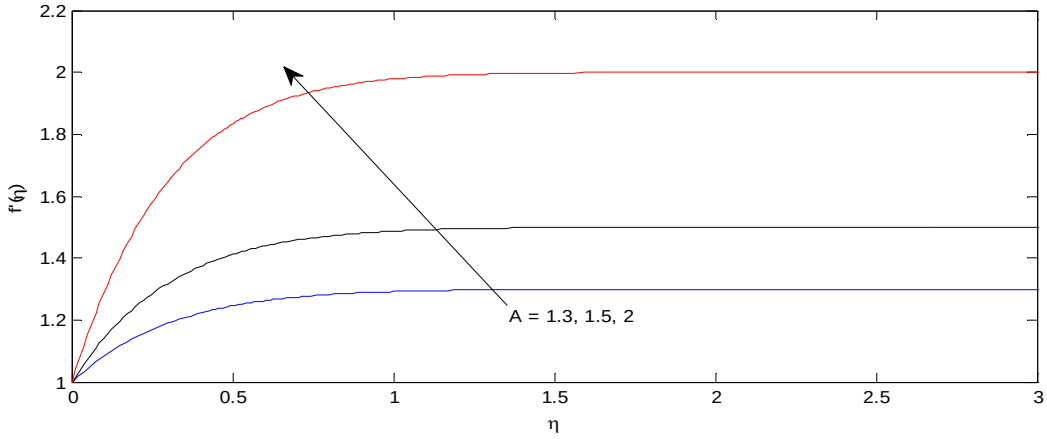

Fig.-2: Velocity profiles for various value of *A*.

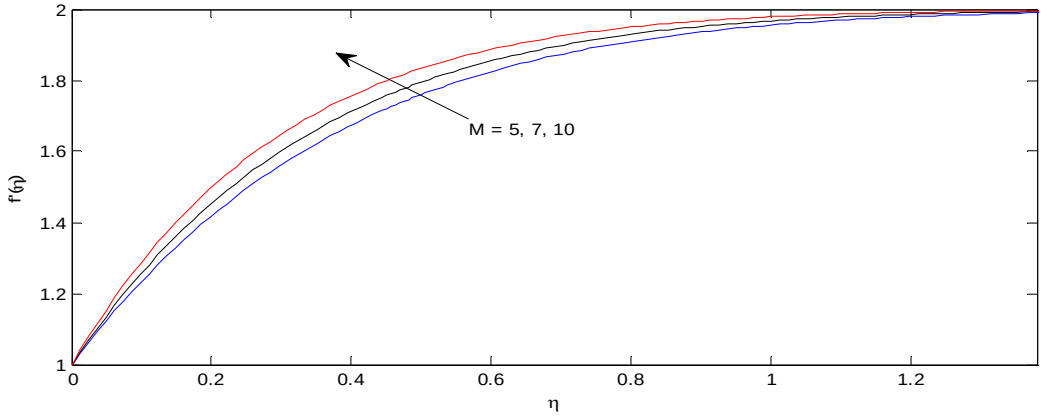

Fig-3: Velocity profiles for various value of *M*.

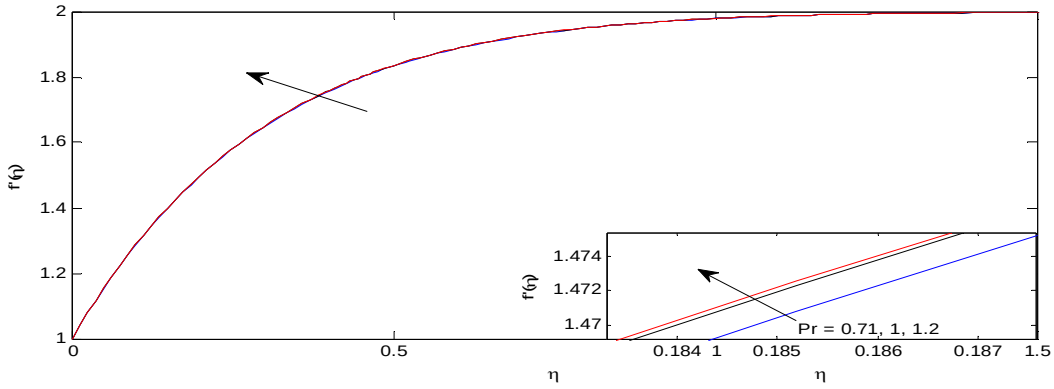

Fig-4: Velocity profiles for various value of *Pr*.

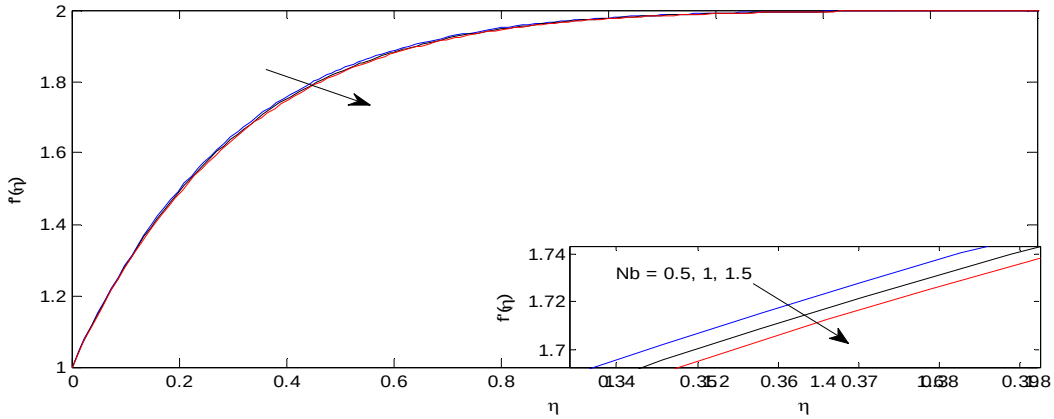

Fig-5: Velocity profiles for various value of *Nb*.

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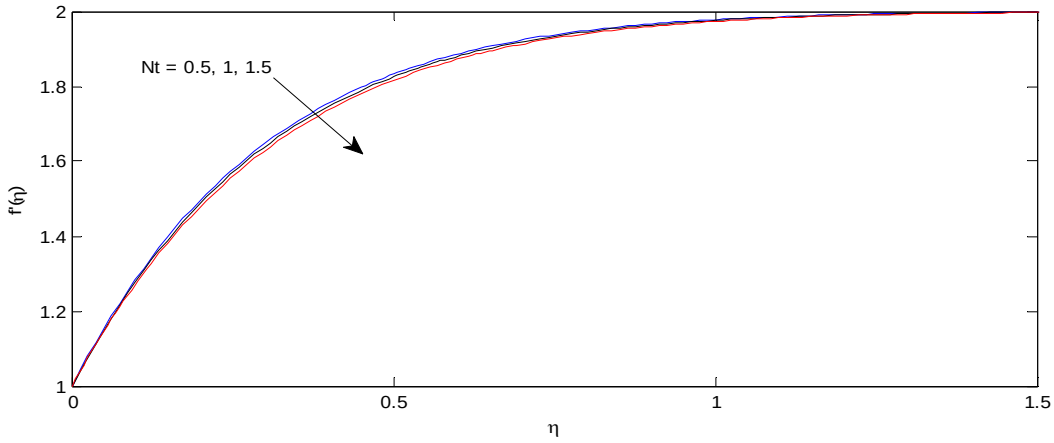

Fig-6: Velocity profiles for various value of *Nt*.

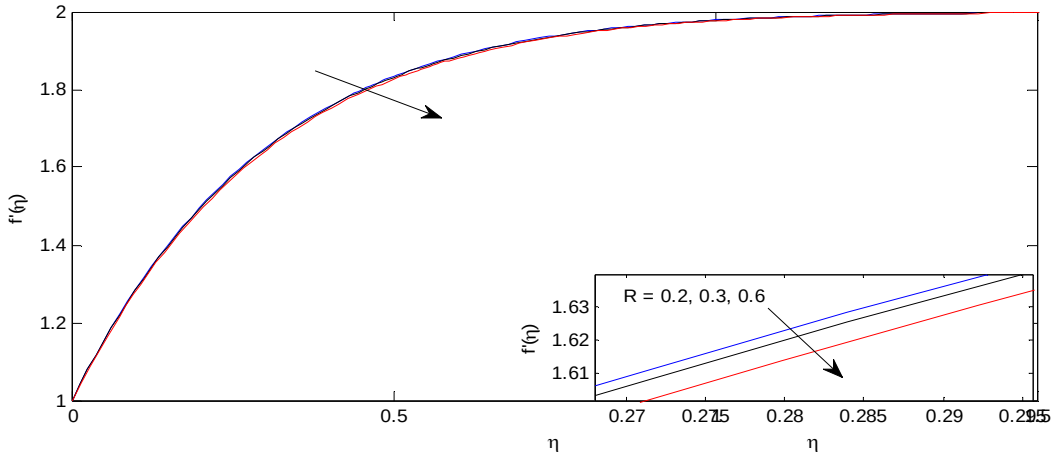

Fig-7: Velocity profiles for various values of radiation parameter *R*.

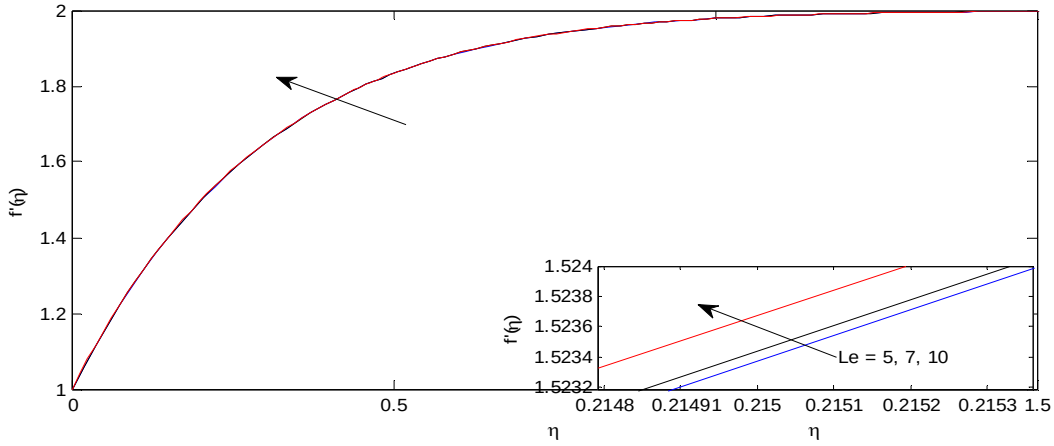

Fig-8: Velocity profiles for various value of *Le*.

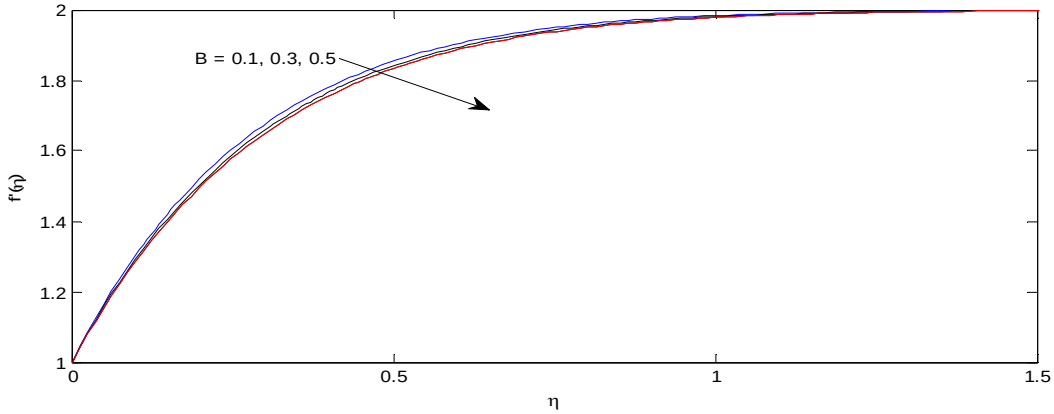

Fig-9: Velocity profiles for various value of *B*.

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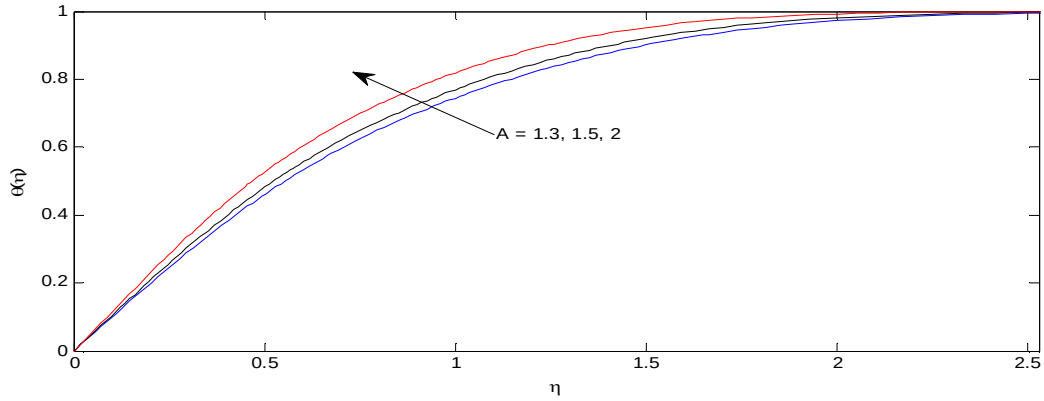

Fig-10: Temperature profiles for various value of *A*.

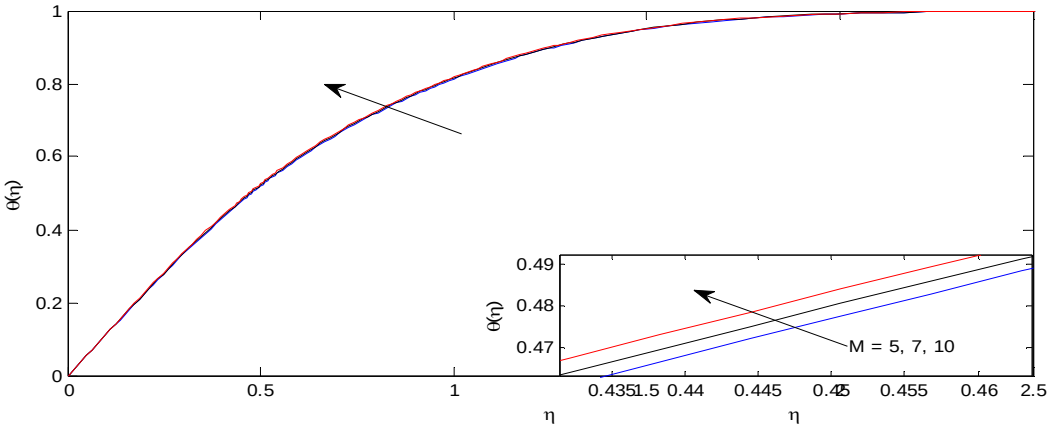

Fig-11: Temperature profiles for various value of *M*.

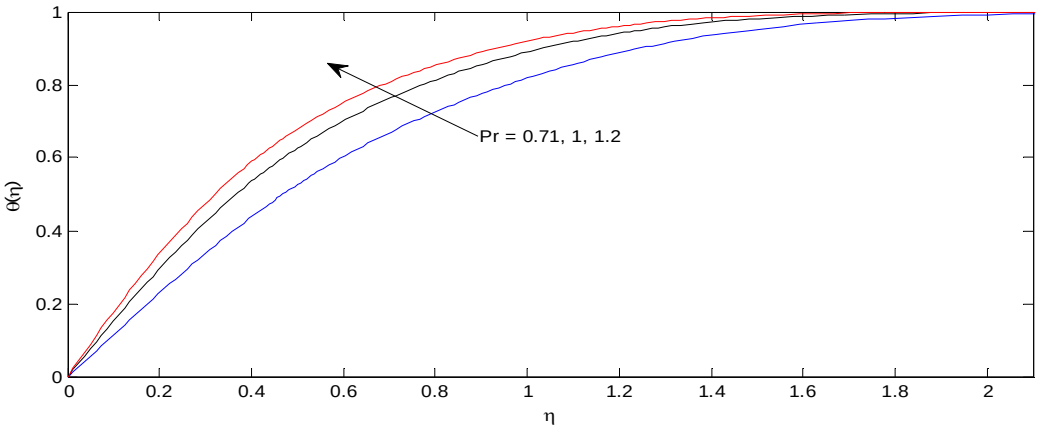

Fig-12: Temperature profiles for various value of *Pr*.

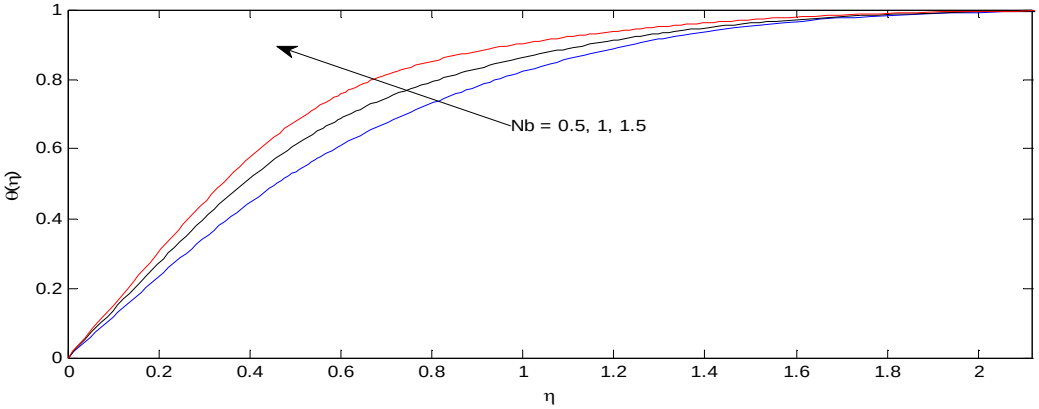

Fig-13: Temperature profiles for various value of *Nb*.

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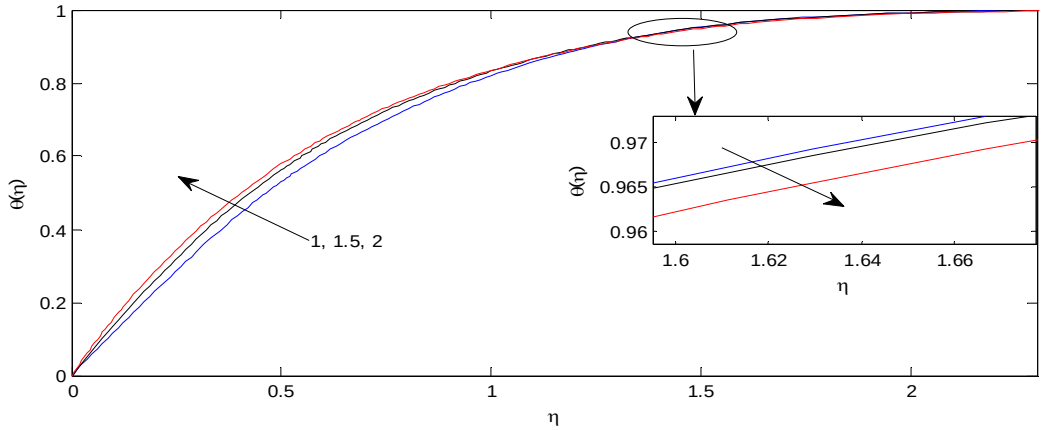

Fig-14: Temperature profiles for various value of *Nt*.

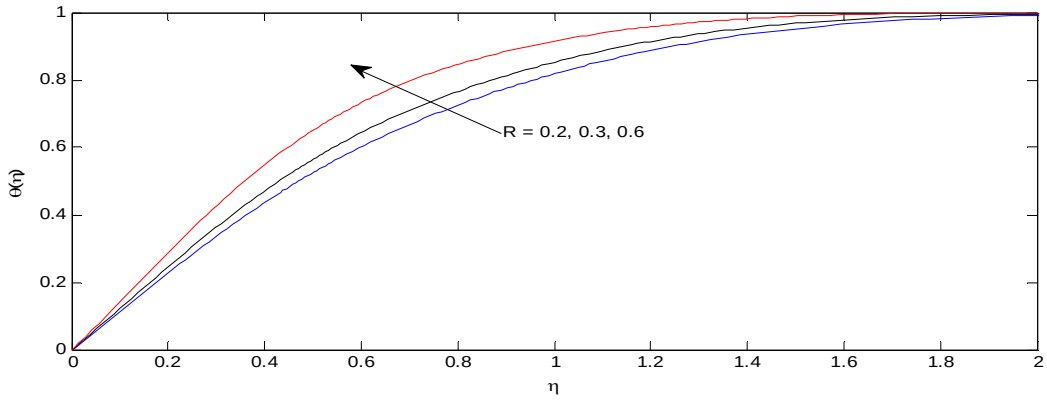

Fig-15: Temperature profiles for various values of radiation parameter *R*.

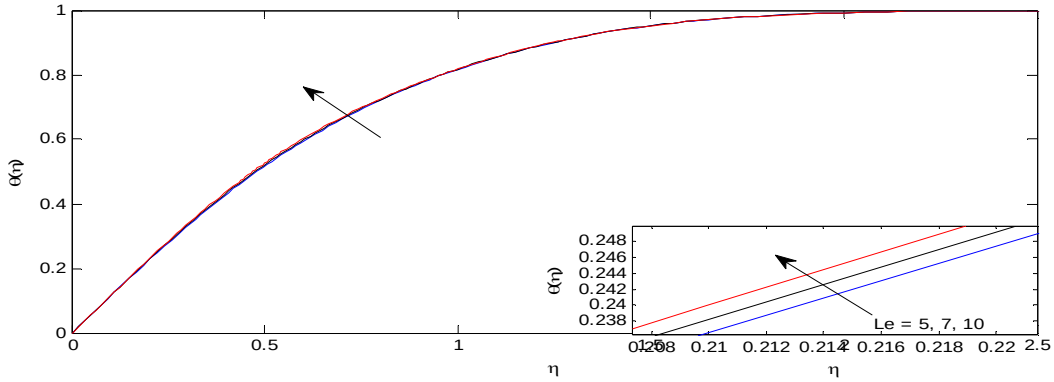

Fig-16: Temperature profiles for various value of *Le*.

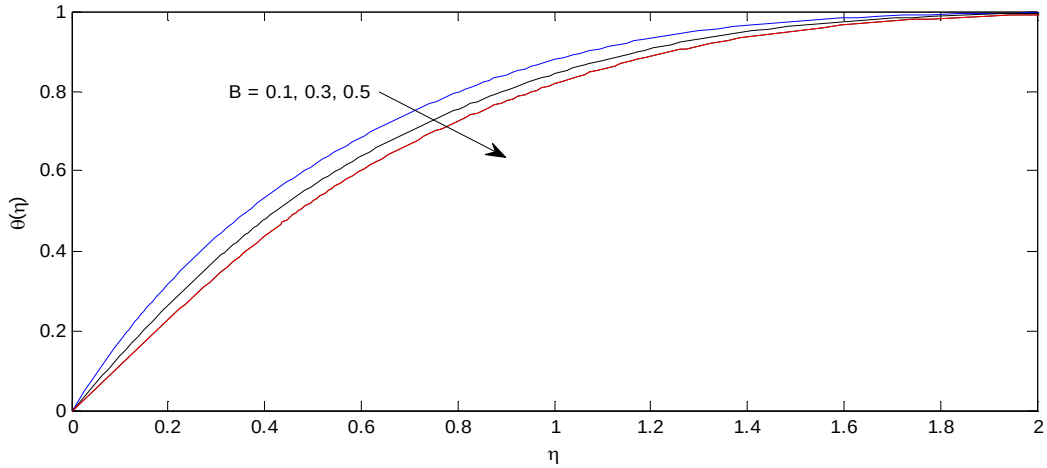

Fig-17: Temperature profiles for various value of *B*.

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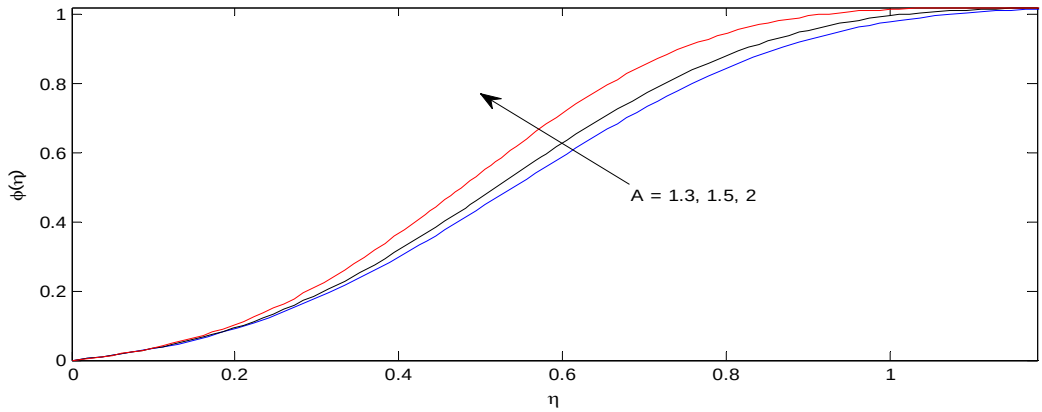

Fig-18: Concentration profiles for various value of *A*.

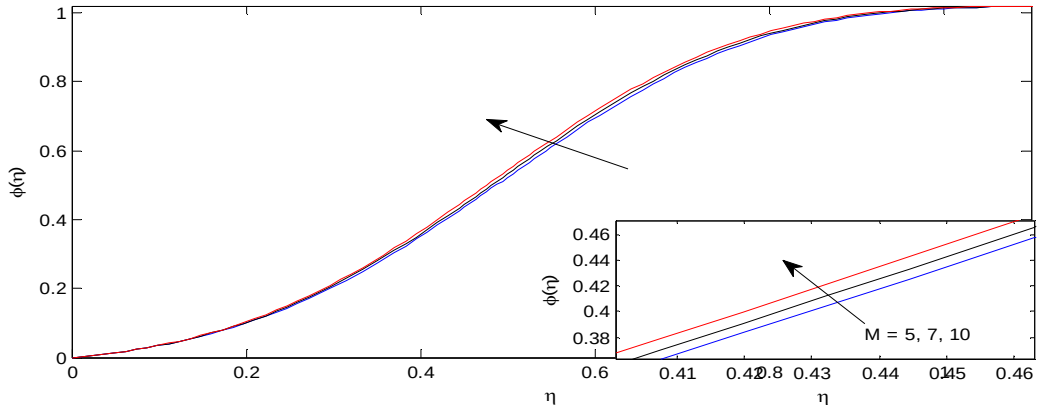

Fig-19: Concentration profiles for various value of *M*.

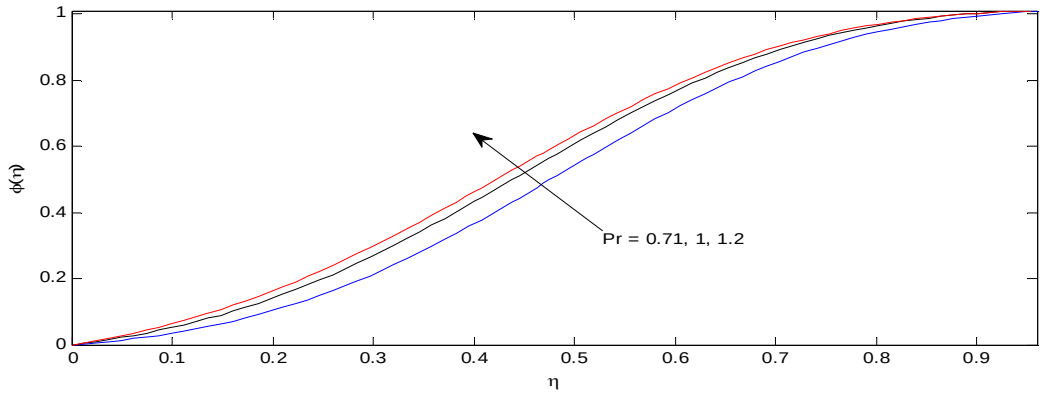

Fig-20: Concentration profiles for various value of *Pr*.

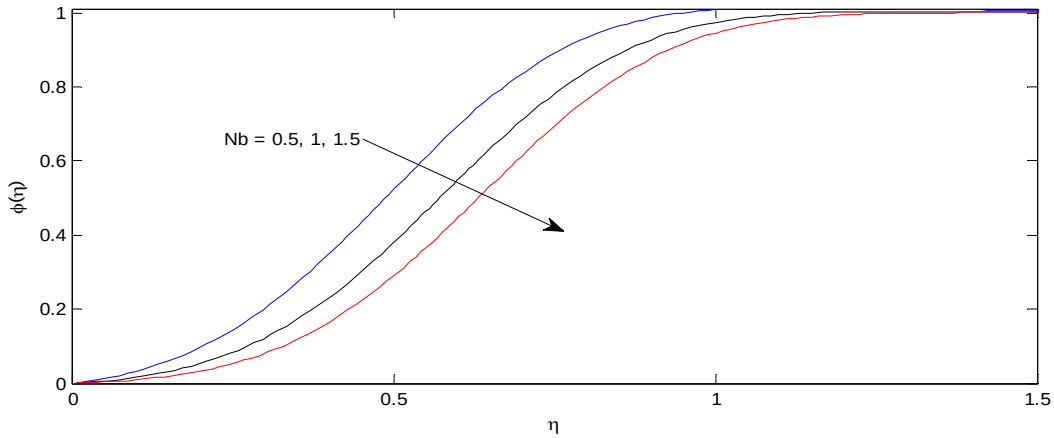

Fig-21: Concentration profiles for various value of *Nb*.

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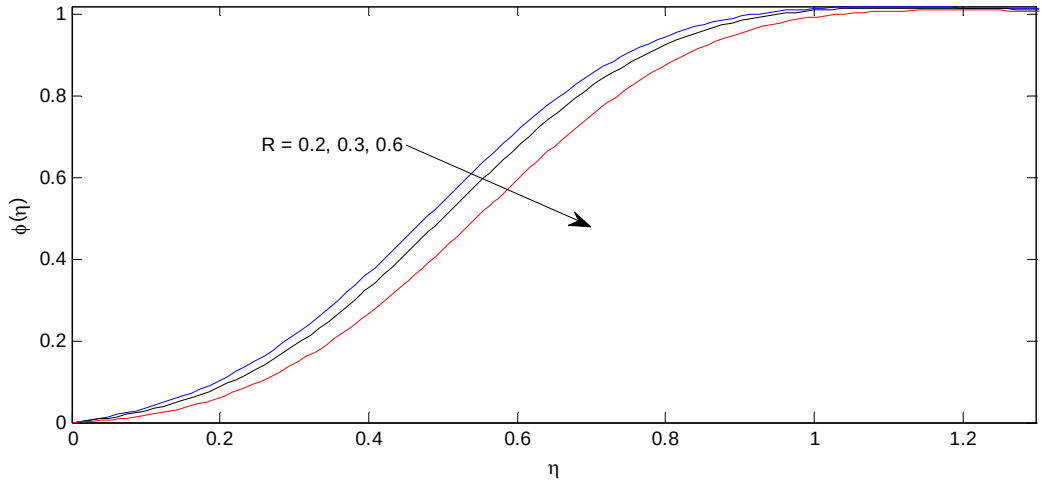

Fig-22: Concentration profiles for various values of radiation parameter *R*.

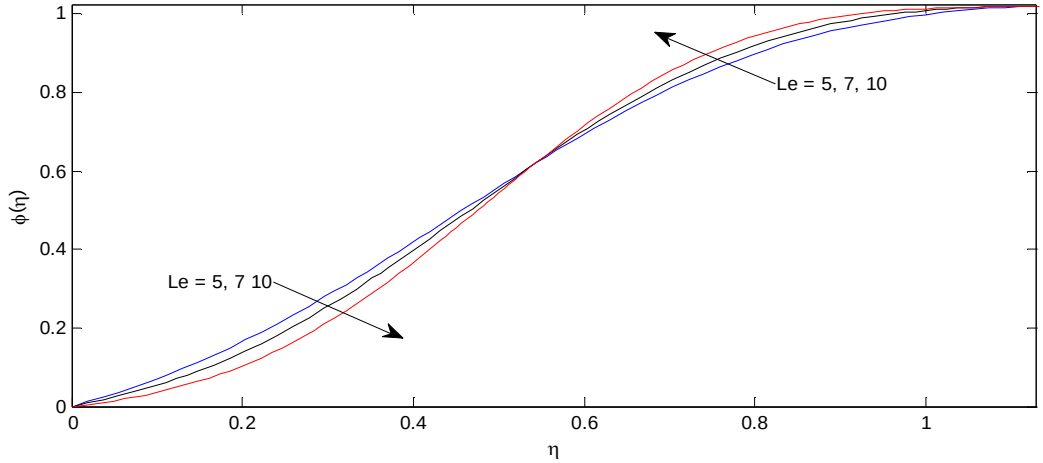

Fig-23: Concentration profiles for various value of *Le*.

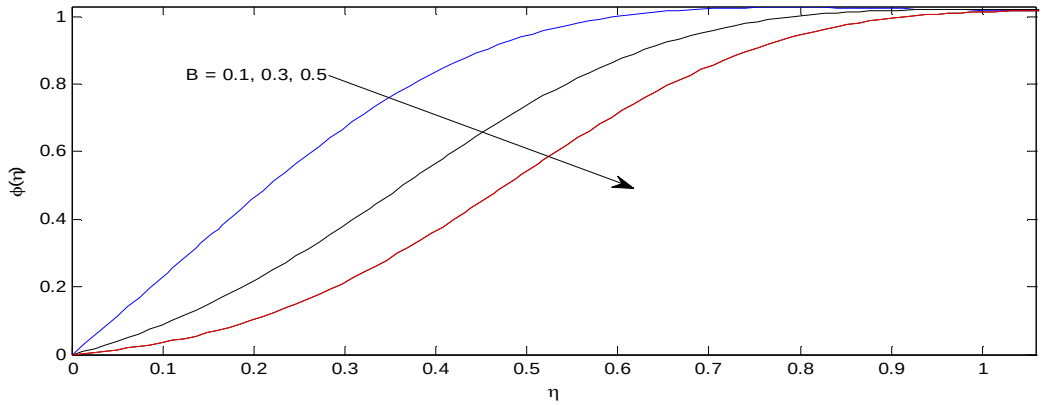

Fig-24: Concentration profiles for various value of *B*

Table 1 represents the effects of pertinent flow parameters on skin friction coefficient $-f''(0)$, local Nusselt number $-\theta'(0)$, and local Sherwood number $-\phi'(0)$. It is observed from the table that on increasing M, and Pr, the numerical values of co-efficient of skin-friction, Nusselt number and Sherwood number are getting increased, while these coefficients are getting decreased on increasing *B*. The co-efficient of skin-friction is getting increased on increasing A and Le, while it is getting decreased on increasing *Nb*, *Nt* and R. The Nusselt number is getting increased on increasing A, *Nb*, *Nt* and R while it is getting decreased on increasing Le. The Sherwood number is getting increased on increasing *Nt*, while it is getting decreased on increasing A, *Nb*, R and Le. This implies that the co-efficient of skin-friction increases

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with the increase in velocity ratio parameter, magnetic field, and Levis number, while it decreases with the increase in thermal diffusion, Brownian motion, thermophoresis parameter, thermal radiation and melting of the sheet. The rate of heat transfer is an increasing function of velocity ratio parameter, magnetic field, Brownian motion, thermophoresis diffusion and radiation, while it is a decreasing function of thermal diffusion, Levis number and melting of the sheet. The velocity ratio parameter, magnetic field, thermophoresis diffusion and thermal radiation tend to increase the nano-particles Sherwood number where as the thermal diffusion, Brownian diffusion, melting of the sheet and chemical reaction have reverse effect on it

Table-1: Effects of various parameters on coefficient of skin-friction, Nusselt number and Sherwood numbers

A	M	Pr	Nb	Nt	R	Le	B	$-C_f\sqrt{\mathrm{Re}_x}$	$-\frac{Nu_x}{\sqrt{\mathrm{Re}_x}}$	$-\frac{Sh_x}{\sqrt{\mathrm{Re}_x}}$
1.3								0.978853	0.981526	0.227544
1.5								1.643588	1.030845	0.226441
2								3.35056	1.140233	0.225997
	5							2.615603	1.120554	0.219469
	7							2.929215	1.129597	0.222306
	10							3.35056	1.140233	0.225997
		0.71						3.35056	1.140233	0.225997
		1						3.365664	1.541025	0.374542
		2						3.368009	1.837163	0.494172
			0.5					3.343586	1.161597	0.207614
			1					3.282864	1.34958	0.094058
			1.5					3.237702	1.49179	0.047027
				0.5				3.342914	1.163657	0.223165
				1				3.259505	1.422871	0.352294
				1.5				3.165524	1.723548	0.843245
					0.2			3.35056	1.140233	0.225997
					0.3			3.324219	1.221163	0.167486
					0.6			3.27162	1.384792	0.066552
						2		3.348892	1.145339	0.574783
						5		3.349516	1.143428	0.401827
						10		3.35056	1.140233	0.225997
							0.1	3.605285	1.94687	2.210072
							0.3	3.446387	1.418755	0.691607
							0.5	3.35056	1.140233	0.225997

4. ACKNOWLEDGMENT

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5. REFERENCES

[1] S. U. S. Choi and J. A. Eastman, Enhancing thermal conductivity of fluids with nanoparticles, in: The Proceedings of the 1995 ASME International Mechanical Engineering Congress and Exposition, San Francisco, USA, ASME, FED 231/MD 66, 1995, pp. 99-105.

[2] S. U. S. Choi, Z. G. Zhang, W. Yu, F. E. Lockwood and E. A. Grulke, Anomalously thermal conductivity enhancement in nanotube suspensions, Appl. Phys. Lett., Vol. 79 (2001), pp. 2252-2254.

[3] X. Q. Wang and A. S. Mazumdar, Heat transfer characteristics of nanofluids: a review, Int. J. Thermal Sci., Vol. 46 (2007), pp. 1-19.

[4] S. K. Das, S. U. S. Choi and W. Yu, T. Pradeep, Nanofluids: Science and Technology, Wiley, Hoboken, New Jersey, 2008.

[5] S. Kakac and A. Pramuanjaroenkij, Review of convective heat transfer enhancement with nanofluids, Int. J. Heat Mass Transf. Vol. 52 (2009), pp. 3187-3196.

[6] Hiemenz K. Die Grenzschict neinem in den gleichformigen flussigkeitsstrom eingetauchten geraden Kreiszylinder. Dingler's Polytech J 1911; 326:321–410.

ISSN 2394 - 7780

[7] Bhattacharyya K, Mukhopadhyay S, Layek GC. Slip effects on boundary layer stagnation-point flow and heat transfer towards a shrinking sheet. Int J Heat Mass Transfer 2011;54:308–13. http://dx.doi.org/10.1016/j.ijheatmasstransfer.2010.09.041.

[8] Motsa SS, Khan Y, Shateyi S. A new numerical solution of Maxwell fluid over a shrinking sheet in the region of a stagnation point. Math Probl Eng 2012. http://dx.doi.org/10.1155/2012/290615. Article ID 290615.

[9] Makinde OD, Charles WM. Computational dynamics of hydromagnetic stagnation flow towards a stretching sheet. Appl Comput Math 2010; 9:243–51.

[10] Nadeem S, Hussain M, Naz M. MHD stagnation flow of a micropolar fluid through a porous medium. Meccanica 2010;45:869–80. http://dx.doi.org/10.1007/s11012-010-9297-9.

[11] Makinde OD. Heat and mass transfer by MHD mixed convection stagnation point flow toward a vertical plate embedded in a highly porous medium with radiation and internal heat generation. Meccanica 2012;47:1173–84. http://dx.doi.org/10.1007/s11012-011-9502-5z.

[12] Mahapatra TR, Nandy SK. Momentum and heat transfer in MHD axisymmetric stagnation-point flow over a shrinking sheet. J Appl Fluid Mech 2013 2013;6:121–9.

[13] A. S. Dogonchi, K. Divsalar and D. D. Ganji, Flow and heat transfer of MHD nanofluid between parallel plates in the presence of thermal radiation, Comput. Methods Appl. Mech. Eng., Vol. 310 (2016), pp. 58–76.

[14] M. Das, B. K. Mahatha, and R. Nandkeolyar. Mixed convection and nonlinear radiation in the stagnation point nanofluid flow towards a stretching sheet with homogenous-heterogeneous reactions effects. Procedia Eng., 127:1018-1025, 2015.

[15] M. Mustafa, A. Mushtaq, T. Hayat, and B. Ahmad. Nonlinear radiation heat transfer effects in the natural convective boundary layer flow of nanofluid past a vertical plate: A numerical study. PlosOne, 9(9):0103946, 2014.

[16] B.K. Mahatha, R. Nandkeolyar, M. Das and P. Sibanda, Stagnation point nanofluid flow along a stretching sheet with non-uniform heat generation/absorption and Newtonian heating, Bulg. Chem. Commun., Vol 49 (2017), pp. 977-985.

[17] B. K. Mahatha, R. Nandkeolyar, G. K. Mahato and P. Sibanda, Dissipative Effects in Hydromagnetic Boundary Layer Nanofluid Flow Past A Stretching Sheet with Newtonian Heating, Journal of Applied Fluid Mechanics, Vol. 9 (2016), No. 4, pp. 1977-1989.

[18] R. Nandkeolyar, B. K. Mahatha, G. K. Mahato and P. Sibanda, Effect of Chemical Reaction and Heat Absorption on MHD Nanoliquid Flow Past a Stretching Sheet in the Presence of a Transverse Magnetic Field, Magnetochemistry, Vol. 4 (2018), Issue 1, pp. 1-14.

[19] WT. Cheng and CH Lin, Melting effect on mixed convective heat transfer with aiding and opposing external flows from the vertical plate in a liquid-saturated porous medium. Int J Heat Mass Transf., Vol. 50 (2007), 3026–34.

[20] C. Tien, Y.C.Yen, The effect of melting on forced convection heat transfer, J.Appl.Meteorol.4 (4) (1965) 523–527.

[21] Epstein M, Cho DH. Melting heat transfer in steady laminar flow over a flat plate. J Heat Transf 1976;98:531–3.

[22] B.J. Gireesha, B. Mahanthesh, I.S. Shivakumara, K.M. Eshwarappa, Melting heat transfer in boundary layer stagnation-point flow of nanofluid toward a stretching sheet with induced magnetic field, Eng. Sci. Tech. Int. J. 19 (2016) 313–321.

[23] T. Hayat, M.I. Khan, A. Alsaedi, M.I. Khan, Homogeneous-heterogeneous reactions and melting heat transfer effects in the MHD flow by a stretching surface with variable thickness, J. Mol. Liq. 223 (2016) 960–968.

[24] P.K. Kameswaran, K. Hemalatha, M.V.D.N.S. Madhavi, Melting effect on convective heat transfer from a vertical plate embedded in a non-Darcy porous medium with variable permeability, Adv. Powder Technol. 27 (2016) 417–425.

ISSN 2394 - 7780

[25] S.K. Adegbie, O.K. Koriko, I.L. Animasaun, Melting heat transfer effects on stagnation point flow of micropolar fluid with variable dynamic viscosity and thermal conductivity at constant vortex viscosity, J. Nigerian Math. Soc. 35 (2016) 34–47.

[26] K. Singh, M. Kumar, Melting and heat absorption effects in boundary layer stagnation-point flow towards a stretching sheet in a micropolarfluid, Ain Shams Eng. J. (2016) http://dx.doi.org/10.1016/j.asej.2016.04.017.

[27] W. Ibrahim, Magnetohydrodynamic (MHD) boundary layer stagnation point flow and heat transfer of a nanofluid past a stretching sheet with melting, Propulsion and Power Research, Vol. 6 (2017) No. 3, pp. 214–222.

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GENDER EQUITY: A STEP TOWARDS SUSTAINABLE DEVELOPMENT

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ABTRACT

According to The Economic Times (2012), the financial crisis had an adverse impact on sustainable development. Although the meaning of the term "sustainable development" remains questionable, the agenda has taken a top priority amongst nations- both developed and developing. The conceptualization emerged from the Rio+20 United Nations Conference on Sustainable Development in 2012 of three interconnecting dimensions: economic, environmental, and social. Focusing on the socio-environmental aspect of sustainable development, the relationship between gender equity and the environment needs to be studied before looking at the role played by microfinance in bringing about gender equity in developing nations. Microfinance may typically be examined along the socio-economic dimension as enhancing gender equity might lead to increased income opportunities. Its relationship to environmental sustainability and suggestions for improving the capacity of microfinance in this area could be explored. Entrepreneurship is seen as an alternative to unemployment and poverty which could play an important role in sustainable development. The changing structure of the traditional enterprises and the impact of those changes on rural communities have been a source of concern to many welfare groups. Additional employment opportunities are needed to utilize labour force and various resources in these areas.

The purpose of this paper is

(a) To summarize the research undertaken in the area of sustainable development and their impact on economy.

(b) To provide a brief critique on the current status and the role of women entrepreneurship towards sustainable development.

Keywords: development, entrepreneurship, environment, equity, green economy, informal sector, microfinance, policy, sustainable development, women, Jharkhand, globalisation.

INTRODUCTION

The continued existence of disparities between women and men in access and control over resources, and the discrimination against women throughout history, are now seen as a clog in the wheel of national and international development agendas. Importantly, the achievement of gender equality is bound up with all other goals of sustainable development, such as good governance, human rights, environmental sustainability, and poverty reduction. The promotion of women's empowerment as a development goal is based on a dual argument that social justice is an important aspect of human welfare and is intrinsically worth pursuing and that women's empowerment is a means to promoting sustainable human development.

Therefore engendering national development and its processes is to ensure that both men and women are free to develop their full potentials, and are able to make choices without restrictive gender roles. It thus follows thereby, that women's and men's needs and interests are to be equally valued and protected if any nation is to achieve sustainable development. More importantly, countries with wide gender gaps are found to exhibit poor indicators of growth and wellbeing – poor nutrition, high maternal mortality rate; high infant mortality rate; high poverty rate; low life expectancy; low level of education; high HIV/AIDS prevalence rate; and are mostly agrarian society (low industrial growth) among others.

As the 'gender variable' enters the development equation, attention is now drawn on a better understanding of gender relations, particularly the unequal power distribution between women and men across societies. Notably, gender equality does not ignore the biological differences between men and women especially in reproductive roles, rather it helps to appreciate the uniqueness of each gender group and the importance of bringing the different needs and priorities of both women and men into development agenda, thereby helping to focus on gender differences in social arrangements, gender equity, and social justice which are at the heart of sustainable development. In the wake of the 2008 financial crisis and multiple natural disasters, the sustainable development agenda has regained popularity not just in international policy making circles, but also in classrooms reflecting a variety of disciplines, local and national governments, and even corporate boardrooms. But there is a hitch. The meaning of the term "sustainable development" remains contested. "Sustainable" often

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refers to an outcome (e.g., economic growth) lasting over time, or a process which is environmentally sound. Environmental economists commonly consider the relationship between these two dimensions. However, there is a third (social) dimension of sustainability that is often either downplayed or compartmentalized by mainstream analysis. Gender equity is linked not only to multiple elements of social sustainability: participation, security, and social cohesion being three examples, but also to economic and environmental sustainability. Much has been written about the role gender plays in the process of economic development Women contribute to productivity and economic growth both (i) directly by participating in the paid labor market and (ii) indirectly through social provisioning, including unpaid work raising children, and investing in their communities. However, a wide range of gender inequities — from access to education, nutritious food, productive inputs, and decent work, to time poverty, limits women's ability to contribute to their own and their family's wellbeing as well as to long-run economic growth. Such inequities are exacerbated by environmental degradation, but they also hinder climate change adaptation and mitigation. In the absence of sufficient regulation, market-led growth strategies have contributed to "overexploitation of natural resources and the pollution of climates, land and oceans". Like economic and social shocks, environmental shocks are disproportionately borne by the poor, given their minimal asset ownership and ineffective or absent risk management. As economic development degrades water sources and forests, women and girls must walk farther distances to collect sufficient drinking water and firewood for their families. Gender-based health inequities are also aggravated by climate change's impact on the availability and predictability of food supply. Women and girls are expected to go without proper nutrition in order to preserve sufficient food for men and boys. Thus, as familial health declines, women's care burden increases. Microfinance offers loans even if clients do not have assets for collateral or a formal bank account. Even though much research has focused on the social-economic nexus of microfinance and its relationship to inclusive growth, comparatively less research explores the social-environmental nexus. The environmental impact of microfinance can be considered from a number of angles: the impact of poverty reduction; the impact of microfinance client activities; and the impact of microfinance institutions (MFIs) themselves. Reducing poverty not only decreases household vulnerability to environmental shocks, but also mitigates the need to "pillage their natural surroundings for food or shelter" as households diversify their asset base. The environmental impact of microfinance client activities depends on the usage of loans. If loans are distributed solely according to the potential profitability of the product/service being sold, it is possible for production processes to be resource intensive or contribute to environmental degradation. MFIs may be able to target loans, screening applicants or providing lower interest rates to entrepreneurs addressing certain social and environmental criteria. MFIs can promote eco-friendly business ideas, such as "production of organic fertilizers and biomass charcoal briquettes, clean energy cook stove fabrication, and handicrafts made from sustainably sourced materials", along with solar-powered products, waste recycling, rainwater harvesting, and water storage systems. In East Kolkata, India, community members used microloans to establish an eco-tourism program, conserving wetlands and preserving local livelihoods. Alternatively, micro-loans can be distributed for the sole purpose of investing in clean energy technology for one's household or business. As one example, Xac Bank offers micro-loans to Mongolian women for a package including a water filter, energy-efficient stove, and solar light. Thus, in addition to reducing annual household carbon emissions by three tons, this reduces household energy costs and frees up resources and time for women. In Bangladesh, Grameen Shakti offers micro-loans for small solar energy systems that help street vendors stay open after dusk and earn more income. Micro-loans can even address pressing sanitation needs. Water Credit has disbursed nearly 4,50,000 loans — 91 percent of them to women — so that households can arrange for water connections and toilets (Water Credit 2014). This is not only less expensive than paying per-use or per-bottle fees to private sellers, but it also reduces time poverty for women and girls.

LITERATURE REVIEW

Nachimuthu & Gunatharan (2012) conducted a study of 350 women entrepreneurs in Tamilnadu to gauge the strength of SHGs and other form of enterprises in empowering women. Results indicated that women entrepreneurs in SHGs are more empowered than other Non-SHG entrepreneurs. Margaret and Kala (2013) studied on the substantial impact of NGOs on the empowerment and development of the women recipients. They argued that the demographic variables like age, education, monthly income and years of association influence the level of empowerment of the women. Kirankere & Subrahmanya (2013) argued that Self Help Groups (SHGs) are successful in the empowerment of women by allotting entrepreneurial finance to rural women entrepreneurs. According to study the SHGs had major impact on social and economic life of rural women. Handy, Kassam, and Ranade (2003) studied women entrepreneurs in the non-profit sector and role of SHGs' in various social and cultural factors that influence women entrepreneurs in a particular segment of the non-profit sector in India to determine such self- selection. Singh, Thakur & Gupta (2013) studied on roll of micro entrepreneurship among the rural women. They argued that micro enterprise is an effective instrument of

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social and economic development of rural youth. It also helps to generate employment for a number of people and is best tool for rural women as it enables them to add to the family income. Sharma, Dua & Hatwal (2012) examined the impact on women empowerment through micro entrepreneurship development and SHGs. They argued that micro finance play a vital role in the success of SHGs. Brown & Hisrich (1986) compared and evaluated various research studies done on entrepreneurship including women entrepreneurship. It concludes that female entrepreneurs are relatively well educated in general perhaps not in management skills. Moore & Buttner (1997) in their study explained, "Female entrepreneurs are those who use their knowledge and resources to develop or create new business opportunities who are actively involved in managing their businesses and own approximately half the percent of the business." Srilatha et al. (1997) observed that a major improvement of making the women SHGs was that the shift of power completely goes to the people. Joseph (1998) concluded that the "Preshitha Service Society (PSS)" of Coimbatore district had made women not only economically independent but they were also made to change their self-perception that they need not always be at the receiving end. Men and society had come to understand women's capabilities and their contribution to the development process. Mridula (1998) stated that women's development in recent years emphasize on providing equal opportunities to women by removing gender bias, empowering women and creating self-reliance among them. Sashi (1998) revealed that through the intervention of Indian Social Institute in two slums, women were beginning to develop a better understanding of their self in terms of health, income, leisure, marital and familiar roles and various other rights and obligations. Puhazhendi (2000) 'Journal of Commerce and Management Thought' revealed that participation of women in SHGs made a significant impact on their empowerment both in social and economic aspects. The women members were able to increase their income level manifold and contribute to the development of the family. Above reviews clearly revealed that the major factors affecting the empowerment were access to land, independent earning, community participation, decision making and self-confidence. Further education and social participation, also affect the empowerment of women. In the work of Mazumdar, M and Ahmed, M (2015), the stress is given on consistent participation of women in the entrepreneurial activities. In their work the roles of SHGs' have great impact on the development of women entrepreneurs. Due to the participation in the entrepreneurial and other activities of SHGs, there was an increase in self-confidence, independence also. As per data in the study approximately 60% of Indian rural women are self-employed. SHGs' are empowering economically these rural women, which help them to generate income and employment opportunities for other females too. They also emphasized the role of government in the upliftment of women entrepreneurs. Increased literacy level could be helpful for the SHG members to overcome cognitive constraints and to understand government policies, technical understanding and gaining required skills. Mitra, A.S. and Ali, M.H. (2015), they concluded with group-wise difference in terms of income, savings, expenditure and debt reduction have been found. According to their analysis SHGs failed to work when we call from the point of equity. This could be reflected by the fact that SHGs have failed to cater entrepreneurship among the women in West Bengal. There are mixed response upon the working of SHG. Despite social and economic barriers there are a number of promising women entrepreneurs groomed by SHGs. However, constant watch, monitoring and dissemination of skills, knowledge among the women in a systematic way with linkages with different rural institutions will usher in new hope in rural areas. Patil, S.S. (2013), suggests in which SHGs empowering the women of Kolhapur district like training facilities, marketing, cooperation and co-ordination and also on political front among the groups. From the study it is indicated that (65.33%) of the respondents say that there is lack of training facilities. So, emphasis is on the provision of vocational training centers. The role of SHGs' in majority of respondents demands for better marketing facilities of their goods. In the study, it was also found that financial institutions have negative view about SHGs. 89.33% of the respondents reflects disputes among the members of group regarding sharing of work, status, group leadership etc. which will have an adverse effect on the working of these groups. Considering the various factors that hinder the progress of SHGs, it is the need of the hour to create environment for promoting women SHGs. Government banks and other financial institutions should come forward to offer financial assistance to these groups. India will work on right direction to empower more and more women in social, economical, cultural and political matters. In nearly every country, women work longer hours than men, but are usually paid less and are more likely to live in poverty. In major economies, women spend much of the day performing tasks to maintain the household, such as carrying water and collecting fuel. In many countries, women are also responsible for agriculture production. Females are engaged in almost every field of work but they are still paid less salary as compared to their male counterparts. This directly affects the health of women worker and their social life. According to NABARD, the definition of SHG is "An SHG is a small, economically homogeneous and affinity group of rural poor voluntarily formed to save and mutually agree to contribute common fund to be lent to its members as per group decision for their socio-economic development". As the name suggests, it is an informal group of about 10-15 people from a similar class, coming together for

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focusing on their common problems. The main aim of SHG is to make group members self-sufficient and independent by self-employment and empowerment through these informal groups are of recent origin in rural India, helping more than 17 million women from villages to improve their incomes, educate their children & buy assets. SHGs have also helped women to crusade against oppressive social practices & become a force of development in their villages. Studies have shown that the delivery of micro finance to the poor is productive & less costly, if they are prepared to help self help groups. SHGs in India exemplify an exclusive approach to financial link, which pools access to low cost financial services. Role of SHGs' in the self management and development for women is important. SHGs are formed & supported usually by NGOs or increasingly by government agencies, linked not only to the banks but also to wider development programs. SHGs are seen to confer many benefits both economic & social. SHGs can also be community platforms from which women become active in village affairs, stand for local election or take action to address social community issues. There should be step-by-step development of entrepreneurship through SHGs' as discussed below:

1) Identification of potential Entrepreneur: For the successful implementation of SHG initiative it is necessary to accept the entrepreneurial activity by each member of the group. Then, the need is to locate potential and indigenous entrepreneur, which have common interest to start new venture with SHG interest and blend them with technical assistance.

There is a big list of several Government and non-government agencies for providing technical assistance:

- Women's Corporate Finance Corporation (WCFC).
- Small Entrepreneurship Development Institution of India (SEDII).
- District Industries Center (DIC).
- Integrated Rural Development Program (IRDP).
- Federation of Societies of Women Entrepreneurs (FSWE).

2) Establishing the financial help and creating customers: Finance is the lifeblood of any business enterprise and so for entrepreneurs too. There is a need for adequate and timely supply of credit that is essential for new entrepreneurs' development. Various banks and financial institutions are fulfilling their financial needs and SHGs' women can start various income generating activities e.g. dairying, medicinal plants, nursery, bee keeping, domestic industries like, preservation of locally available fruits and vegetables, masala making, handicrafts, embroidery, quilting, knitting, soft toy making, doll making, pottery, fancy items, candle making, chalk making, agarbatti etc. No enterprise survives without the customers. Its existence and survival solely depends on customers. There are two options available for entrepreneur either to respond to consumer's demand or to create demand. These SHGs' women can identify the customers and explore the markets for their products.

3) Expansion of business through innovation: Generally, women entrepreneurs have small-scale businesses and have to strive through tough competition by other businesses. For this they have to enhance their skill or knowledge through innovative techniques and various marketing strategies. They need to learn how to adjust to the new technological environment and to bring the same to their own level in the SHG. Either way constant re-examination is needed.

INDIAN GOVERNMENT SUBSIDY SCHEMES

BHARATIYA MAHILA BANK

Started in 2013, Bharatiya Mahila Bank today, has 45 branches spread across India. The bank focuses on helping women who are economically neglected, underprivileged, unbanked or discriminated, but looking forward to starting their own business. The popular loans provided by this bank are:

BMB Shringaar: Under this CGTMSE Scheme, a subsidiary free loan of up to Rs.1 crore can be availed for setting up a beauty parlor /saloon/spa. The interest rate at which the loan is provided is 12.25% (Base Rate + 2.00%) and the repayment can be done within 7 years.

BMB Annapurna: This collateral free loan of up to Rs. 1 Crore is provided for food business and can be repaid in 3 years. This loan is categorized under CGTMSE Scheme and is provided at an interest rate of 11.75% (Base Rate + 1.50%).

BMB Parvarish: Women willing to open a day care center can benefit from this loan provided under CGTMSE Scheme. The term of the loan is up to 5 years and the collateral free loan provided is up to Rs.1 crore. The interest rate is 12.25% (Base Rate + 2.00%).

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TRADE RELATED ENTREPRENEURSHIP ASSISTANCE AND DEVELOPMENT (TREAD) SCHEME FOR WOMEN

As provided by the Ministry of Micro, Small & Medium Enterprises (MSME), Trade Related Entrepreneurship Assistance and Development (TREAD) Scheme for Women offers a subsidy of up to 30% of the total cost of the project (that will be assessed by lending institutions). The rest of the loan assistance is to be provided by the lending institutions.

Women who can benefit from this scheme include those who are not being helped by banks. Generally, the applicants under this scheme are illiterate/semi-literate or lesser privileged women. The request for subsidy is considered for approval only if it is made through an NGO. Women have been among the most disadvantaged and oppressed section of our country with regard to access to and control over resources. Problems faced by them continue to be grave particularly for illiterate & semiliterate women of rural and urban areas. In order to alleviate their problems, Govt. of India launched a scheme entitled "Trade Related Entrepreneurship Assistance and Development" (TREAD) during the 9th plan period, which has slightly been modified and is now put in operation. The scheme envisages economic empowerment of such women through trade related training, information and counseling extension activities related to trades, products, services etc.

MAHILA COIR YOJANA

Providing assistance to artisan women living in rural areas (producing coir fibre), the Mahila Coir Yojana (MCY) Subsidy Scheme is a boon for women looking for funding options. It is the first women oriented self-employment programme in the coir industry, which aims to providing self-employment to rural women artisans in regions producing coir fibre. The conversion of coir fibre into yarn on motorized ratts in rural households provides scope for large scale employment, improvement in productivity and quality, better working conditions and higher income. The scheme is being implemented by the Government through the Coir Board under its plan scheme “Training, Extension, Quality Improvement, Mahila Coir Yojana and Welfare Measures”.

SCHEMES FOR WOMEN-OWNED BUSINESSES

Of late, many reputed banks have come up with attractive lending schemes for female entrepreneurs. There are many schemes that are exclusively framed for women entrepreneurs. These schemes are advantageous for them since they provide relaxation both in terms of collateral security and rate of interests. In most cases, interest rate varies from 0.25 percent to 1 percent on applicable terms and conditions. Many banks even have special cells for female entrepreneurs. They provide proper training and counseling to the women business owners as well as show them avenues for promoting and marketing their businesses.

PROBLEMS FACED BY WOMEN ENTREPRENEURS

Women entrepreneurs face a series of problems right from the foundation till the enterprise functions.

1. Patriarchal Society: Entrepreneurship has been traditionally seen as a male preserved field and idea of women taking up entrepreneurial activities is considered as a distant dream. Women also have to face role conflict as soon as they initiate any entrepreneurial activity. The greatest deterrent to women entrepreneurs is that they are women. A kind of patriarchal - male dominant social order is the roadblock in their way towards business success.
2. Absence of Entrepreneurial Aptitude: The male – female competition is another factor, which develop hurdles to women entrepreneurs in the business management process. They have lack of knowledge about the insights of running a business.
3. Marketing Problems: Mobility is a big challenge as they are unable to overlook and ignore their family and social responsibilities which limits their marketing of products and services.
4. Financial Problems: Obtaining the support of bankers, managing the working capital, credit resources are the issues which still remain in the male’s domain. Women are yet to make significant mark in quantitative terms. The financial institutions are skeptical about the entrepreneurial abilities of women. The bankers consider women as higher risk than men.
5. Family Conflicts: Women also face the conflicts between family and professional life as they are not available to spend enough time with their families.
6. Credit Facilities: Women in developing nations have little access to funds, due to the fact that they are concentrated in poor rural communities with few opportunities to borrow money (Starcher, 1996; UNIDO, 1995a). The women entrepreneurs are suffering from inadequate financial resources and working capital. The women entrepreneurs lack access to external funds due to their inability to provide tangible security.

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7. Fine balance: Married women have to make a fine balance between business and home. More over the business success depends on the support of the family members extended to women in the business process and management. The interest of the family members is a determinant factor in the realization of women business aspirations.
8. Low-level management: Women entrepreneurs have low-level management skills as compared to what is considered.
9. Heavy Competition: Many of the women enterprises have imperfect organizational set up. But they have to face severe competition from organized industries. Knowledge of latest technological changes, know how, and education level of the person are significant factor that affect business. The literacy rate of women in India is found at low level compared to male population.
10. Shortage of raw-materials: Women entrepreneurs encounter the problems of shortage of raw-materials.
11. High Production cost: Finally, high production cost of some business operations adversely affects the development of women entrepreneurs. The installation of new machineries could be considered as an example.

ADVANTAGES OF MICRO-ENTERPRISES IN EMPOWERING RURAL WOMEN ENTREPRENEURS

Micro-Enterprises in rural areas can help women to bring their entrepreneurial potential. These small-scale concerns not only generate employment but also enhance capabilities, freedom and productivity of these women. Economic empowerment of these women may lead to the social independence, family development, economic growth, and ultimately results in national growth.

Some of the major traits that these enterprises develop among its female members are as follows:

- Economic independence
- Sense of achievement
- Social responsibility
- Leadership qualities
- Self-confidence
- Financial independence
- Decision making capacity
- Societal interaction
- Awareness
- Improved standard of living

METHODOLOGY AND OBJECTIVES

This paper is descriptive in nature. The information is collected from secondary sources only. The secondary data and information have been studied for preparing this paper. The secondary information is gathered from various books, articles published in different journals, periodicals, conference paper, working paper and websites. The objectives of this paper are:

1. To study various Policies and Schemes initiated by the Government and other Institutions to encourage Women Entrepreneurs that promotes gender equity.
2. To identify socio-economic barriers for gender equity.
3. To study the hindrances faced in carrying out business and maintain sustainable development.
4. To know the impact of entrepreneurship in empowering women.
5. Overview of Gender Equality/Women Empowerment (GEWE) frameworks.
6. Gender/Women Empowerment at the intersection of Sustainable Development
7. Forward Looking Strategies – Adopting GEWE as a tool for sustainable development.

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ANALYSIS

In India, there were 1,59,99,000 Women Entrepreneurs benefited (number of accounts opened) under Pradhan Mantri Mudra Yojana (PMMY) during 2016-17 as on Nov.25, 2016. The amount disbursed to these Women Entrepreneurs during the same time period under PMMY was Rs.37052.59 Crores. The top 10 States/UTs in terms of number of Women Entrepreneurs benefited under PMMY during 2016-17 as on Nov.25, 2016 were: Tamil Nadu, Karnataka, Maharashtra, Bihar, West Bengal, Uttar Pradesh, Odisha, Madhya Pradesh, Rajasthan and Jharkhand. Out of the above said top 10 States/UTs, top 5 states were Tamil Nadu, Karnataka, Maharashtra, Bihar and West Bengal, which benefited (number of accounts opened) 2435864, 1890285, 1669527, 1516870 and 1467957 of Women Entrepreneurs respectively under PMMY during 2016-17. Under PMMY these 5 states Tamil Nadu, Karnataka, Maharashtra, Bihar and West Bengal disbursed Rs. 5700.43 Crores, Rs. 4707.78 Crores, Rs. 3985.29 Crores, Rs. 2889.26 Crores and Rs. 2724.61 Crores respectively to Women Entrepreneurs during 2016-17. These top 5 states accounted for 56.13% of the total number of Women Entrepreneurs benefited (number of accounts opened) under PMMY in India as a whole during 2016-17 as on Nov.25, 2016. Out of the above said top 10 States/UTs, bottom 5 states were Uttar Pradesh, Odisha, Madhya Pradesh, Rajasthan and Jharkhand, which benefited (number of accounts opened) 1428262, 1358811, 1156996, 423014 and 410025 of Women Entrepreneurs respectively under PMMY during 2016-17. Under PMMY these 5 states Uttar Pradesh, Odisha, Madhya Pradesh, Rajasthan and Jharkhand disbursed Rs. 2907.17 Crores, Rs. 2608.24 Crores, Rs. 2632.86 Crores, Rs. 1077.59 Crores and Rs. 847.34 Crores respectively to Women Entrepreneurs during 2016-17. The above mentioned top 10 states accounted for 85.99% of the total number of Women Entrepreneurs benefited (number of accounts opened) under PMMY in India as a whole during 2016-17 as on Nov.25, 2016. In this regard, the CM of Jharkhand appreciated the women engaged in manufacturing the napkins and said the initiative will benefit families that do not have a proper source of income. Chief Minister Raghubar Das said that the Jharkhand government will purchase sanitary napkins from Self-help Groups (SHGs) for distribution among school girls. The government during the recent budget session taken this decision to empower women working in SHGs, the CM told, after inspecting a sanitary napkin manufacturing centre at Bagunhatu in Jamshedpur East constituency. Tata Steel, under its Corporate Social Responsibility (CSR) initiatives, has been providing training to women in SHGs to make sanitary napkins. Altogether 15 SHGs here have been engaged in napkin manufacturing work in Bagunhatu, the CM said, adding that the initiative is aimed at promoting self-employment. The state that was spending around Rs 25 crores annually to buy sanitary napkins from contractors will now procure them from these self-help groups. Appealing to the media to promote locally made goods, he said Prime Minister Narendra Modi's dream of doubling the income of poor can be fulfilled by endorsing products of small and cottage industries. Having left virtually no stone unturned to attract investors from within the country and outside in the last six months, and being criticized by the opposition for catering only to the corporate interest and perennially being on tour, Jharkhand Chief Minister Raghubar Das presented the state's annual budget for 2017-18 under the theme of "Garib Kalyan Varsh". Women's SHGs, working women, rural issues and sops for youths were at the centre of the announcements made by Das. Invoking Deen Dayal Upadhyaya and Netaji Subhash Chandra Bose, the CM did make a passing mention about the state holding Global Investors Meet in February 2017, which has paved the way for employment generation. He also mentioned that there would be no new taxes and sops to promote digital payments in the state due to the Goods and Services Tax implementation. The CM appreciated the women engaged in manufacturing the napkins and said the initiative will benefit families that do not have a proper source of income. Taking a couple of leaves from Centre's initiatives, the budget of 2017-18 was advanced and the terms "plan and non-plan" have been done away with. Das presented a total budget of Rs 75,673.42 crores, out of which Rs 57,861.32 crore was the revenue expenditure and Rs 18,812.10 crore was the capital expenditure. At current prices, the budget has grown nearly 20 per cent over 2016-17. The lion's share of the budget allocations went to the education sector, which got over Rs 10,000 crore worth of allocation. Das attributed the shaping of the budget to 1,005 suggestions that were received in pre-budget consultations from the common people through "Yojana Banao Abhiyaan", besides inputs from Jharkhand Development Council and 20-point Programme Implementation Committee. At least 70 of those suggestions, many of them new announcements, have been included in the budget proposals. "We are going to strengthen this practice further, as people feel that it is their budget and take interest in its implementation" he said. Some of the budget announcements received as suggestions from various quarters are: Sakhi Mandals (women's self-help groups) to have single loan rate across the state, crèche in every panchayat, rural libraries in every panchayat, Chief Minister's Education Loan Guarantee Fund (starting with Rs 50 crore, a fund through which the state government becomes guarantor for education loans of Scheduled Castes/Scheduled Tribes and Other Backward Classes), 35 kg food grain packet to be delivered through "Dakia Yojana" to the door-step of the Primitive Tribal Groups' houses, Chief Minister's Educational Tour Scheme (along the lines of CM's religious tour scheme that was started, in which state provided heavily subsidized

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religious tours to old men/ women from the BPL families); setting up of ANM Schools in five districts to overcome shortage of nurses and setting up of pharmacy colleges for para-medical staff; and trauma centre in all district hospitals, besides three national highways (NH-2, 33 and 143). Das said that the Sakhi Mandals would be strengthened to become virtually a fountainhead for employment generation in areas like poultry, milk, textiles, school uniforms, and handicraft, lac and tussar silk products. Their products would be produced locally and markets provided in those areas, besides government schools, hospitals and offices being the biggest buyer of their products. At least one lakh Sakhi Mandals would also be given a smart phone each. Besides, the CM also announced a new body for Tana Bhagats (Tribal's who fought bravely during the independence struggle using only Gandhian principles, something they stick to even today) called "Tana Bhagat Development Authority" with a provision of Rs 10 crore.

OVERVIEW OF GENDER EQUALITY/WOMEN EMPOWERMENT (GEWE) FRAMEWORKS

The initial efforts made at integrating the woman's question into the development process, tend to focus exclusively on women. This attempt gave rise to the evolution of the Women In Development (WID) Approach of the 1970s (i.e. the women empowerment paradigm). Aside from the feminist movement of the 1960s in Europe and America, the first international policy push for women in development agenda came from the United Nations, by its International Year of Women (1975) and the International Women's Decade (1976-85), which led to the establishment of Women's Ministries in many of its member countries, and the adoption of WID policies by donor agencies, governments, and NGOs. Though WID opened up some spaces for the women's agenda, it failed to bring women's issues into the centre-page of the development discourse. As it becomes obvious that women and men have to be involved in setting development goals and agendas, the shortcoming found in the WID/WAD approach led to a paradigm shift (i.e. the evolution of the Gender and Development Approach - GAD). GAD addresses both the needs and priorities of women and men, while analyzing the outcomes of development based on such factors as gender, age, marital status, religion, ethnicity, and class. No longer are women (or men) treated as homogenous group, while the underlying structural inequalities in societies are treated as important variables shaping and reshaping women and men experiences in societies. It follows therefore that "gender issues" are not the same as "women's issues". Rather, understanding 'gender' means understanding opportunities, constraints and the impact of change as they affect both women and men. Put simply, traditional gender stereotypes (often detrimental to women) could only be amenable to positive change by creating a partnership between women and men, and building mutual trust across gender groups. A key strategy in promoting gender equality has been the adoption of 'gender mainstreaming' tools which ensures that women's and men's concerns and priorities are incorporated into development policies, strategies, and interventions at all levels, and at all stages – policy formulation and programme/project planning, implementation, monitoring and evaluation among others. Despite the paradigm shift (i.e., between WID/WAD and GAD approaches), 'women empowerment and 'gender equality' principles continue to guide global, regional, and national development agendas. While 'gender equality' remains an end in itself, 'women empowerment' agenda remains an entry point in this process.

GENDER/WOMEN EMPOWERMENT AT THE INTERSECTION OF SUSTAINABLE DEVELOPMENT

With few years to the end of the Millennium Development Goals target date of 2015, the African Continent continued to face development crises including high level of poverty, corruption, bad governance, poor health indicators, environmental degradations, eroding educational systems, economic crises and worst still, violent conflicts and wars. Central to the African development debate is the gender conditions in the continent, and in particular the status of the African women. It is now popularly agreed that the achievement of all the other MDG Goals is hinged on the achievement of MDG Goal 3 – "to promote gender equality and empower women". Thus, the gender variable remains at the core of the various development challenges which currently face Africa, including poverty, corruption, bad governance, conflicts, depletion of natural resources, globalization, and impacts of socio-economic reforms amongst others.

The intersection of 'gender' with these core development challenges are explored below.

1. Poverty: Poverty is not only described as having a woman's face (see UNIFEM, 2000, World Bank, 2001), the underlying determinants of poverty are traced to the subtle but enduring nature of gender inequalities both at the level of policy and practice. Feminization of poverty is heightened in both public and private engagements in Africa, through non-gender responsive methods of resource allocations, inequity in human resource development, low participation of women in decision making, and more importantly, in politics and governance; environmental insecurity; and non-gender responsive policy environment. The feminization of poverty and the specific impact of poverty on women is the result

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of inequalities embedded in norms, traditions and practices that hinder women's access to critical resources such as land and credit. These curtail their inheritance rights and constrain their political participation. The causes and outcomes of poverty are highly differentiated between women and men, particularly because of persistent unequal access to, and control over, productive resources and decision-making processes. Yet, traditional conceptualizations of poverty consistently neglect to take this into account, resulting in policies and programmes, which fail to improve the lives of poor women and men and their families. A focus on gender equality is essential for adequate analysis of the causes and impacts of poverty and the identification of effective strategies to eradicate poverty. Central to such a focus is the attention drawn on gender perspectives, including the equitable participation of women across sectors.

2. Good Governance: Good governance has been defined as the exercise of political, economic and administrative authority to manage a nation's affairs, and the complex mechanisms, processes, relationships and institutions through which citizens' groups articulate their interests, exercise their rights and obligations and mediate their differences. Accountability, transparency, participation and legitimacy are the core elements of good governance. Gender responsiveness is essential to all of these, and is a measure of good governance. Analysis and action on gender issues, the participation of women as well as men in governance processes at all levels, and the recognition by institutions of women's rights and needs, are central to good governance as to poverty reduction. The relationship between good governance, poverty reduction and gender equality at the grass root level is the key to sustainable development, based on equality and equity and the effective participation of all stakeholders at all levels of society. A major concern in many African countries is the continued exclusion of women at all levels, including grass root levels, from important political and economic negotiations, and/or women's purely token representation without possibility for meaningful contribution in governance both at the grass root and at national level. Women's as well as men's voices must be heard in all areas of development, including analyses of poverty and development of strategies and programmes for sustainable development. What has emerged very clearly from research in Africa is that women at the grass root level have an important contribution to make to the development of participatory forms of democracy. There is potential for greater attention to gender perspectives in the move towards democracy at the local level. Facilitating women's participation can move institutions towards more inclusive forms of democracy.

   Women's limited access to resources, public debate and political decision- making is still insufficiently considered in mainstream governance literature. Only ten to twelve per cent of parliamentarians world-wide are women. A major area of concern regarding gender equality and governance is thus the issue of participation of women. However the issue of gender equality in relation to governance goes far beyond women's representation. Equally important is the lack of attention to relevant gender perspectives in both process and substance. Governance policies are developed by institutions whose rules, norms and practices often effectively restrict women's right to meaningful participation and potential to make real choices. Gender perspectives are important in governance, in particular, because the discourse, procedures, structures and functions of governance remain heavily skewed. This raises important questions about transparency, inclusion, legitimacy and accountability – all of which lie at the heart of the governance debate. Governance must be gender-sensitive if it is to be equitable, sustainable and effective. The different ways in which women and men participate in and benefit from governance are significantly shaped by prevailing constructions of gender, whose norms, expectations and institutional expressions may constrain women's access to socio-economic and political resources.

3. Globalization: The African Region continues to play the role of an unequal partner in the areas of trades, industrialization, technology development, learning and applications. This has reinforced the north-south divide in the effects of globalization, with attendant implications for socio-economic conditions of the African states, communities and households. Generally, the developing nations are not only disadvantaged against the developed nations, the individuals and groups within them are further disadvantaged. Women, who traditionally face socio-cultural discriminations within traditional modes of production in Africa, tend to face the double burden of the emerging capitalist production systems which present men with more opportunities (since men traditionally control critical resources - land, labor, capital, and entrepreneurial skills). Thus, women bear the brunt of the new production systems. Huge gender disparities are therefore found in the labor market processes (both commercial agriculture and non-agricultural employment); new technologies including ICT; and the global markets. This has undermined the total potential of African nations to be competitive in global markets, especially given the critical roles of women in both reproductive and productive roles. Also, because women lack requisite educational qualifications,

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they are more likely to be found in low skilled works, while men are generally found in high paying jobs, in the banks, industries, and the corporate world.

4. Depletion of Natural Environment: African women generally have very poor access to natural resources, including land, water bodies, forestry resources, and are virtually ignored in the prospects for extractive industries (oil, gas, and solid minerals). Women therefore often encroach into what they see as 'free' spaces (forest lands) for subsistence farming, gathering of fuel-wood, herding, and gathering of wild resources amongst others. To survive poverty, women exploit the natural environment thereby becoming major actors in the process of climate change.
5. Global Policy Environment: The gravity of threat to humanity that was created as a result of the Second World War made the allied countries to start to re-group and to form an international organization that would have the power to maintain security and foster prosperity. It was within this context that the United Nation's Charter was written. The Universal Declaration on human right which is the primary international articulation of the fundamental and inalienable rights of all members of the human family, which also represents one of humanity's greatest achievement, eventually led to the adoption of the Covenant on Economic and Socio-Cultural Rights, the Covenant on Civil and Political Rights and many other legally binding international rights and instruments.

The common provision which runs through the bills of rights is that which establishes gender equality as fundamental human rights for all without any form of bias. The 1948 Universal Declaration of Human Rights re-affirmed the rights to gender equality in its Article 2. "Everyone is entitled to all the rights and freedoms set forth in this Declaration without opinion, national or social origin, property, birth or other status." Despite the acclaimed guarantee of human rights, women's rights remained at doldrums, and unrecognized in most societies of the world, especially in developing economies. The UN has no doubt played critical roles in the history of the promotion of women's human rights. By 1952, in recognizing that women deserved political rights to participate in governance and choosing representatives, the UN came up with the Convention on the Political Rights of Women (1952). The convention on the nationality of married women (1957) was adopted to guarantee the rights of women who get married across national boundaries while the right to make a choice about marriage was ensured in the Convention on the Consent to Marriage (1962). Further conventions were adopted to ensure that no discrimination existed between men and women. These include the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR). A major issue that required international consensus for intervention was the continued existence of discrimination against women based on their perceived social status, often explicit in almost culturally acceptable norms and practices, such as domestic violence, and the subordination of women in almost all spheres of life. Hence, the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) was adopted in 1979 by the UN General Assembly. This convention began the advent of globalization of the rights to equality for all women and guaranteed equal access to opportunities in political, business, and public environments. Over 180 countries embraced this convention and they all agreed to put in place the necessary instruments including legislation and programs to ensure that women enjoy all necessary rights and privileges. Gender equality had become a universal issue. By now it had become clear that no meaningful development can take place in an environment plagued with discrimination and in particular, exclusion of women from governance and policy processes. Notably, the adoption of CEDAW was a follow-up on other strategies that were in place before it, particularly the Mexico Plan of Action (1975) which emanated from the first World Conference on Women. A major achievement of the Mexico Plan of Action was the declaration of the United Nations Decade for Women (1976-1985) by the General Assembly.

To change the structures which perpetuate gender inequalities across the globe, the United Nations adopted 3 key strategies which are:

- Full gender equality and the elimination of gender discrimination
- The integration and full participation of women in development
- An increased contribution by women in the strengthening of world peace

The United Nations decade for women also led to the creation of the International Research and Training Institute for the Advancement of Women (INSTRAW) and the United Nations Fund for Women (UNIFEM). By the end of the UN Decade for Women, the Nairobi Conference (1985) which appraised the program came up with Forward Looking Strategies to strengthen the achievements of the Decade for Women, essential ingredients to development were lacking and women were still disadvantaged in many areas. The need to

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address these gaps influenced the emergence of more declarations and conventions. Education which is a veritable tool for development was first recognized as an area where gender equity was in urgent need. A World Conference on Education for All was held in 1990 and this came up with Declarations and a platform for action to address education gaps including the rights of women to education. The United Nations Conference on Environment and Development came up with Agenda 21 (1992) and clearly enunciated the rights of women within environmental issues. Some of the rights were reaffirmed in the 1993 Conference on Human Rights and the 1994 International Conference on Population and Environment. A major milestone was achieved at the Fourth World Conference on Women (1995) which ended with the Beijing Declaration and the Beijing Platform for Action (BPA). With the provision that women must be part of the decision making process in matters relating to economic, political and social advancement, the idea of women empowerment became irrevocably tied to development in nations of the world. Among other interests, the BPA recognized the need for women to have improved economic status, participation in the political process and empowerment. It was agreed that massive efforts should be channelled towards reduction of poverty among women especially in developing nations where over 70% of the women population lived below the poverty line. The BPA was preceded in Africa by the Fifth Regional Conference on Women by the United Nations Commission for Africa in Dakar in 1994 where a consensus was adopted on the African Common Position for the Advancement of Women. The BPA fully subsumes the outcome of that conference. Further strategies were put in place by the UN to improve women empowerment as contained in the Outcome Document adopted by the General Assembly Session on Gender Equality and Development and Peace in the 21st century titled "Further Actions and Initiatives to Implement the Beijing Declaration and Platform for Action".

The adoption of the Millennium Development Goals (2000) as a global strategy for poverty reduction further changed the gender landscape in favour of women. Five of the eight goals directly impact on the improvement of the status of women with one goal in particular seeking to achieve gender equality in education by 2015, a goal fully supporting the Dakar Declaration on Education for All (EFA) (2000) which contains most of the ideals of the Beijing Platform.

CONCLUSION

Much needs to be done. The new policies, programs, regulatory structures, jobs, and incentives for green initiatives will neither benefit women and men equally, nor maximize results unless gender is thoughtfully and thoroughly incorporated into each nation's strategy — from ideation to planning and from implementation to assessment. This requires significant cooperation between governments, corporations, and civil society. While many important issues will figure into the next round of climate talks, restructuring existing programs aimed at poverty alleviation — like microfinance — can also address both gender inequity and climate change. MFIs cannot solve these global problems, but they are a player in a complex network of economic, social, and legal institutions. So, along with providing new sources of income (and ideally empowerment) for women, microenterprises can be helpful in spreading sustainable agriculture, reducing deforestation, protecting clean water sources and their accessibility, and preserving biodiversity. If the process of "greening" microfinance is participatory and community-building, this will build an even stronger bridge between the social and environmental dimensions of sustainable development, both in theory and in practice. The present recognition given to gender issues in national/state policies and plans is a direct result of our inter-connectedness with global feminism, a direct gain from the global action against women oppression, and evidence of a growing global identity for women as a social group – irrespective of race, ethnicity, and class. It is clearly demonstrated in this paper that government has a big role to play in bringing about social transformation of the Nigerian society based on gender equality and women empowerment principles. These efforts include-developing appropriate policies and frameworks; institution building for GEWE; working with local communities to engender traditional structures and institutions which for a long time. Albeit, this paper reinvigorates the centrality of the 'gender' variable in development policy and planning in the quest for national growth and overall sustainable development, and the institutionalisation of fundamental human rights and principles and social justice in nation building. More importantly, Feminist Studies/Gender and Development must thrive in the academic institutions if we are to engender the production of knowledge. A major challenge to feminists, especially those in the academia is to bring 'the gender variable' into the centre piece of our quest for social reforms and social engineering, as we all attempt to build a better society devoid of all forms of discriminations, social injustice, and inequalities. Feminists in the academia must continue to challenge mainstream theories and methods in social research from a gender perspective, and in particular those theories that create polarity between our worlds. Gender research helps to query divisive social structures, and to better appreciate our similarities and differences, while in many cases it teaches us how to celebrate these differences rather than despise them. After decades of resistance, the quest to bridge gender gaps in both private

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and public lives is now sweeping across parliamentary systems, boardrooms and social institutions. Academic institutions, however, have a great role to play in shaping and reshaping our knowledge of the sexes and the social intersections that divide them.

REFERENCES

- Lina, O.I. (2008) 'The Gender Equality/Women Empowerment (GEWE) Agenda and the Nigerian Development'. Paper Presented at the ISA International Laboratory for PhD.
- Students on 'Globalisation, Social Problems and Social Policy, 18th – 23rd November, 2008, Maiduguri, Nigeria.
- Engendering Social Sciences in Africa. Paper presented at the Conference of Deans of Social Sciences in Africa. Organised by CODESRIA. Rabat, Morocco 7-9 November, 2011.
- Anne, Marie Goetz (2003) 'No shortcuts to power: African Women in Politics and Policy making' (London: Zed Books)
- Ashworth, Georgina (1994) "Women, Good and Bad Government", in Good Government. One World Action, London
- Braidotti, Rosi; Ewa Charkiewicz; Sabine Hausler; Saskia Wieringa (1994), Women, the Environment and Sustainable Development: Towards a Theoretical Synthesis. Zed Books in association with INSTRAW.
- UNDP (2006) Human Development Reports (New York, UNDP)
- UNDP (2008) Human Development Reports (New York, UNDP)
- UNIFEM (2005) Progress of World Women Reports (New York, UNIFEM)
- USAID/GHANA (2002) Briefing Paper World Bank (1997).
- Helping Developing Countries Combat Corruption, Washington D.C, the World Bank.
- WRAPA (2008), Gender and Affirmative Action: Issue Based Approach, a Research Report.

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MELTING HEAT TRANSFER ON MHD STAGNATION POINT FLOW OF A HEAT ABSORBING NANO-FLUID PAST A STRETCHING SHEET

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ABSTRACT

An investigation is made on MHD stagnation point flow of a viscous, incompressible, electrically conducting, and heat absorbing nano-fluid past a stretching sheet with melting. Non-linear partial differential equations, governing to the problem, are transformed into non-linear ordinary differential equations with the help of adequate similarity transformations and then solved by using bvp4c (Matlab's boundary value problem solver). To validate accuracy of results, the numerical results obtained in the present paper have been compared with the existing literature and found to be in an excellent agreement. Numerical results of velocity $f'(\eta)$*, temperature* $\theta(\eta)$*, and species concentration* $\phi(\eta)$ *are depicted graphically. Numerical values of skin friction coefficient, Nusselt number, and Sherwood number are presented in tabular form. Such nano-fluid flows find applications in heat transfer processes, heat exchanger, engine cooling, vehicle thermal management etc.*

Keywords: Nano-fluid, MHD Stagnation point flow, Melting heat transfer, Absorption.

1. INTRODUCTION

Solar energy is the easiest and most available source of renewable energy in the universe.In the present scenario, due to the rapid advancement in scientific and industrial processes, renewable energy can only be the source of energy to fulfill the growing energy demand. This attracts scientists and engineers to develop devices having the property of cooling/heating very fast. This may lead to energy saving and/or storage in a large amount. Such devices could be more suitable economically as well as environmentally.Thermal collectors are designed to capture a large amount of solar energies.Conventional fluids are being used as a heat transfer mediumin these collectors. These fluids have poor thermal conductivity which ultimately affects the performance. To overcome the problems of poor conductivity, researchers forced to develop fluids with enhanced thermal conductivities. In this direction, Choi and Eastman [1] initiated and introduced the term "**nano-fluid**" to refer fluids with suspended nanoparticles. These fluids have unique thermo-physical properties. encountered that It has been shown experimentally, by Choi et al. [2], that thermal conductivity of the conventional fluids is being enhanced (around 40% to 150%) by mixing a small amount (<1% volume fraction) of nanoparticles in the these fluids. After this encouraging work, many researchers [3–5] carried out their research studies on the flow of nano-fluids to examine different aspects of the problem.

It was Crane [6] who first investigated the flow of fluid over a linearly stretching sheet. This problem is of particular interest since an exact solution of the two-dimensional Navier-Stokes equations has been obtained by him. After his work, the fluid flow past a stretching surface has attracted researchers and sufficient amount of work has been carried out [7–9]. Heat transfer over stretching/shrinking surface has its own significance due to its wide applications in industrial and manufacturing processes. Many researchers [10-12] studied fluid flow problems on heat transfer over stretching/shrinking surfaces.

Temperature difference between the boundary layersurface and fluid plays an important role in several fluid engineering devices. Due to temperature-differences heat generation/absorption effects produced and have significant implications on heat transfer characteristics, such as,in processes where the working fluid undergoes exothermic/endothermic chemical reactions [13],and in preparation of metal waste obtained as a by-product from used nuclear fuel [14]. Thus,the studies involving heat sources/sinks have become a central point of attraction for the researchersinterested in investigating fluid dynamic problems. Chamkha and Khaled [15] investigated the effect of heat generation/absorption onthe hydromagnetic flow and heat transfer along a semi-infinite flat plate in a saturated porousmedium. Two different cases viz.uniform heat flux and uniform wall temperature at the plate have been considered by them. Kamel [16] studied, analytically, the MHD transient convective heat and mass transfer flow towards avertical surface considering heat generation/absorption into account. Many researchers [17-20] have their contributions in the study of fluid flow problems taking heat generation/absorption into account.

Melting (or solidification) characteristics in heattransfer has varied and wide industrial applications, such aswelding and magma solidification, thawing of frozen ground, casting,melting of permafrost, and in the

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process of silicon wafer etc.) [21]. Inrecent years, researchers attracted in this area and doingtheirresearchstudieson meltingheattransfer. In this direction, Tienand Yen [22] haveexaminedtheeffectof melting on convective heat transfer between ameltingbodyand surrounding fluid. They found that meltingretards the rate of heat transfer. Then after, Epstein and Cho [23] discussed the usefulness of melting phenomenon in the laminar flow over flat surface. Stretched flow of viscous nano-liquid with stagnation point, considering melting heat transfer and inclined magnetic field into the problem has been investigated by Gireesha et al. [24]. Hayat et al. [25] studied the effect of melting parameter in the flow of a chemically reacting fluid. A comprehensive study of heat transfer phenomenon in nano-fluid flow was made by many researchers [26-28]. Ibrahim [29], in the year of 2017, carried out a research study on the melting effects and heat transfer of a nano-fluid past a stretching sheet.

Though the researchers are doing their research studies on melting heat transfer and considerable amount of work has been done in the nano-fluid flow over a stretching surface, still more attention is needed to study the effects of heat absorption on melting heat transfer of a nano-fluid flow past a stretching sheet. Hence authors were motivated to investigate the effects of heat absorption, and melting heat transfer on MHD nano-fluid flow over a stretchable surface. Objective of the present paper is to investigate the steady two dimensional MHD boundary layer stagnation point flow of a viscous, incompressible, electrically conducting and heat absorbing nano-fluid over a stretching sheet, with melting, in the presence of an applied transverse magnetic field taking viscous and joule dissipations into account.

2. MATHEMATICAL MODEL OF THE PROBLEM

Consider a two-dimensional steady state MHD stagnation point boundary layer flow and heat transfer of a viscous, incompressible, electrically conducting, and heat absorbing nano-fluid past a stretching sheet which is melting at steady rate into a constant property is examined. The flow is subjected to a uniform transverse magnetic field(parallel to y - axis) of strength $B = B_0$ .A coordinate system has chosen such a way that x-axis is extending along the stretching surface and y - axis normal to it (as shown in figure 1). Temperature of the sheet is T_m, concentration C take constant value C_w. The ambient value of T and C are denoted by T_∞ and C_∞, respectively, where $T_\infty > T_m$. Free stream velocity takes the form $U_\infty = bx$ and velocity of the sheet is $u_w = ax$, where a and b are positive constants. Figure 1 represents geometrical model of the flow. It is further assumed that

- There is no applied or polarized voltages exist so the effect of polarization of fluid is negligible.
- Magnetic Reynolds number of the fluid is very small therefore induced magnetic field effects are neglected in comparison to the applied one.
- Both (nanoparticles and base fluid) are in a state of thermal equilibrium and there is no slip between them.

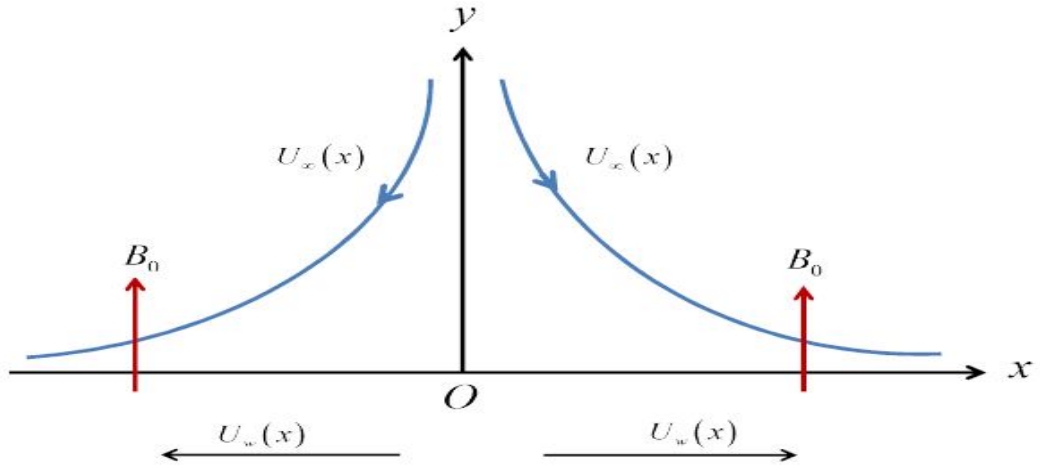

Fig-1: Geometry of the flow

Under the assumptions made above equations governing the conservation of mass, momentum, energy,and species concentrations, are given by

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0 \qquad (1)$$

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$$u\frac{\partial u}{\partial x}+v\frac{\partial u}{\partial y}=\upsilon\frac{\partial^2 u}{\partial y^2}+U_\infty\frac{\partial U_\infty}{\partial x}+\frac{\sigma B_0^2}{\rho_f}(U_\infty-u) \tag{2}$$

$$u\frac{\partial T}{\partial x}+v\frac{\partial T}{\partial y}=\alpha\frac{\partial^2 T}{\partial y^2}+\tau\left\{D_B\frac{\partial C}{\partial y}\frac{\partial T}{\partial y}+\frac{D_T}{T_\infty}\left(\frac{\partial T}{\partial y}\right)^2\right\}+\frac{Q_0}{\rho C_p}\left(T-T_m\right) \tag{3}$$

$$u\frac{\partial C}{\partial x}+v\frac{\partial C}{\partial y}=D_B\frac{\partial^2 C}{\partial y^2}+\frac{D_T}{T_\infty}\frac{\partial^2 T}{\partial y^2} \tag{4}$$

where $\alpha=\dfrac{k}{(\rho c)_f}$, $\tau=\dfrac{(\rho c)_p}{(\rho c)_f}$

The boundary conditions are:

$u=U_w=ax,\ v=0,\ T=T_m,\ C=C_w$ at $y=0$ $u\to U_\infty=bx,\ v=0,\ T\to T_\infty,\ C\to C_\infty$ at $y\to\infty$

$$\alpha\left(\frac{\partial T}{\partial y}\right)_{y=0}=\rho\left[\lambda+C_s\left(T_m-T_0\right)\right]v(x,0) \tag{5}$$

where u and v are the components of velocity along x and y axes, respectively. Furthermore, $\upsilon,\sigma,\rho_f,\rho_p,\alpha,k,(\rho c)_f,(\rho c)_p,Q_0,\lambda$ and C_s are respectively the kinematic viscosity coefficient, electric conductivity, density of base fluid, density of nanoparticle, thermal diffusivity, thermal conductivity, heat capacity of the base fluid, heat capacity of the nanoparticle material, heat absorption, latent heat of the fluid, and heat capacity of the solid surface.

The similarity and dimensionless variables are introduced as follow:

$$\eta = y\sqrt{\frac{a}{\upsilon}},\ \psi = \sqrt{a\upsilon}\ x\ f(\eta)$$
$$\theta(\eta)=\frac{T-T_m}{T_\infty-T_m},\ \phi(\eta)=\frac{C-C_w}{C_\infty-C_w} \tag{6}$$

The equation of continuity is satisfied if we choose a stream function $\psi(x, y)$ such that

$$u = \frac{\partial\psi}{\partial y},\ v = -\frac{\partial\psi}{\partial x} \tag{7}$$

With the help of above transformations, equation (1) is identicallysatisfied, and equations (2), (3) and (4) along withboundary conditions (5) take the following forms:

$$f'''+ff''-f'^2+A^2+M\left(A-f'\right)=0$$
$$(8)\ \theta''+\Pr\left(f\theta'+Nb\phi'\theta'+Nt\theta'^2+Q\theta\right)=0$$
$$(9)\ \phi''+Lef\phi'+\frac{Nt}{Nb}\theta''=0 \tag{10}$$

The corresponding boundary conditions are:

$$\left.\begin{aligned}&f'(0)=1,\ B\theta'(0)+\Pr f(0)=0,\ \theta(0)=0,\ \phi(0)=0,\\&f'(\infty)\to A,\ \theta(\infty)\to 1,\ \phi(\infty)\to 1.\end{aligned}\right\} \tag{11}$$

Here the governing parameters are defined by:

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$$\left.\begin{aligned} &M=\frac{\sigma B_o^2}{\rho_f a},\ Le=\frac{\upsilon}{D_B},\ \Pr=\frac{\upsilon}{\alpha},\ A=\frac{b}{a},\ B=\frac{C_f\left(T_\infty-T_m\right)}{\lambda+C_s\left(T_m-T_0\right)},\\ &Nb=\frac{\left(\rho c\right)_p D_B\left(C_\infty-C_w\right)}{\left(\rho c\right)_f \upsilon},\ Nt=\frac{\left(\rho c\right)_p D_T\left(T_\infty-T_m\right)}{\left(\rho c\right)_f \upsilon T_\infty},\ Q=\frac{Q_0}{a\rho c_p}. \end{aligned}\right\} \quad (12)$$

where f', θ and ϕ are the non-dimensionless velocity, temperature and concentration respectively. M, Le, Pr, A, Nb, Nt, Q and B are respectively, the magnetic parameter, Lewis number, Prandtl number,velocity ratio parameter, Brownian diffusion coefficient, thermophoretic diffusion coefficient, heat absorption parameter and melting parameter. Dimensionless melting parameter (B) is the combination of Stefan numbers $\frac{C_f\left(T_\infty-T_m\right)}{\lambda}$(for liquid phase) and $\frac{C_s\left(T-T_0\right)}{\lambda}$(for solid phase).

Based on the above quantities, the skin friction coefficient C_f the local Nusselt number Nu_x and the local Sherwood number Sh_x are defined as:

$$C_f=\frac{\tau_w}{\rho u_w^2},\ Nu_x=\frac{xq_w}{k\left(T_\infty-T_m\right)},\ Sh_x=\frac{xh_m}{D_B\left(C_\infty-C_w\right)} \quad (13)$$

where the wall shear stress τ_w, the wall heat flux q_w and wall mass flux h_m are given by

$$\tau_w=\mu\frac{\partial u}{\partial y},\ q_w=-k\left(\frac{\partial T}{\partial y}\right)_{y=0},\ h_m=-D_B\left(\frac{\partial C}{\partial y}\right)_{y=0} \quad (14)$$

By using the above equations, we get

$$C_f\sqrt{\mathrm{Re}_x}=-f''(0),\ \frac{Nu_x}{\sqrt{\mathrm{Re}_x}}=-\theta'(0),\ \frac{Sh_x}{\sqrt{\mathrm{Re}_x}}=-\phi'(0) \quad (15)$$

where Re_x, Nu_x, Sh_x are local Reynolds number, local Nusselt number and local Sherwood number, respectively.

3. RESULTS AND DISCUSSION

The non-linear ordinary differential equations (8) - (10) with boundary conditions (11) have been solved using by the bvp4c routine of Matlab.In order to investigate the effects of various parameters viz. velocity ratio parameter$A$, magnetic parameter M, Thermal diffusion parameterPr, Brownian motionparameter Nb, thermophoresis parameter Nt, heat absorption parameter$Q$,Levis number Le, and the melting parameter B, the profiles of nano-fluid velocity, nano-fluid temperatureand nano-particle concentration are depicted graphically in Fig. 2 - Fig. 25 while the values of coefficient of skin-friction, Nusselt number, and Sherwood numberare tabulated in Table 1.

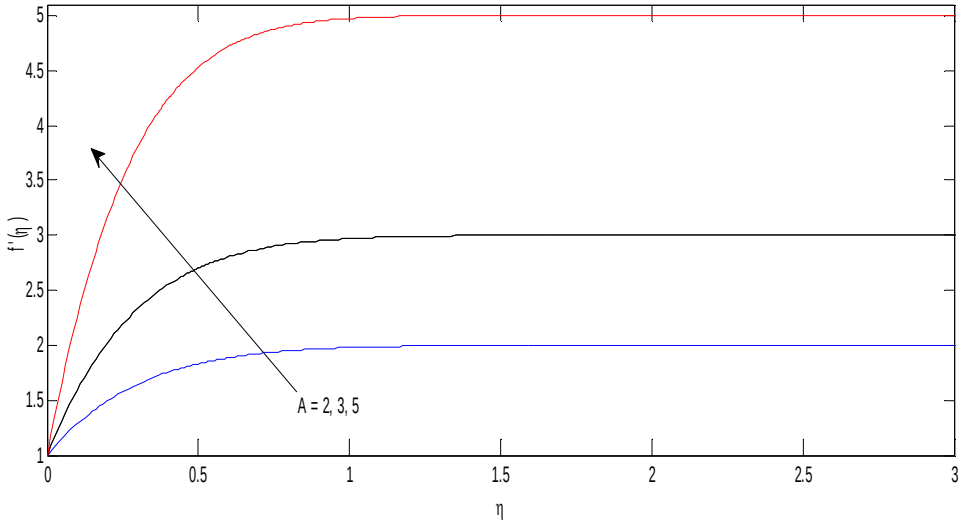

Fig-2: Velocity profiles for various value of A.

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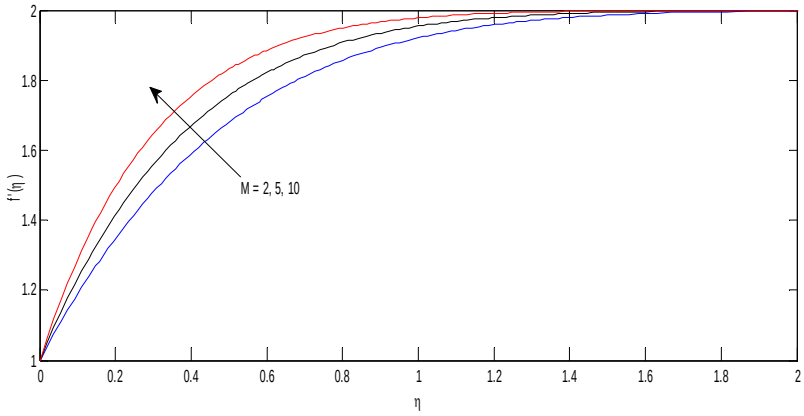

Fig-3: Velocity profiles for various value of *M*.

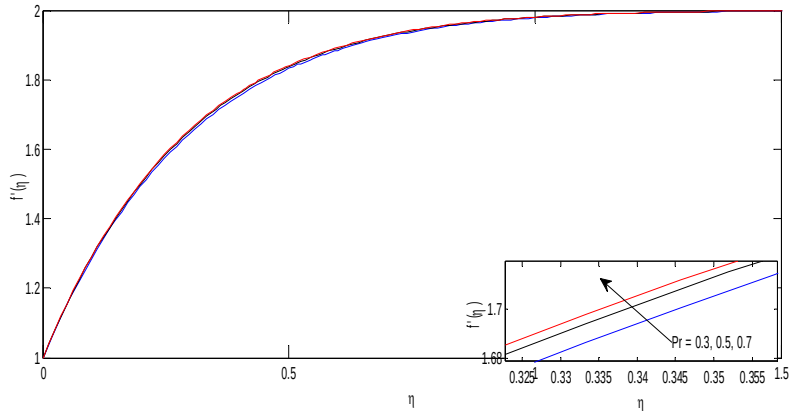

Fig-4: Velocity profiles for various value of *Pr*.

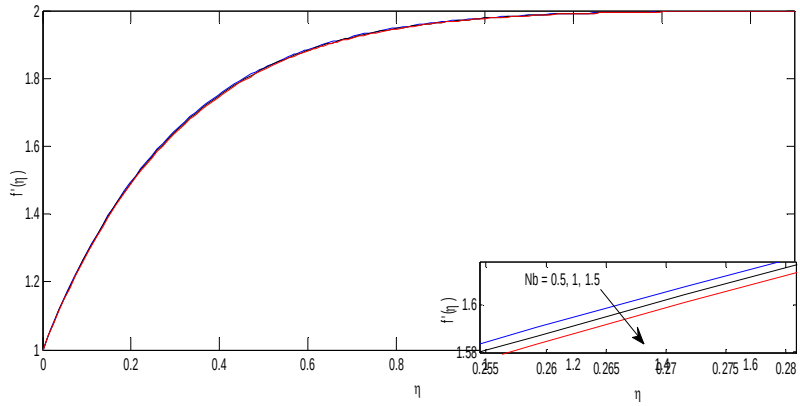

Fig-5: Velocity profiles for various value of *Nb*.

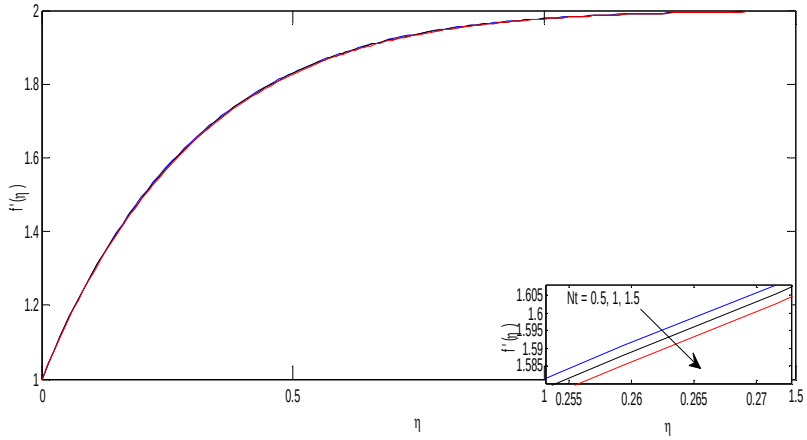

Fig-6: Velocity profiles for various value of *Nt*.

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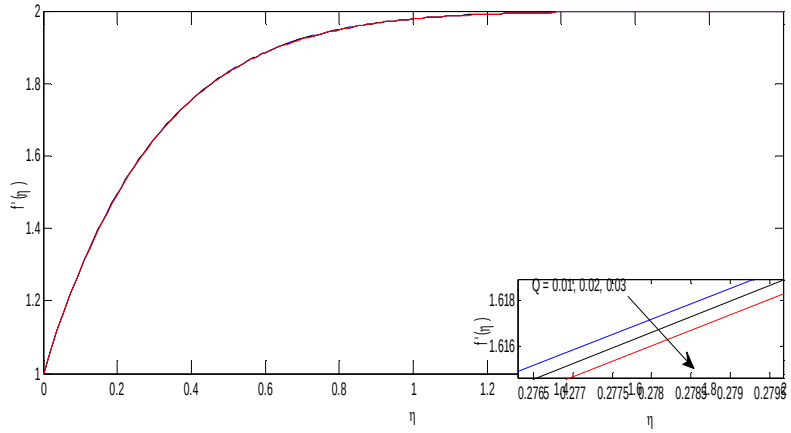

Fig-7: Velocity profiles for various value of *Q*.

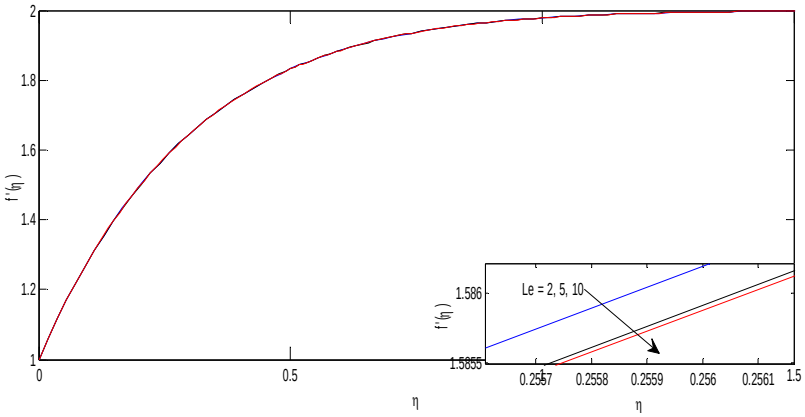

Fig-8: Velocity profiles for various value of *Le*.

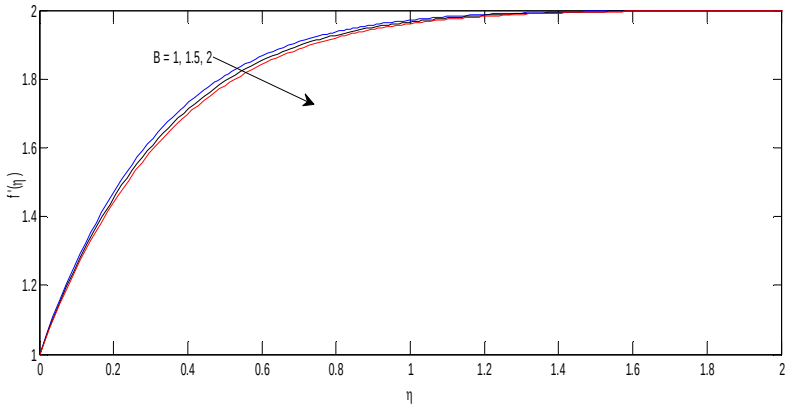

Fig-9: Velocity profiles for various value of *B*.

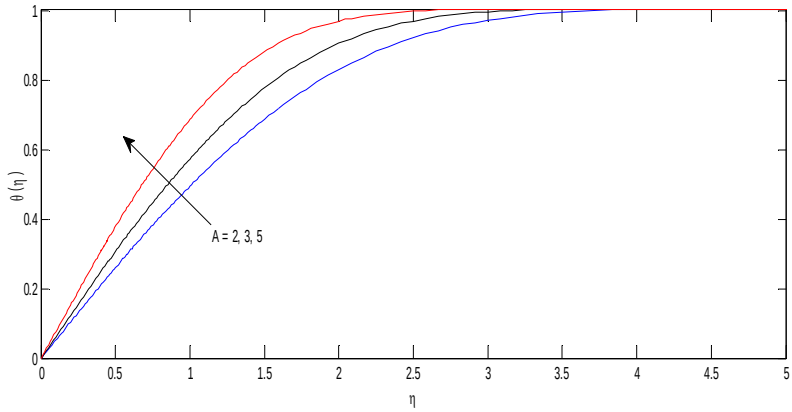

Fig-10: Temperature profiles for various value of *A*.

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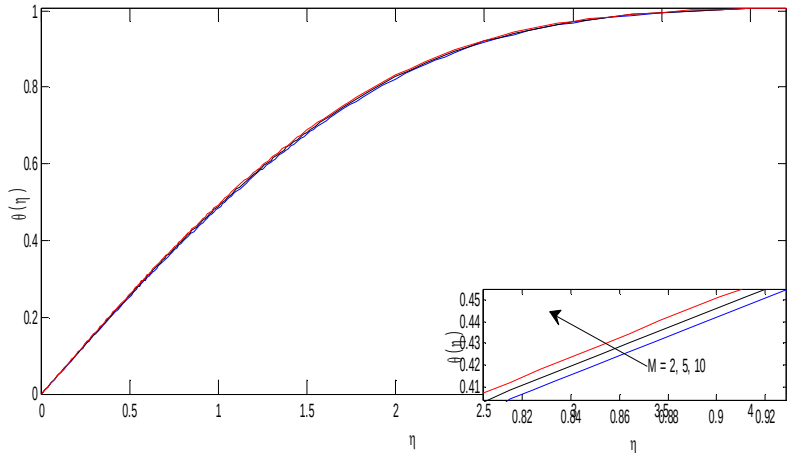

Fig-11: Temperature profiles for various value of *M*.

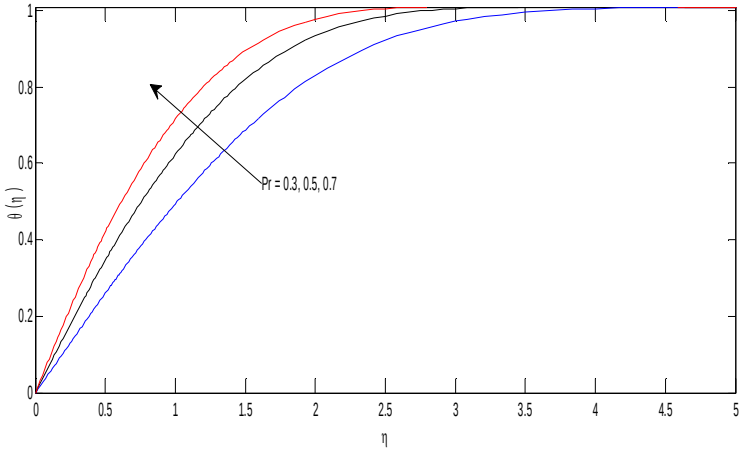

Fig-12: Temperature profiles for various value of *Pr*.

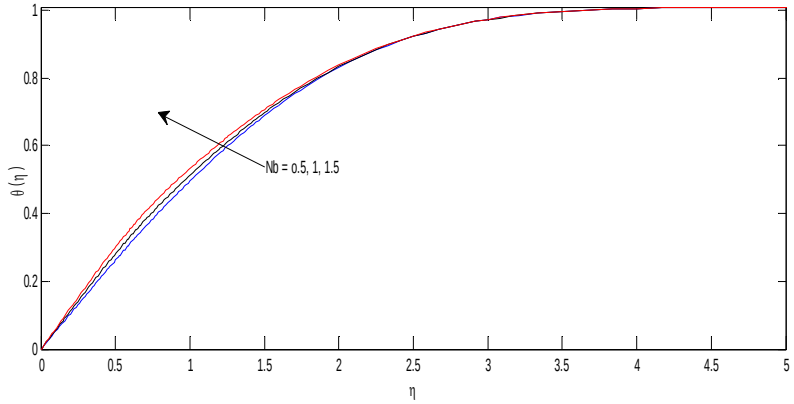

Fig-13: Temperature profiles for various value of *Nb*.

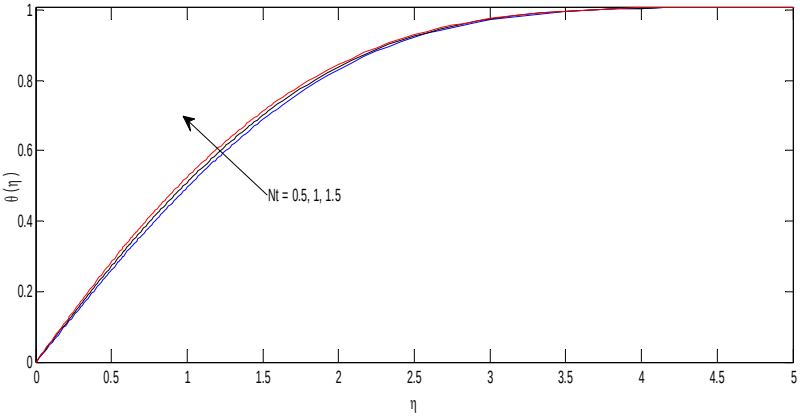

Fig-14: Temperature profiles for various value of *Nt*.

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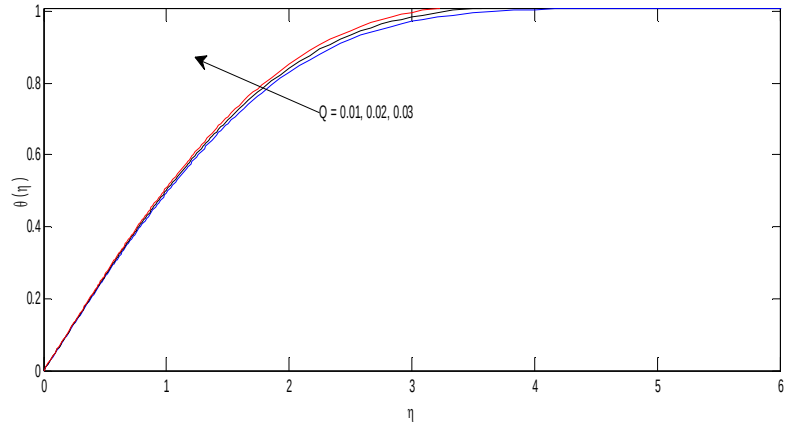

Fig-15: Temperature profiles for various value of *Q*.

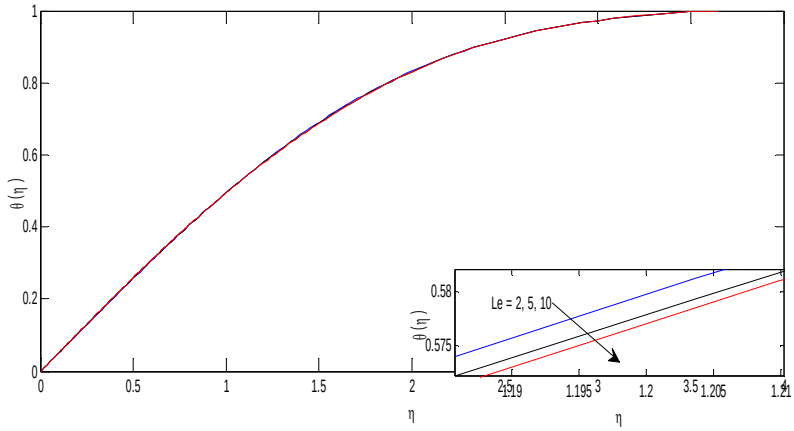

Fig-16: Temperature profiles for various value of *Le*.

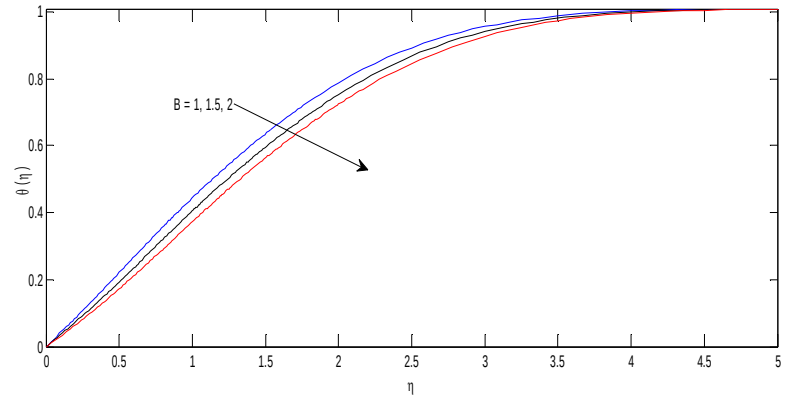

Fig-17: Temperature profiles for various value of *B*.

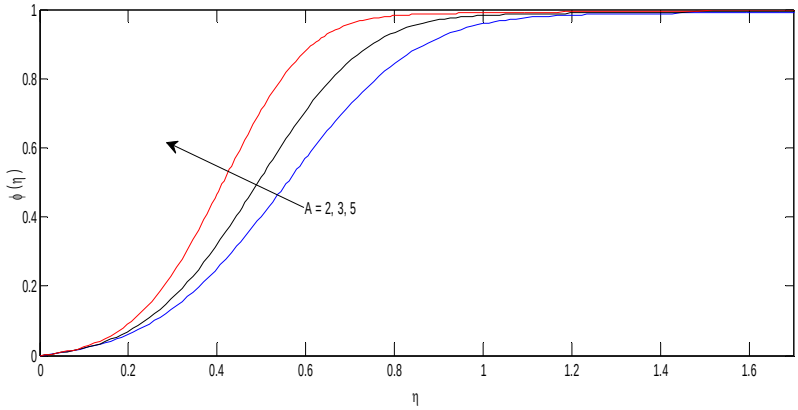

Fig-18: Concentration profiles for various value of *A*.

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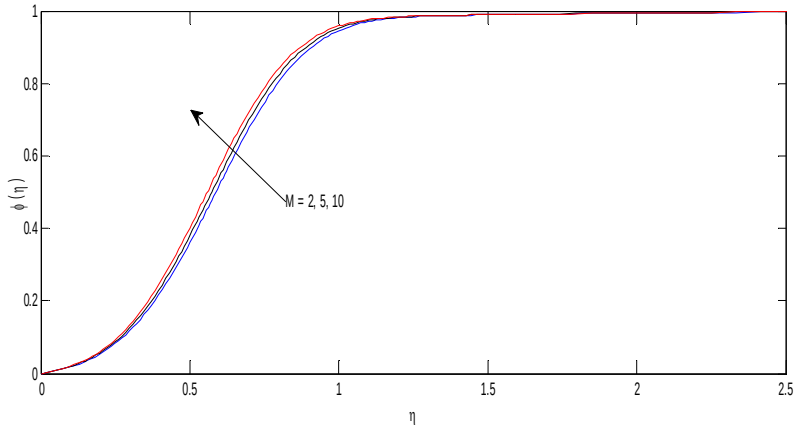

Fig-19: Concentration profiles for various value of *M*.

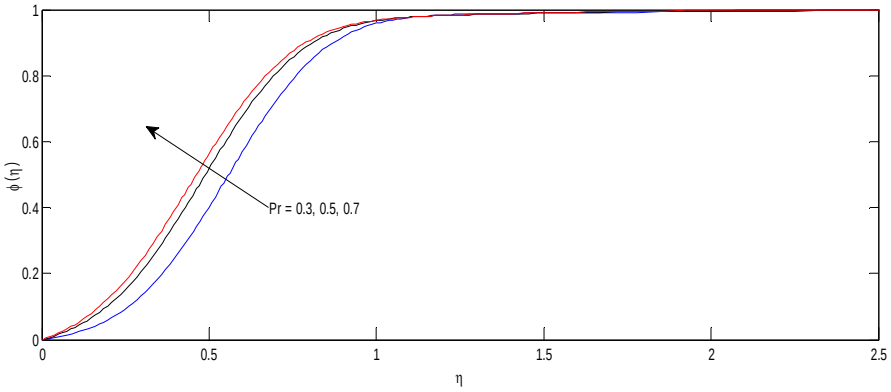

Fig-20: Concentration profiles for various value of *Pr*.

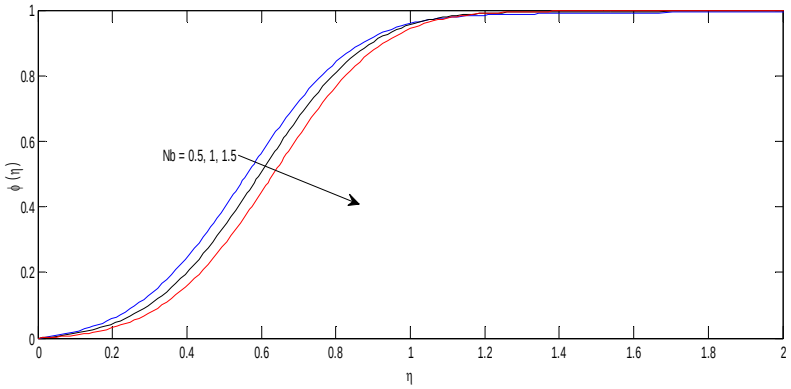

Fig-21: Concentration profiles for various value of *Nb*.

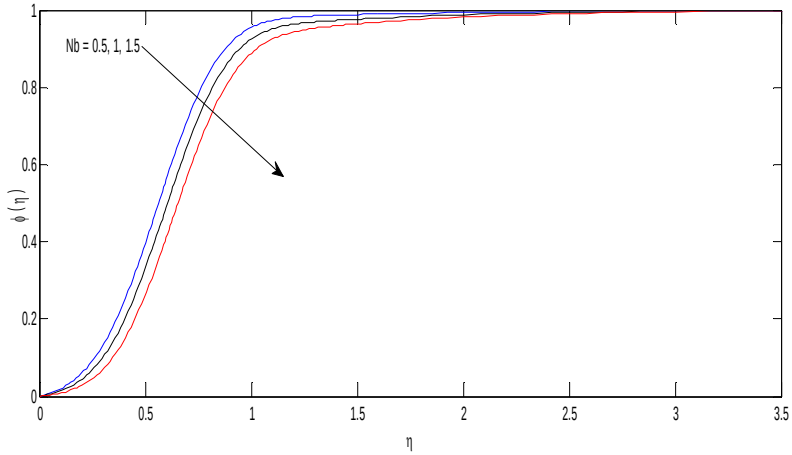

Fig. 22 Concentration profiles for various value of *Nt*.

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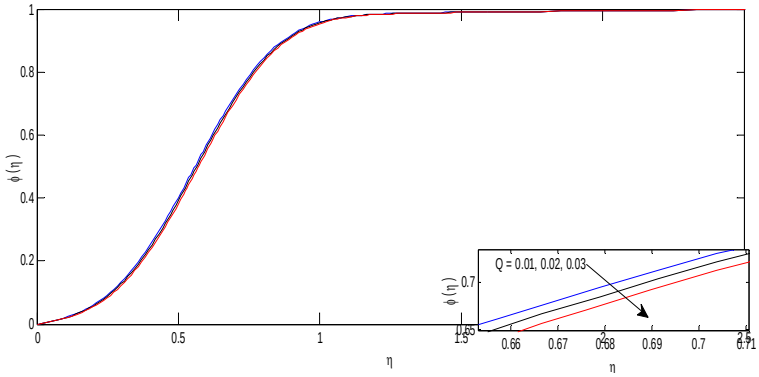

Fig-23: Concentration profiles for various value of *Nt*.

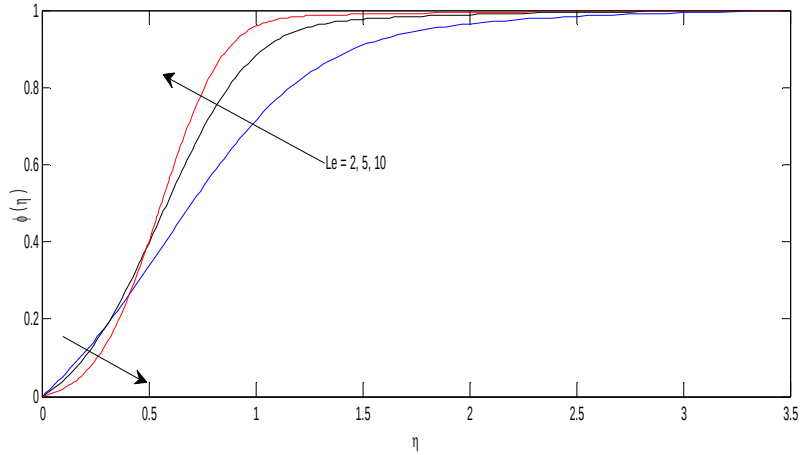

Fig-24: Concentration profiles for various value of *Le*.

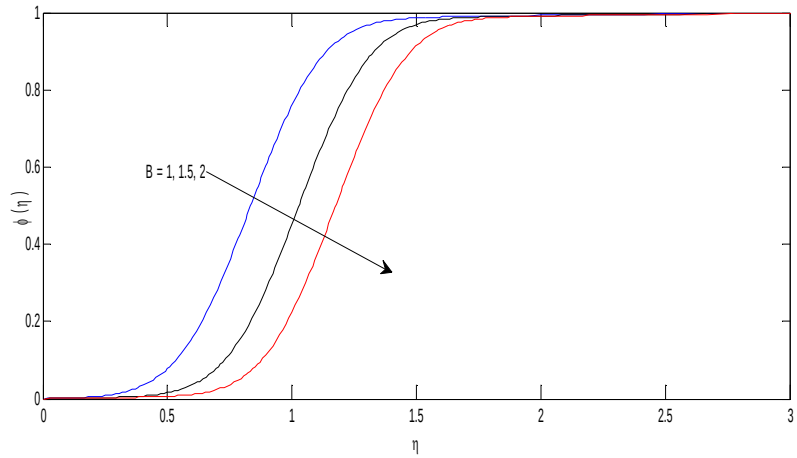

Fig-25: Concentration profiles for various value of *B*

Table-1: Effects of various parameters on coefficient of skin-friction, Nusselt number and Sherwood numbers

A	*M*	*Pr*	*Nb*	*Nt*	*Q*	*Le*	*B*	$-C_f\sqrt{\mathrm{Re}_x}$	$-\frac{Nu_x}{\sqrt{\mathrm{Re}_x}}$	$-\frac{Sh_x}{\sqrt{\mathrm{Re}_x}}$
2								3.3259	0.5138	0.1339
3								6.8906	0.6058	0.1302
5								14.7525	0.7506	0.1313
	2							2.0439	0.501	0.1217
	5							2.5896	0.5074	0.1272
	10							3.3259	0.5138	0.1339

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		0.3						3.3259	0.5138	0.1339
		0.5						3.3943	0.7093	0.2656
		0.7						3.4273	0.8952	0.3392
			0.5					3.3227	0.518	0.1286
			1					3.2909	0.5597	0.0856
			1.5					3.26	0.6006	0.0566
				0.5				3.3237	0.5167	0.1302
				1				3.3006	0.5468	0.0919
				1.5				3.2763	0.5789	0.0508
					0.01			3.3259	0.5138	0.1339
					0.02			3.3207	0.5206	0.1262
					0.03			3.3154	0.5275	0.1189
						2		3.3292	0.5094	0.4914
						5		3.3267	0.5128	0.3399
						10		3.3259	0.5138	0.1339
							1	3.0966	0.412	0.014
							1.5	2.9445	0.3481	0.0098
							2	2.8334	0.3034	0.0087

4. REFERENCES

[1] S. U. S. Choi and J. A. Eastman, Enhancing thermal conductivity of fluids with nanoparticles, in: The Proceedings of the 1995 ASME International Mechanical Engineering Congress and Exposition, San Francisco, USA, ASME, FED 231/MD 66, 1995, pp. 99-105.

[2] S. U. S. Choi, Z. G. Zhang, W. Yu, F. E. Lockwood and E. A. Grulke, Anomalously thermal conductivity enhancement in nanotube suspensions, Appl. Phys. Lett., Vol. 79 (2001), pp. 2252-2254.

[3] X. Q. Wang and A. S. Mazumdar, Heat transfer characteristics of nanofluids: a review, Int. J. Thermal Sci., Vol. 46 (2007), pp. 1-19.

[4] S. K. Das, S. U. S. Choi and W. Yu, T. Pradeep, Nanofluids: Science and Technology, Wiley, Hoboken, New Jersey, 2008.

[5] S. Kakac and A. Pramuanjaroenkij, Review of convective heat transfer enhancement with nanofluids, Int. J. Heat Mass Transf. Vol. 52 (2009), pp. 3187-3196.

[6] L. J. Crane, Flow past a stretching plate. Z. Angrew. Math. Phys., Vol. 21 (1970), pp. 645-647.

[7] E. Magyari and B. Keller, Exact solutions for self-similar boundary-layer flows induced by permeable stretching walls, Eur. J. Mech. B Fluids, Vol. 19 (2000), pp. 109-122.

[8] E.M. Sparrow and J.P. Abraham, Universal solutions for the streamwise variation of the temperature of a moving sheet in the presence of a moving fluid, Int. J. Heat Mass Transfer, Vol. 48 (2005), pp. 3047-3056.

[9] J.P. Abraham and E.M. Sparrow, Friction drag resulting from the simultaneous imposed motions of a freestream and its bounding surface, Int. J. Heat Fluid Flow, Vol. 26 (2005), pp. 289-295.

[10] B.K. Mahatha, R. Nandkeolyar, M. Das and P. Sibanda, Stagnation point nanofluid flow along a stretching sheet with non-uniform heat generation/absorption and Newtonian heating. Bulg. Chem. Commun., Vol 49 (2017), pp. 977-985.

[11] B. K. Mahatha, R. Nandkeolyar, G. K. Mahato and P. Sibanda, Dissipative Effects in Hydromagnetic Boundary Layer Nanofluid Flow Past A Stretching Sheet with Newtonian Heating, Journal of Applied Fluid Mechanics, Vol. 9 (2016), No. 4, pp. 1977-1989.

[12] R. Nandkeolyar, B. K. Mahatha, G. K. Mahato and P. Sibanda, Effect of Chemical Reaction and Heat Absorption on MHD Nanoliquid Flow Past a Stretching Sheet in the Presence of a Transverse Magnetic Field, Magnetochemistry, Vol. 4 (2018), Issue 1, pp. 1-14.

ISSN 2394 - 7780

[13] Vajravelu, K.; Nayfeh, J. Hydromagnetic convection at a cone and a wedge. Int. Commun. Heat Mass Transf.**1992**, 19, 701–710.

[14] Westphal, B.R.; Keiser, D.D.; Rigg, R.H.; Loug, D.V. Production of MetalWaste Forms from Spent NuclearFuel Treatment. In Proceedings of the DOE Spent Nuclear Fuel Conference, Salt Lake City, UT, USA,13–16 December 1994; pp. 288–294.

[15] Chamkha, A.J.; Khaled, A.R.A. Similarity solutions for hydromagnetic simultaneous heat and mass transferby natural convection from an inclined plate with heat generation or absorption. Heat Mass Transf. 2001,37, 117–123.

[16] Kamel, M.H. Unsteady MHD convection through porous medium with combined heat and mass transferwith heat source/sink. Energy Convers. Manag. **2001**, 42, 393–405.

[17] Chamkha, A.J. Unsteady MHD convective heat and mass transfer past a semi-infinite vertical permeablemoving plate with heat absorption. Int. J. Eng. Sci. **2004**, 42, 217–230.

[18] Alam, M.S.; Rahamn, M.M.; Samad, M.A. Numerical Study of the Combined Free-Forced Convection andMass Transfer Flow Past a Vertical Porous Plate in a Porous Medium with Heat Generation and ThermalDiffusion. J. Nonlinear Anal. Model. Control **2006**, 11, 331–343.

[19] Alam, M.S.; Rahman, M.M.; Sattar, M.A. Effects of Chemical Reaction and Thermophoresis on MHDMixed Convective Heat and Mass Transfer Flow Along an Inclined Plate in the Presence of HeatGeneration/Absorption with Viscous Dissipation and Joule Heating. Can. J. Phys. **2008**, 86, 1057–1066.

[20] Mahatha, B.K.; Nandkeolyar, R.; Das, M.; Sibanda, P. Stagnation point nanofluid flow along a stretchingsheet with non-uniform heat generation/absorption and Newtonian heating. Bulg. Chem. Commun. **2017**,49, 977–985.

[21] WT. Cheng and CH Lin, Melting effect on mixed convective heat transfer with aiding and opposing external flows from the vertical plate in a liquid-saturated porous medium. Int J Heat Mass Transf., Vol. 50 (2007), 3026–34.

[22] C. Tien, Y.C.Yen, The effect of melting on forced convection heat transfer, J.Appl.Meteorol.4 (4) (1965) 523–527.

[23] Epstein M, Cho DH. Melting heat transfer in steady laminar flow over a flat plate. J Heat Transf 1976;98:531–3.

[24] B.J. Gireesha, B. Mahanthesh, I.S. Shivakumara, K.M. Eshwarappa, Melting heat transfer in boundary layer stagnation-point flow of nanofluid toward a stretching sheet with induced magnetic field, Eng. Sci. Tech. Int. J. 19 (2016) 313–321.

[25] T. Hayat, M.I. Khan, A. Alsaedi, M.I. Khan, Homogeneous-heterogeneous reactions and melting heat transfer effects in the MHD flow by a stretching surface with variable thickness, J. Mol. Liq. 223 (2016) 960–968.

[26] P.K. Kameswaran, K. Hemalatha, M.V.D.N.S. Madhavi, Melting effect on convective heat transfer from a vertical plate embedded in a non-Darcy porous medium with variable permeability, Adv. Powder Technol. 27 (2016) 417–425.

[27] S.K. Adegbie, O.K. Koriko, I.L. Animasaun, Melting heat transfer effects on stagnation point flow of micropolar fluid with variable dynamic viscosity and thermal conductivity at constant vortex viscosity, J. Nigerian Math. Soc. 35 (2016) 34–47.

[28] K. Singh, M. Kumar, Melting and heat absorption effects in boundary layer stagnation-point flow towards a stretching sheet in a micropolarfluid, Ain Shams Eng. J. (2016) http://dx.doi.org/10.1016/ j.asej.2016.04.017.

[29] W. Ibrahim, Magnetohydrodynamic (MHD) boundary layer stagnation point flow and heat transfer of a nanofluid past a stretching sheet with melting, Propulsion and Power Research, Vol. 6 (2017) No. 3, pp. 214–222.

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PHARMACOLOGICAL SCREENING OF *ACHYRANTHES ASPERA* AQUEOUS LEAF EXTRACT ON THYROID HORMONES IN MALE *ALBINO RATS*

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ABSTRACT
The leaves of Achyranthes aspera are used in folk medicine but their specific impacts on thyroid hormones had not properly been studied. Keeping this aspect in background the present study was carried out to investigate the pharmacological screening of Achyranthes aspera aqueous leaf extract on thyroid hormones in male Albino rats. Two groups of male Albino rats were used having (n=3 each). Group 1 served as control. Group II were orally administered 1 ml of aqueous extract (24 mg/ml) of Achyranthes aspera for 10 days. Initial and final body weights were taken .Blood serum was collected for estimation of blood parameters T_3 ,T_4 and TSH at the start and termination of the experiment. Average initial T_3 concentration was 132.7± 0.9 ng/dl and final concentration was 139.83± 1.04 ng/dl. The average initial T_4 concentration was 8.56±0.65 Ug/dl and final concentration was 10.4± 0.2 µg/dl.Similarly the average initial TSH concentration was 1.06±0.10 ulU/ml and final concentration was 0.93±0.07. Statistical analysis using student's t- test showed that T_3, and T_4 concentration increased significantly ($p<0.001$ and $p<0.05$) respectively after ten (10) days administration. TSH concentration showed a non-significant decrease ($p<0.05$) in the serum. It was also observed that body weight decreased significantly at 5% level at the termination of experiment. It appeared that the aqueous leaf extract induced increased serum T_3 and T_4 concentration. So, it can be concluded that aqueous leaf extract has thyroregulatory role and stimulant to thyroid function.

Keywords: Achyranthes aspera, Hyperthyroidism, T_3, T_4 ,TSH.

INTRODUCTION
Thyroid hormones affect actions of the most body tissues(Roshangar,2014)[1] .These hormones control development and maturity process(Fisher,1982) and action of some organs like heart ,stomach, liver (Daza,1982;Wiekenden,1997) and neural system [2][3][4]. Thyroid gland is the biggest and one of the most important glands of body which its hormones (T3 and T4) are very important for growth, development and metabolism(Roshangar,2014) [1] .Thyroid hormonal disorder are associated with the imbalance of T3 and T4 hormones secreted by the thyroid gland directly into the blood ,the severity of thyroid hormonal imbalance leads to some of the common diseases like diabetes, hypertension and disturb the BMR of the body(Gupta,2012) [5]. Thyroid problems are among the most common endocrine disorder presently seen worldwide (Sharma,2015) [6]. About 1 to 2 % of the adult population is known to suffer from thyroid disorder(Pocock,1999) [7]. According to the World Health Assembly report, about 1.5 billion peoples in more than 110 countries are threatened with thyroid disorder (Sharma,2015) [6]. Recently, the importance of the traditional indigenous medicines has been realized because of the side-effect of the modern medicines, failure to treat deadly diseases, costly treatment and unavailability of medical facilities in remote places (Pandey,2013) [8].

Achyranthes aspera L. (prickly chaff flower) has occupied a pivotal position in Indian culture and folk medicine(Pandey,2013) [8].According to Ayurveda it is bitter, pungent ,heating, laxative ,stomachic ,carminative and useful for the treatment of vomiting , bronchitis , heart diseases, piles ,itching, abdominal pains, ascites, dyspepsia, dysentery, blood diseases etc (Bhandari,1990; Dwivedi, 2003) [9][10].Considering that there isn't any scientific study about the effect of aqueous leaf extract on thyroid hormones, the aim of this study was probable effect of its extract on thyroid hormone in male albino rats.

MATERIALS AND METHODS
EXPERIMENTAL ANIMALS
6 adult male *albino rats* of the same age (8 weeks) and weight 150-180 g were used in the study. Animals were maintained under standard condition of ventilation temperature (25± 2 °c)and light/dark condition (12/12 h).Rats were housed in stainless steel cages and were provided with free access of food and drinking water *ad libitum.* After two weeks of acclimatization animals were divided into two groups. Group I control and group II experimental (n=3 each).

COLLECTION OF PLANT MATERIALS
The fresh and tender leaves were collected, dried in a shade under (28±2˚c) for six to seven days and then crushed into powdery substance by using electric grinder. The powdery substance was dried again and was then

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sieved to get fine powder using the fine plastic sieve, which was then stored in an air tight bottle in the laboratory until required (Tabassum,2013) [11].

AQUEOUS LEAF EXTRACT PREPARATION

125 g of the powder was macerated in 1000 ml of distilled water for 12 h at room temperature and separated(Sakr,2017) [12}. The concentration was 24 mg/ml (Sakr,2017) [12]. Experimental animals in the present study were orally given 1 ml of the concentration (Kamtchoving,2002) [13].

EXPERIMENTAL DESIGN

Initial body weight of each experimental animals were taken. Blood samples were collected from control and the experimental group in the beginning and termination of the experiment by overnight fasting.

GROUP I : **Given 1 ml of distilled water orally for 10 days.**

GROUP II : **Given 1 ml of aqueous leaf extract for 10 days.**

ESTIMATION OF THYROID HORMONES

Estimation of serum T3, T4 and TSH was done by ELISA method.

STATISTICAL ANALYSIS

The result was expressed as mean ± SD. The difference between the mean value was statistical analysed by student's t- test**.**

OBSERVATION AND RESULTS

Table-1: T3, T4 and TSH concentration along with their percent increase (+) or decrease (-) in relation to the control values in male rats.

Parameters	Control	Leaf Extract	% increase (+) or decrease (-)	Significant at
Body Weight (gm)	**175 ± 5.00**	**155.6 ± 6.02**	**- 11.42**	**5 %**
T3 (ng/dl)	**132.7 ± 0.90**	**139.8 ± 1.04**	**+ 5.30**	**0.1%**
T4 (Ug/dl)	**8.5 ± 0.65**	**10.4 ± 0.20**	**+25**	**5 %**
TSH (uIU/ml)	**1.06 ± 0.10**	**0.93 ± 0.07**	**-7.9**	**NS**

Values are expressed as mean ± SEM from the experiments, n=3.

Effect on body weight

Table (1) showed that average initial body weight of albino rats was 175± 5.00 g , after treatment of leaf extract of *Achyranthes aspera* for 10 days body weight decreased to 155.6± 6.02 g. Statistical analysis showed that decrease in body weight was significant at 5 % level.

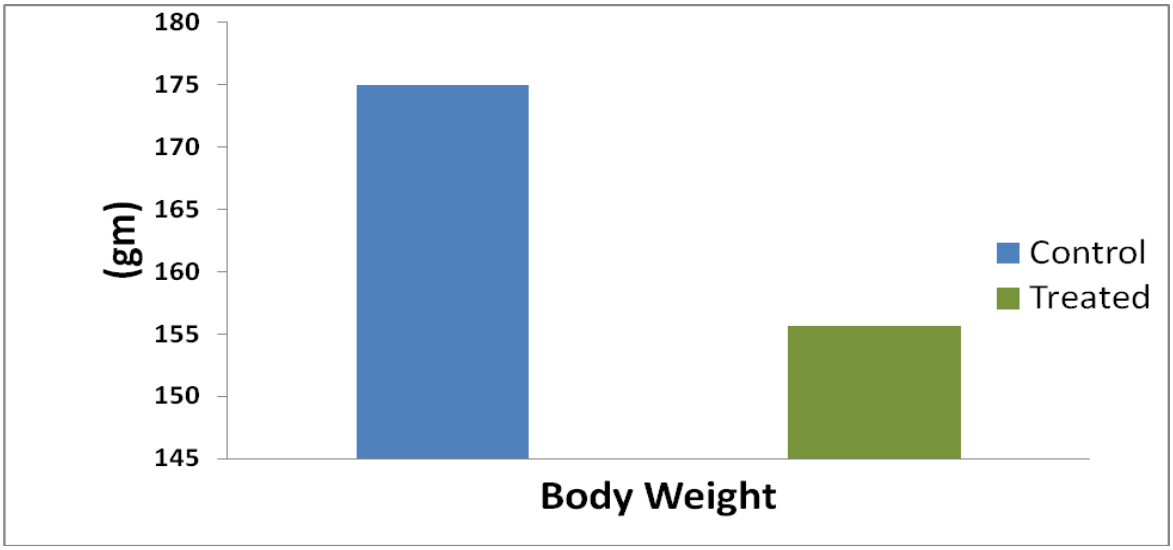

Fig-1: Effect of *Achyranthes aspera* leaf extract on body weight of albino rats.

Effect on serum T3, T4 and TSH

Table:-1 showed that initial serum T3,T4 and TSH level of control albino rats was132.7± 0.90 (ng/dl) ,8.5 ± 0.65 (Ug/dl) and 1.06 ± 0.10 (ulU/ml) respectively. After treatment of *Achyranthes aspera* leaf extract for 10 day,T3 level increased to 139.8 ± 1.04 (ng/dl). This increase was significant at 0.1 % level. Similarly T4 also increased to 10.4 ± 0.20 (Ug/dl) which was also found significant at 5 % level. This indicates that aqueous *Achyranthes aspera* leaf extract has thyrostimulatory effect causing increase in T3 and T4 level significantly.

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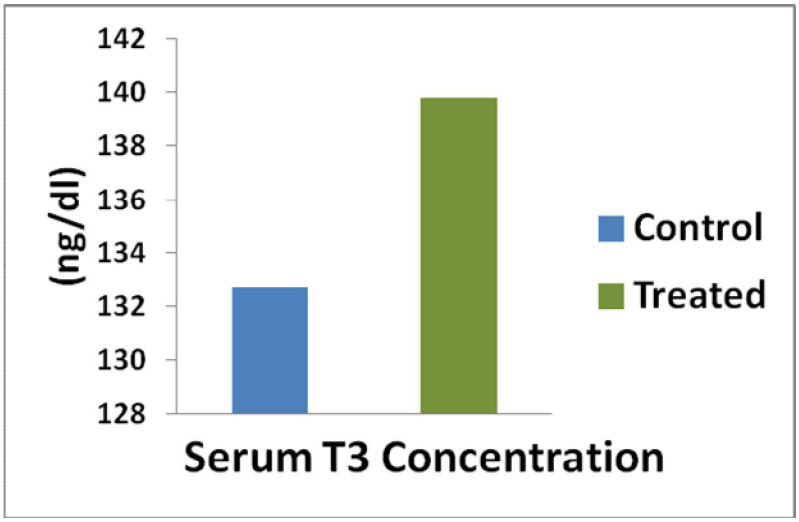

Fig-2: Effect of *Achyranthes aspera* leaf extract on serum T3 of albino rats.

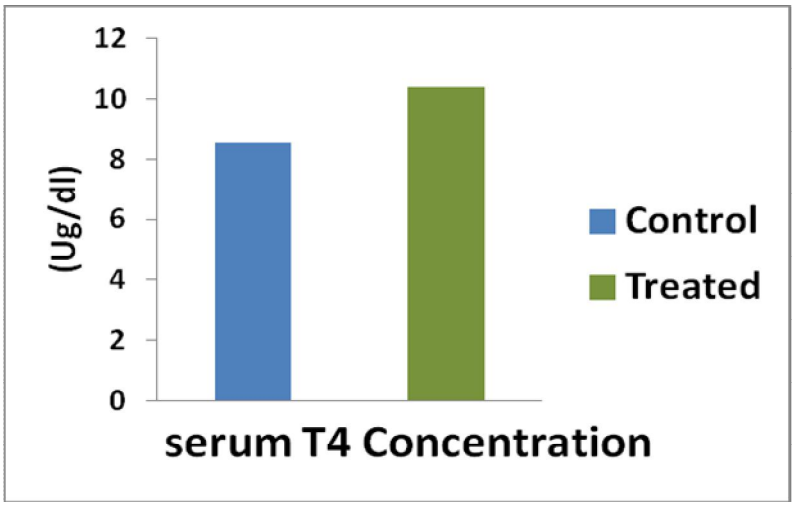

Fig-3: Effect of *Achyranthes aspera* leaf extract on serum T4 of albino rats.

Serum TSH level decreased to 0.93 ± 0.07 (ulU/ml) after treatment of *Achyranthes aspera* leaf extract. Although, this decrease was statistically insignificant.

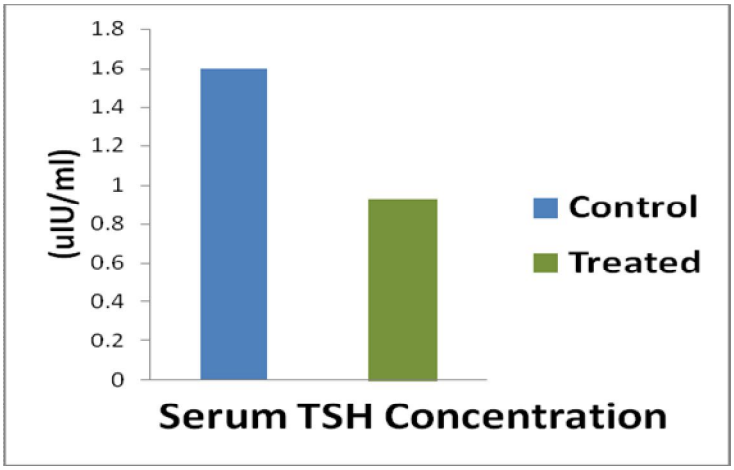

Fig-4: Effect of *Achyranthes aspera* leaf extract on serum TSH of albino rats.

DISCUSSION

The data recorded on thyroid profile in control and *Achyranthes aspera* fed rats are presented in Table (1).The result showed increase in thyroid activity. The TSH level correlated well inversely with T3 and T4 level. Which clearly proves that the response was effective and the *Achyranthes aspera* aqueous leaf extract can be used in hypothyroidism condition to normalize hormone level. Thyroid hormones play important role on growth and development of the body and regulate metabolism (Huang ,2008). So, with an increase in thyroid activity, marked changes in thyroid hormone production, metabolism and action occurs. This may result in an increased

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prevalence of sub-clinical thyroid disease that is associated with thyroid dysfunction (Peeters,2008). Many factors can influence the concentration of these hormones and therefore disturb the general body metabolism. Thiocyanate from tobacco , smoke, percholarate and drugs which contain different amount of iodine can influence the structure and function of thyroid hormones (Steinmaus ,2007). Various other studies reported that thyroid disorders vary according to age , genders , ethenic and geographical areas (Lamfon,2008).

Similar results have been observed in different plant extracts such as caraway(Dehghani,2010); Everyouth and Dreamshape (Ohye,2005) . Also *Ficus carica* leaf extract showed similar changes in the levels of T3 and T4 ,where as TSH levels was not investigated (Saxena,2012) .Furthermore there are reports where TSH level was inversely correlated with T4 levels but the levels of T3 were variable (Mokshagundam and Barzel,1993; Chuang,1998; Mansoor,2011). Elevated TSH level directly reflects impaired thyroid hormone production (Saha ,2007). The better co-relation of TSH with T4 may be due to the reason that T4 is mainly produced from pituitary gland while only 7 % of T3 is secreted. The rest of the T3 production is dependent on the peripheral conversion of T4 to T3 which in turn dependent on many factors including bioavaibility of enzyme deiodonase, drugs , disease in which inactive T3 form instead of T3. Age, gender ethnic distributions have been reported to be additional contributing factors by many studies (Nishikawa,1981; Ahmed,2009).

Although further investigation are required to reveal the exact mechanism of action(s) of thyroid hormone regulation by *Achyranthes aspera* leaf extract, the present findings clearly indicates that this extract is stimulant to thyroid functions. However, the authors emphasize that further studies are required to observe the effect of leaf extract which might be effective and safe in ameliorating hypothyroidism.

REFERENCES

1. ROSHANGAR. F, MODARESI. M, AND TOGHYANI. M, .Effect of Marshmallow's Root Extract on Thyroid Hormones in Broilers. Res. J .App. Sci. Eng. Technol., 2014. 7(1):161-164.
2. FISHER, D.A., S. HOATH AND J. LAKSHMANAN. The thyroid hormone effects on growth and development may be mediated by growth factors.Endocrinol .Exp., 1982,259-271
3. DAZA,F.J., R. PARRILLA AND A. MARTIN-REQUERO.Influence of thyroid status on hepatic alpha 1a drenoreceptorresponseivness. Am. J. Physiol.,1997. 237:1065-1072.
4. WIEKENDEN, A.D., R. KAPRIELIAN, T.G. PARKER, O.T. JONES AND P.H. BACKX. Effects of development and thyroid hormones on k channel gene expression in rat ventricle. J. Physiol., 1997. 504(pt2):271-286.
5. SAXENA. V,DHARAMVEER,GUPTA.R, SARAF. S.A. *Ficus carica* extract in regulation of thyroidism using ELISA technique. Asian J Pharm Clin Res. 2012. Vol 5, 44-48.
6. SHARMA .T, MALVIKA, GUPTA .M, NATHANI .S,.Review of Ayurvedic acting on hypothyroidism.2015. International Ayurvedic Medical Journal ISSN: 2320 5091.
7. POCOCK, G. AND RICHARDS, CD. The thyroid gland, in *Human Physiology: The Basis of Medicine*,1999. Oxford University Press, New York, p. 212.
8. PANDEY .N.K, SHARMA .H.P, AMIT.P, PARAS.J,. A review on potential magic folk herbal medicinal plant:*Achyranthes aspera* L. 2013.International Journal of Medicinal Plants. 350-363.
9. BHANADARI M.M., Flora of the Indian desert.1990. MPS Repros, Jodhpur,India. 287-288.
10. DWIVEDI S.N., Ethnobotanical studies and conservational strategies of wild and natural resources of Rewa district of Madhya Pardesh.Journal, Economic Botany and Taxonomy. 27(1) 233-234.
11. TABASSUM .W, KULLU .A.R, AND SINHA.M.P,.Effects of leaf extracts of *Moringa oleifera* on regulation of hypothyroidism and lipid profile.2013. The Bioscan.8(2):665-669.
12. SAKR.A.R, HASSAB.S.E, OKDAH .Y.A,EL-SHABKA .A.M,.Impact of ginger aqueous extract on carbimazole induced testicular degenerative alterations and oxidative stress in albino rats. 2017.Journal of Coastal Life Medicine. 5(4):167-173.
13. KAMTCHOVING .P, MBONGUE FNDIO .G, DIMO .T, JATSA II. Evaluation of androgenic activity of *Zingiber officinale* and *Pentadiplandra brazzeana* in male rats. 2002. Asian J Androl; 4: 299-301.
14. HUANG, Y.H., TSAI, M.M. AND LIN, K.H. Thyroid hormone dependent regulation of taeget genes and their physiological significance. 2008. Chang Gung Med. J.,31:325-334.

ISSN 2394 - 7780

15. PEETER, RP., Thyroid hormones and aging. 2008. Hormones. 7:28-35.
16. STEINMAUS, C., MILLER, M.D AND HOWD, R. Impact of smoking and Thiocyanate on perchlorate and thyroid hormone associations in the 2001-2002 national health and nutrition examination survey. 2007. Environ. Health Perspect. 115: 1333-1338.
17. LAMFON HA., Thyroid Disorders in Makkah, Saudi Arabia. 2008. Ozean .J. Appl. Scien .1(1).
18. DEHGHANI, F., PANJEHSHAHIN, M.R. AND VOJDANI, Z. Effect of hydroalcoholic extract of caraway on thyroid gland structure and hormones in female rat. 2010. Iranian Journal of Veterinary Research, Shiraz University. 11(4):337-341.
19. OHYE, H; FUKATA, S; KANOH, M; KUBOTA, S KUMA, K; MIYAUCHI, A AND SUGAWARA, M. Thyrotoxicosis caused by weight-reducing herbal medicines. 2005. Arch. Intern. Med., 165:831-834
20. SAXENA, V., DHARAMVEER, GUPTA, R. AND SARAF, S.A. *Ficus carica* leaf extract in regulation of thyroidism using elisa technique. 2012. Asian J. Pharma. Clin. Res. 5(2):44-48.
21. MOKSHAGUNDAM, S.P AND BARZEL, U.S. Thyroid disease in the elderly. 1993. Am.Soc. 41:1361-1369.
22. CHUANG C-C, WANG S-T, EANG P-W. Prevalence studt of Thyroid Dysfunction in the Elderly of Taiwan. 1998. Gerontology. 44:162-67.
23. MANSOOR R, RIZVI SSR, KAUSAR W, ASLAM F AND HUDA ST .Comparison of TSH , T3 and T4 levels in Primary Hypothyroidism in relation to Gender and age in a Tertiary Care Hospital. 2011. Ann. Pak. Inst. Med. Sci. 7(4):186-190.
24. SAHA PK, BAUR B, GUPTA S. Thyroid stimulating hormone measurement as the confirmatory diagnosis of hypothyroidism: A study from a tertiary- care teaching hospital, Kolkatta. 2007. Ind .J. Com.Med. 32(2):139-140.
25. NISHIKAWA M, INADA M, NAITO K. Age related changes of serum 3,3 iiodothyronine, 3,5 diiodothyronine and 3,5 – diiodothyronine concentration in man. 1981.J. Clin. Endocrinol. Metab. 52: 517-22.
26. AHMED Z, KHAN MA, HAQ AU, REHMAN SAJU. Effect of Race Gender and Age on Thyroid Stimulating Hormone Level in North West Frontier Province, Pakistan. 2009. J.Ayub Med. Colfl. Abbott. 3:21-24.

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GREEN TECHNOLOGY FOR SUSTAINABLE AGRICULTURE

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ABSTRACT
Agriculture is the backbone of countrys economy, In Indian Economy Agriculture plays a pivotal role. Better performance is vital for inclusive growth. Although its contribution in GDP is only 17-18% .The sector employs 50% of the workforce. To meet the increasing global demand of food, the agriculture sector has to rely on expansion in production area and advances in production techniques. However increased human activities and rapid population growth have resulted threatened the ability of the agriculture sector to provide food and income for the people and overexploitation of the environment, technologies advances over the centuries have improved food quality and increased productivity. Agricultural green technology developed in recent decades have brought significant benefits in crop production, high productivity and crop quality.

Technology has potential to support dual goals of food quality and higher productivity, earth friendly, and to stimulate the spread of mare eco efficient farming practices.

Present Article aims to emphasis how green technology are innovative technologies with the potential to steer Agriculture along a sustainable path.

Keywords: Green Technology, Sustainable development, Food security, Climate change.

INTRODUCTION
Technology is defined as knowing of tools, techniques craft, system, machines, as a set of process for modifying, making, using in order to improving a pre existing solution to a problem, solving a problem, handling and applied input/output relation, solution to a problem or perform a specific function. Many technological process generate unwanted byproducts, which deplete natural resources, give rise to pollution, to the determinant of earth environment. To improve any present system in the society, it is normal practice that system has to be compared with an hypothetical, predicted system of that kind called "Ideal System" the word Ideal system refers to the system which has ideal characteristics i.e perfect in every way .It is what the mind pictures as being perfect. Ideal technology is also called "Green Technology" . One of the properties of green technology is sustainability and zero green gas emission to the environment i.e Ideal Technology.

Green Technology (GT) is environmental healing technology and not support to any kind of environmental degradation and also consume less resources and do not support to increase. The entropy of the universe ,It is support the use of natural organic resources and avoid production of green gasses.

Table 1 : Objective of green technologies in various areas of the society

SL. NO.	Area	Objective of the Green Tecgnology
1	Agriculture	To avoid environmental degradation in agricultural process
2	Food Processing	To eliminate poisonous content in food and to avoid green gas emission and environmental degradation in all food packaging process.
3	Potable Water	To large scale filter used water and sea water through green process without environmental degradation.
4	Sustainable energy	To develop technologies for harvesting potential natural energy source to generate required energy to human civilization without degrading environment
5	Consumer products	To product variety of new generation consumer products without side effects and without degrading environment in any production , packaging and in actual use by consumers.
6	Automobiles	To product energy efficient, zero emission automobiles using renewable energy process.
7	Construction	To build environmental friendly, energy efficient, smart buildings.
8	Industrial Automobiles	To develop industrial process which are environmental friendly , no green gas emission , recyclable waste product

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		using green energy.
9	Computer and information communication	To develop and utilize environmental friendly, recyclable electronic and computer components which uses renewable energy and efficient performance.
10	Education	Use of green technology in all education services
11	Health	Use of green technology and green process in all health and medical services.
12	Aircraft and space travel	Use of green energy and green materials and environmental friendly process in air and space travel.

GREEN TECHNOLOGY FOR AGRICULTURE AND FOOD

The green technology should be practicle, cost effective, efficient and free from pollution. The sustainability factor should be looked at without degrading the Environment,the ability of the agricultural land to maintain acceptable level of production over a long period of tie. Some of the opportunities towards sustainable agriculture are Rotational grazing, Integrated pest management (IPM) water quality, soil conservation, crop/landscape diversity, cover crop, agro forestry, nutrient management, marketing of green products.

OBJECTIVES OF THE STUDY

1- To study the green technologies opportunities towards sustainable agriculture.

2- To study the current trends in green technology for rural agriculture, for food security, for climate change.

In order to assess progress in agriculture and food several steps need to be taken. First it is necessary to identify measurable green growth policy targets related to foods production and consumptions, resources use and social welfare, economic efficiency, Second the policy target should determine the set of indicator needed to measures environmental and resource use impact, economic efficiency, and social welfare, Third, case studies and analytical tools are needed to access whether policies are meeting the green growth target in the agriculture, food chain and fisheries.

MATERIAL AND METHODS

For the purpose of the present study the contents and data have been taken from relevant books and articles, from journal and websites.

The methods used is descriptive and analytical and secondary source of information have been taken.

RESULTS AND DISCUSSION

With the intention of acquiring benefit from Green Technology it needs to be applied to solve socio-economic problems and successfully connected with the countrys overall development objectives. Contribution in the sustainable development of agriculture by the green technologies can be immense by considering such factor. Organic agricultural system when combined with green technology achieve superior yields, in distinction to the conventional practice used in developing countries , and thus make way for the sustainable development in the agriculture. (Ghadiyal and kayasth, 2011) (2).

OPPORTUNITIES TOWARDS SUSTAINABLE AGRICULTURE THROUGH GREEN TECHNOLOGY

- Integrated pest management/ Integrated pest control

Integrated pest management is an eco friendly technique for pest management encompassing biological, cultural and mechanical and need based utilization of chemical, pesticides with a favorable usage of bio pesticides, bio control agents and indigenous alternative potential . The key goal of Integrated pest management is maximizing the yield of organic food with minimum cost with creating awareness among farming community about beneficial and detrimental insect pests and diseases and their management along with to curtail environmental pollution in air, water and soil due to pesticides.(Ghadiyal and Kayasth, 2012) (3)

Fig.1 new knowledge and technology for integrated pest management

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Fig-2: Rotational Grazing

- Rotational Grazing

Rotational Grazing is a management system through which farmers and ranchers move live stock from paddock to paddock to prevent overazing and allow time for plants to regenerate. Rotational Grazing incresess forage quality, limits, soil erosion, controls the spread of manure as fertilizer , and enhances plant root system, thereby increasing soil quality, water infiltration and carbon sequestration. Grazers harvest their own feed-grass, forbs, rather than depending on corn, soy and other grains grown with synthetic inputs such as fertilizer and pesticides.

Rational Grazing is a core sustainable agricultural approach to raising livestock in a profitable, climate and environmentally friendly manner.

- Water Quality

In sustainable agriculture practice for water quality protection ecologically sound practices should be adopted to ensure a reduced impact on water resource .Among these (1) Rational rates timing types and technology of placement of fertilizers can contribute to obtain environmental and economic benefits. (2) conservation agriculture among the sustainable cropping system can reduce surface runoff and con assist in pressuring water in the top soil stratum and increase rain infiltration etc.

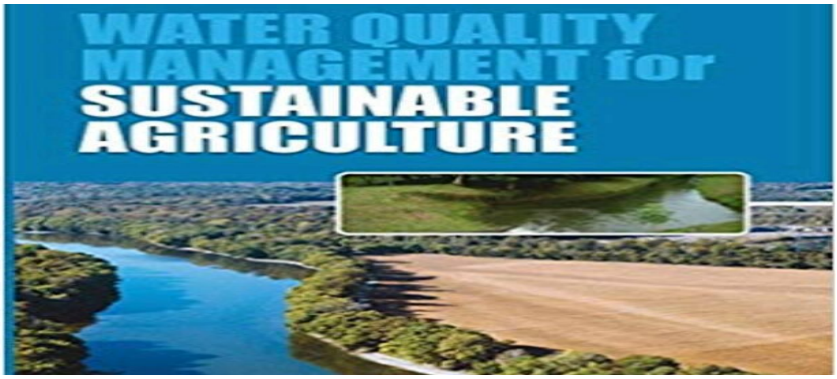

Fig-3: water quality

- Soil Conservation

Soil conservation aims to prevent the loss of soil. The best way to avoid such type of problem is agriculture. For conservation of soil various methods are adopted like contour farming agronomic practices, field strip, cropping, crop rotation, dry farming method etc. A sequel to the deforestation is typically large scale erosion, less of soil nutrients and some time total desertification. Ministry of agriculture, Indian council of agriculture research , department of agriculture made a combine effort to delineate the entire geographical area in to ten soil conservation regions.

1- North Himalayan region.

2- North eastern Himalaya region.

3- Desert areas region.

4- Assam valley and Gangetic delate region.

5- Indo-gangetic alluvial plain region.

6- Southern red soil region.

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7- Eastern red soil region.

8- Mixed black and red yellow soil region.

9- Black soil region.

10- East west coast and island region.

- Green technology of multiple cropping and group rotation

Multiple cropping is a form of polyculture and can be defined as in the same land producing more than two crops, during the same season. It can be done in two methods i.e relay cropping where a succeeding crop is sown along with the first one, before it is harvested and double cropping, where the first the current crop is reaped then the successive crop is planted. On the other hand the process of growing two or more dissimilar or unrelated crop in the same land in different season is known as crop rotation. the major benefit that is available with the help of such system is conserving the standard of land which is decreased because of the inorganic farming. These farming practices aim at nondestructive environment with improved production of organic food. In distinction to conventional farming , this system contributes a maximum harmonious relationship to the crops as they have soils of higher biological, physical and in several, situations chemical quality (Deshmukh,2014)(3).

CURRENT TRENDS IN GREEN TECHNOLOGY FOR RURAL AGRICULTURE

Green technologies have had great impact on communities of the areas where they have been implemented. Rural household has empowered communities and has increased their productivity through provision of bio gas plant. Villagers have built their own water storage and rainwater harvesting techniques and are not dependent on outside help. This has raised the standard of living in the participating villages.

CLIMATE CHANGE

climate change present challenges for the agricultural sector in mitigating greenhouse gas emission as well adapting to climate impacts which are expected to have pronounced implication for farming climate change also offers opportunities in the agricultural capacity for the ability to offset emission from other sectors and for carbon sequestration agricultural accounts for 10-12 percent climate change of global green house gas emission, methane, primarily nitrous oxide. nitrous oxide produced naturally in soil but also from fertilizers, is released by farming activity and accounts for 60% of total agricultural emission. Livestock and rice cultivation breathing both emit large quantities of methen accounting for 30% of emission from the sector. Modern farming is also very energy intensive and the use of fossil fules accounts for 10% of agricultural emission in the form of carbondioxide. Agriculture can help mitigation greenhouse gases through carbon sequestration as soil can capture and absorb carbon and offset emission from farming and other sector. for example greenhouse gas emission associated with live stock could be offset by capturing the carbon in pastureland. Although it is estimated that carbon capture and storage in soil could offset as much as 20% of global greenhouse gas emission, advanced techniques to increase soil carbon content are experimental as well as expensive.

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FOOD SECURITY

As the population continues to grow and natural resources become scarcer, the need to shift towards an environmentally responsible, more equitable, socially accountable and "greener" economy has become increasingly apparent. Food is one of the basic need of society and ensuring adequate food for all has engaged the attention of policy makers for long. The phrase "food security" embeds three important components food access, availability and use. Technology plays a crucial role in achieving food security. developed countries have been able to master the use of technological intervention to a great extent and consequently to no face food security problem, developing countries are still struggling to fill the demand supply gap. A possible reason is the differential and comparatively adoption in developing countries.

Technology may provide an answer to the mounting challenge of national and global food security. but policy expert also need to adopt an integrated approach that factors in outcomes when the technology in a product life cycle is about to get saturated. Corrective measures could be adopted without compromising the sustainability of the ecosystem and giving consideration to the long term implications of resorting to technological interventions.

CONCLUSION

The agriculture sector is crucially important in the green growth context because it is the major use of water land and marine resources and has important linkage with biodiversity while the sector can causes environmental harm. Green growth implies that the whole set of policies becomes more coherent and compatible with respect to their sustainability and growth objectives.

Measuring the growth towards green growth in the agriculture and food sector will not be easy and not are the link between the economic, biophysical and social relationship imperfectly understood , information on the state of the environment is difficult to collect and interpret. There is no single indicator of environmental (or social) performance while some indicaters are available. The challenges will be to develop indicators that cover the food chain as a whole.

The adoption and diffusion of green technology very much dependent on attaining a balance between environmental and economical profitability as an economically sound solution, organic farming has to satisfied the triangle benefits of consumer , producer and services.

Some of the challenges identified in promoting green technology for rural area include: better access, mainstreaming of organic agriculture for farmers, government support and subsidy for certification and marketing and promoting green technology.

Other important consideration identified include: access to source of technology, improving farmers' distribution and dissemination of benefits from technology adoption and governments' political will to provide support services and right institutional framework for the adoption of green technology and development.

REFERENCES

1. Casey, v & Richard, I a practical application of the IDEAL model software process: improvement & practices, 9 (3), pp. 123-132, 2004.
2. Ghadiyali T, Lad k, Patel B. Agriculture intelligence: an emerging technology for farmer community. In emerging application of information technology (EAIT), 2011 second international conferences, 2011, 313-316.IEEE.
3. Ghadiyali TR, Kayash MM, contribution of green technology in sustainable development of agriculture sector. Journal of environmental research and development. 2012 ;7(1A):590-596.
4. Deshmukh MP Sustainable Agriculture development in India, research direction 2014; 2(3):1-5.
5. Narayann, s(2005), "organic farming in India; Relevence, problems and constraints."
6. Kates RW, Thomas M. An critical, science and policy for sustainable development.
7. Ram B. Impact of human activities on land use changes in arid Rajashthan.
8. Kates, R.W and Thomas M.P 2005 An article, Science and policy for sustainable development.
9. Boye, J.I Arcand, y Current Trends in Green Technology in Food production and processing.
10. Aradhey A, Wright T. India Biofuel Annual -2011, Global Agricultural Information Network (GAIN) report number: INI 109, 2011.
11. Chel, A kaushik G, Renewable energy for sustainable agriculture , agronomy for sustainable development.

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AXIAL BUCKLING OF SQUARE ALUMINIUM PLATE WITH CENTRAL CUT-OUT REINFORCED WITH CIRCULAR STRIPS AND TUBES

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ABSTRACT
The aim of the present study is to investigate the critical buckling of perforated square aluminium plates reinforced with circular strips and tubes. The effect of critical buckling load with the increase in hole radius, strip width and tube thickness is also investigated. The effect of different edge conditions to increase the stiffness and the optimum value of hole radius to obtain the maximum value of critical buckling load is also investigated. Tubes and strips are used to increase the stiffness of the plate. A series of ANSYS non-linear finite element analysis (FEA) are undertaken for these purpose. FEA showed that in some cases for a particular edge condition and by using strips and tubes the value of critical buckling load is more than that of the original plate with no perforations.

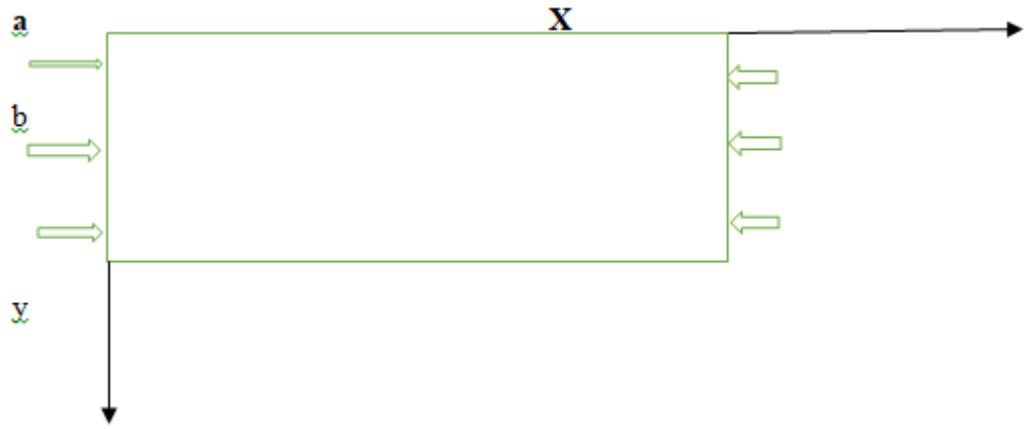
Keywords: Critical buckling load, stiffness, strips and tubes, FEM analysis, perforated plate.

1. INTRODUCTION
Aluminium alloy members are used heavily in structural applications, especially in space structures, bridges, automobile industry (Hydraulic oil filters, motor cycle silencers), chemical and energy (Industrial gas filters, battery separator plates, gas purifiers, liquid gas burning tubes, mine cages), ship structures etc.. The basic parts of offshore structures and ships, which are cut, shaped, bent, and are manufactured to meet the requirements of a desired design configuration. Stiffened curved and perforated plates are the most commonly used as structural members in the ship building industry. Perforation decreases both the weight and natural frequency of plate in comparison with the non- perforated plate.This also leads to a significant reduction in both buckling and ultimate strength and hence reduction in the stiffness of the perforated plate. To solve this problem, the dimension of the hole in the plate is limited to a certain range at the design stage to limit the increasingly altered structural response that is associated with an increasing hole size. Thus several studies have been done in the literature survey to examine the effect of perforation on both critical buckling and stiffness of perforated plates.

2.1 MATHEMATICAL FORMULA
The governing differential equation for a plate under transversal load q and in plane loads N_x, N_y, N_{xy} is as follows [1]:

$$\frac{\delta^4 w}{\delta x^4} + 2\frac{\delta^4 w}{\delta x^2 \delta y^2} + \frac{\delta^4 w}{\delta y^4} = \frac{1}{D}\left(q + N_x\frac{\delta^2 w}{\delta x^2} + N_y\frac{\delta^2 w}{\delta y^2} + 2N_{xy}\frac{\delta^2 w}{\delta x \delta y}\right), \quad \text{(1)}$$

Where, $D = \frac{Et^3}{12(1-\nu^2)}$



From the above figure when only compression load in the X-direction is present then

$$N_x = -N$$

Thus equation (1) reduces to

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$$D\left(\frac{\delta^4 w}{\delta x^4} + 2\frac{\delta^4 w}{\delta x^2 \delta y^2} + \frac{\delta^4 w}{\delta y^4}\right) + N\frac{\delta^2 w}{\delta x^2} = 0 \quad \ldots\ldots (2)$$

For simply supported plate we can represent the deflection in the sine form as

$$W = \sum_m^\infty \sum_n^\infty a_{mn} \sin\frac{mn\pi x}{a} \sin\frac{n\pi y}{b} \quad \ldots\ldots (3)$$

Where m, n= 1, 2 …

With this solution the nontrivial solution of equation (2) can be derived as

$$N = \frac{\pi^2 a^2 D}{m^2}\left(\frac{m^2}{a^2} + \frac{n^2}{b^2}\right)^2 = \frac{\pi^2 D}{b^2}\left(\frac{mb}{a} + \frac{n^2 a}{mb}\right)^2 \quad \ldots\ldots (4)$$

The lowest value of N can be achieved for n=1, that is when there is only one half sine wave in the transverse direction. The buckling load is defined as

$$N_{cr} = k\frac{\pi^2 D}{b^2}, \quad k = \left(\frac{mb}{a} + \frac{a}{mb}\right)^2 \quad \ldots\ldots (5)$$

Where k (buckling coefficient) is a function of the plate aspect ratio a/b and the number of half sine waves m in the longitudinal direction that is in the direction of loading. The minimum value of k=4 when the value of aspect ratio is a/b i.e. m=a/b.

So the buckling load was obtained in mode m as follows:

$$N_{cr} = \frac{4\pi^2}{b^2} = \frac{\pi^2 E t^3}{3b^2(1-\nu^2)} \quad \ldots\ldots (6)$$

2.2 LITERATURE SURVEY

Seifi et al. [1] studies the experimental and numerical analysis on buckling of cracked thin plates under full and partial compression edge loading. Perry [2] has studied on the buckling of elliptical plates by solving their corresponding nonlinear static problem.Jana et al.[3] investigates buckling of certain rectangular plates subjected to different cases of non-uniform loadings such as concentrated, local and sinusoidal loadings . Moen et al. [4]investigates the elastic buckling of thin plates with holes in compression and bending. Laughlan et al. [5]investigates the post buckle failure of steel plate shear webs with centrally located circular cut-outs.Scheperborer et al. [6] investigates the local buckling of aluminium and steel plates with multiple holes and simply supported edges using the finite element method. Paik [7] investigates the ultimate strength characteristics of perforated steel plates under combined biaxial compression and edge shear loads.Kumar et al. [8] determines how the axial compressive force effects a rectangular central opening on the ultimate strength of a square plate. The effects are examined through finite element analysis. Seifi et al. [9] by using experimental and numerical analysis (by using ABACUS software) investigates the axial buckling behaviour of perforated plates reinforced with strips and middle tubes.

2.3 FIGURE AND TABLE

Geometry of the model

In this analysis aluminium square plate of dimension ($240mm^2$) is used and the thickness of the plate is 1.5mm. The strips and tubes are also made up of aluminium alloy (standard6101 alloy). For the designing and assembling purpose SOLID WORKS software is used and for analysing the plates to find critical buckling load for different cases ANSYS WORKBENCH software was used. The plates for analysis are shown in the figure below:

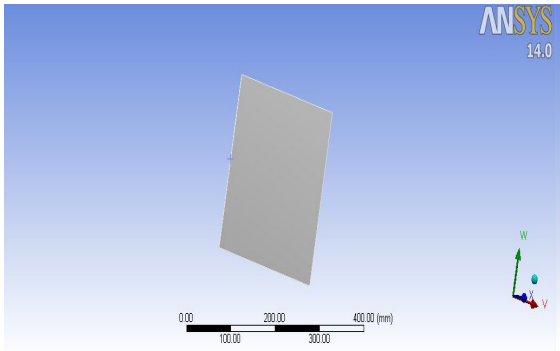

Figure-1: Simple plate

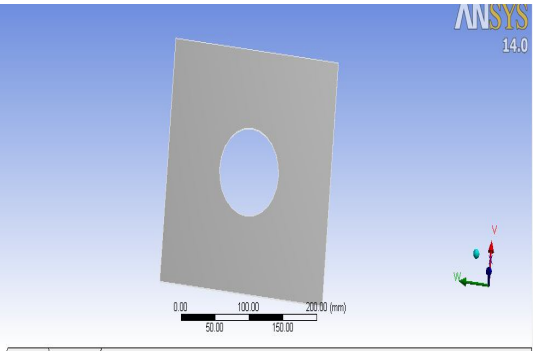

Figure-2: plate with central cut-out

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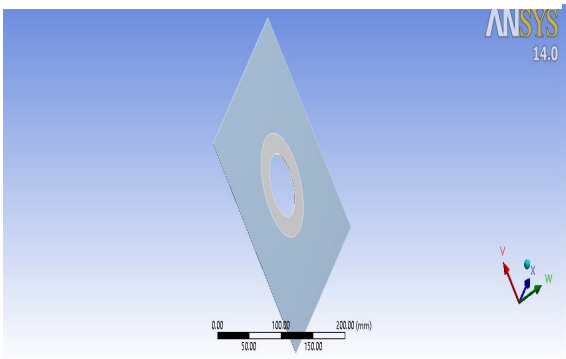

Figure-3: Plate reinforced with strip

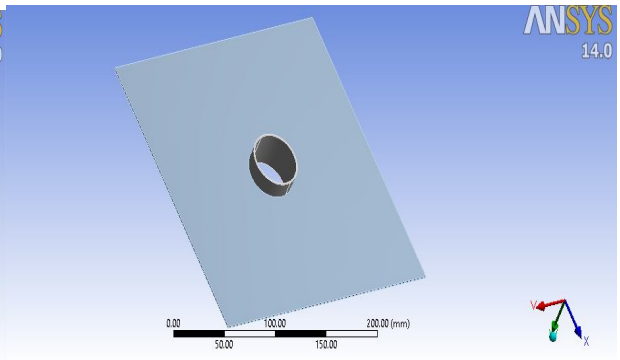

Figure-4: Plate reinforced with tube

The different loading conditions and boundary conditions are shown in the figure below;

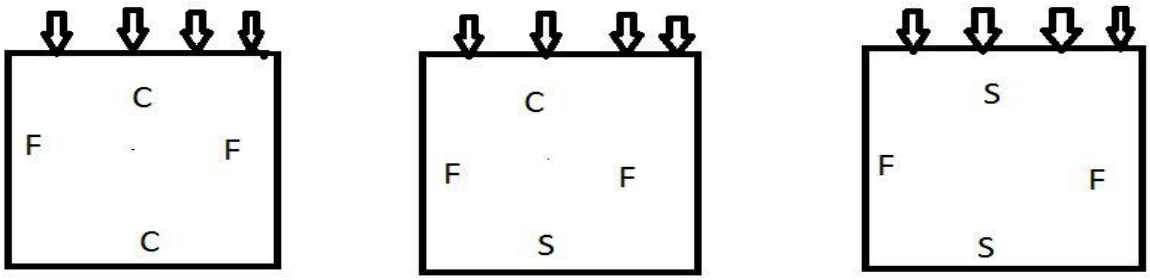

Figure.Boundary conditions and loading, used in the simulations.

C: denotes clamped support condition.

F: denotes free support conditions.

S: denotes free edge condition.

Boundary condition CCFF two faces are clamped and other two opposite faces are free. Clamped face means all the displacements and rotations are restricted. The other two edge conditions are consider for analysis are CSFF and SSFF.

2.3.1 VALIDATION OF EXPERIMENTAL RESULT WITH THE NUMERICAL RESULT

TABLE-1

SSPECIMEN	EXPERIMENTAL RESULT OF BUCKLING LOAD(Newton) [9]	NUMERICAL RESULT OF BUCKLING LOAD (Newton)	ABSOLUTE PERCENTAGE ERROR
Simple plate [fig.5]	2996	3043	1.57%
Plate with hole ($R_h = 23mm$) [fig.6]	2946	2898.4	1.61%
Plate with hole (R_h=31.1mm) [fig7]	2764	2749	0.54%
Plate with hole (R_h=43.4mm) [fig8]	2575	2741.5	6.65%
Plate with strip ($R_h = 31.1mm, R_1$=31.1mm, R_2=41.4mm,W= 10mm) fig.[9]	3432	3522.2	2.63%
Plate with strip ($R_h = 31.1mm, R_1$=31.1 mm, R_2=46.1 mm,W= 15 mm)fig[10]	3976	3976.8	0.02%

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Plate with strip (R_h = 31.1 mm, R_1=31.1 mm, R_2=51.1 mm,W= 20 mm)fig[11]	4187	4210.4	1.5%
Plate with tube ($R_h = 23mm,\ R_0 = 23mm, t = 1.12mm$) fig[12]	3300	3172.2	3.87%
Plate with tube($R_h = 31.1mm,\ R_0 = 31.1mm, t = 2.17mm$) fig[13]	3515	3515.3	0.008%
Plate with tube($R_h = 43.4mm, R_0 = 43.4mm, t = 2.03mm$) fig[14]	3927	3889.3	0.96%

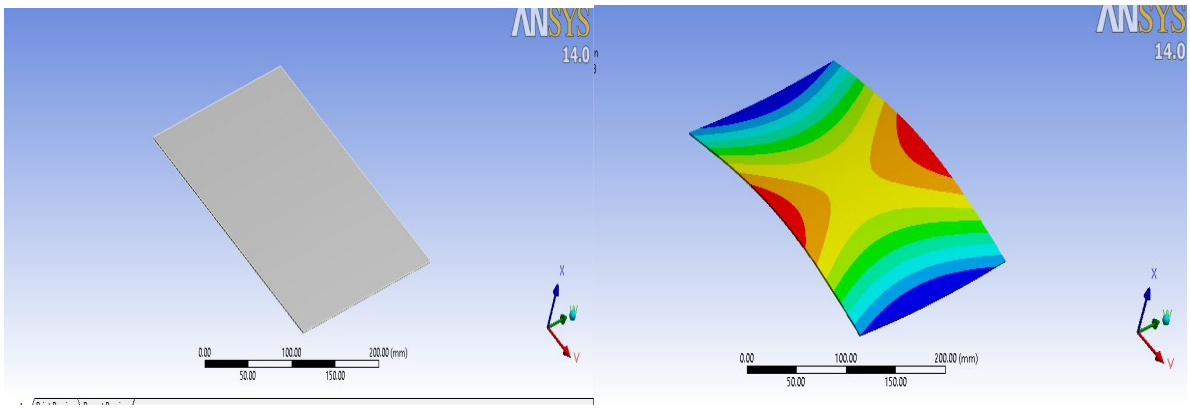

Figure [5], it shows the Simple plate and it's buckling behaviour. During buckling analysis the number of nodes and element takes as [No. of nodes = 28167, no. of element= 13452]

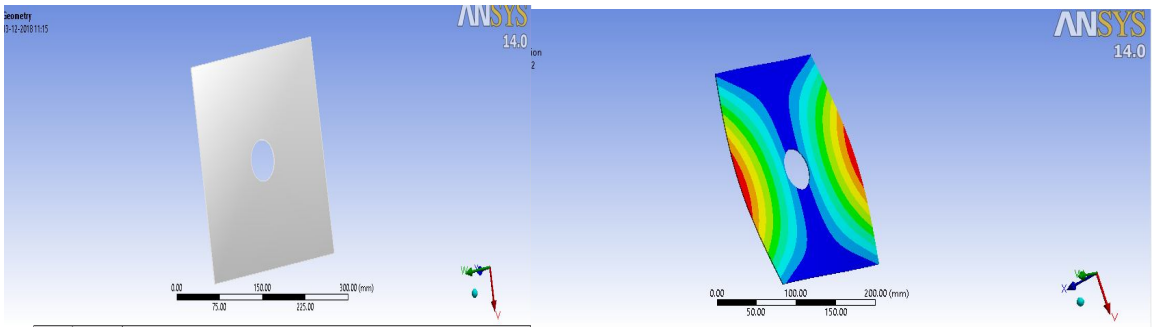

Figure [6],it shows the plate with circular hole and it's buckling behaviour. The dimension of the plate is indicated in table-1 third row. In this analysis[no. of nodes=60247, no. of elements=29412]

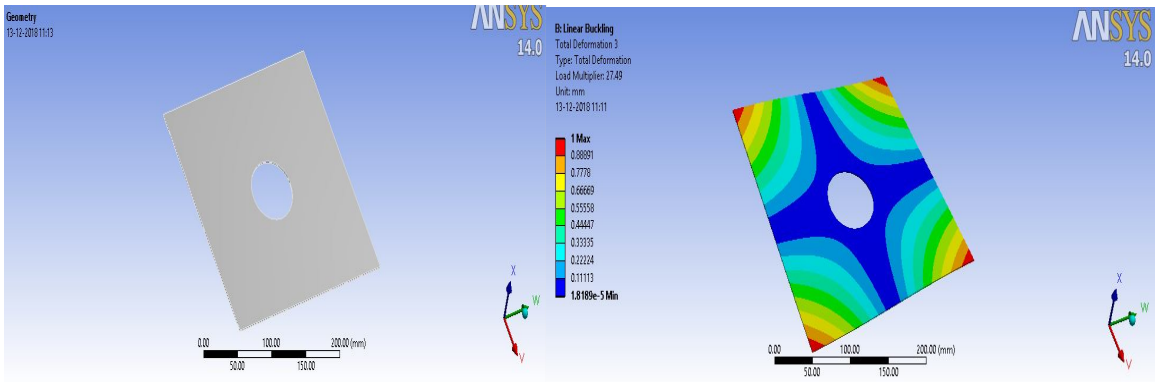

Figure [7],it shows the plate with circular hole and its buckling behaviour. The dimension of the plate is indicated in table-1 fourth row.

[no. of nodes=36698, no. of elements=17652]

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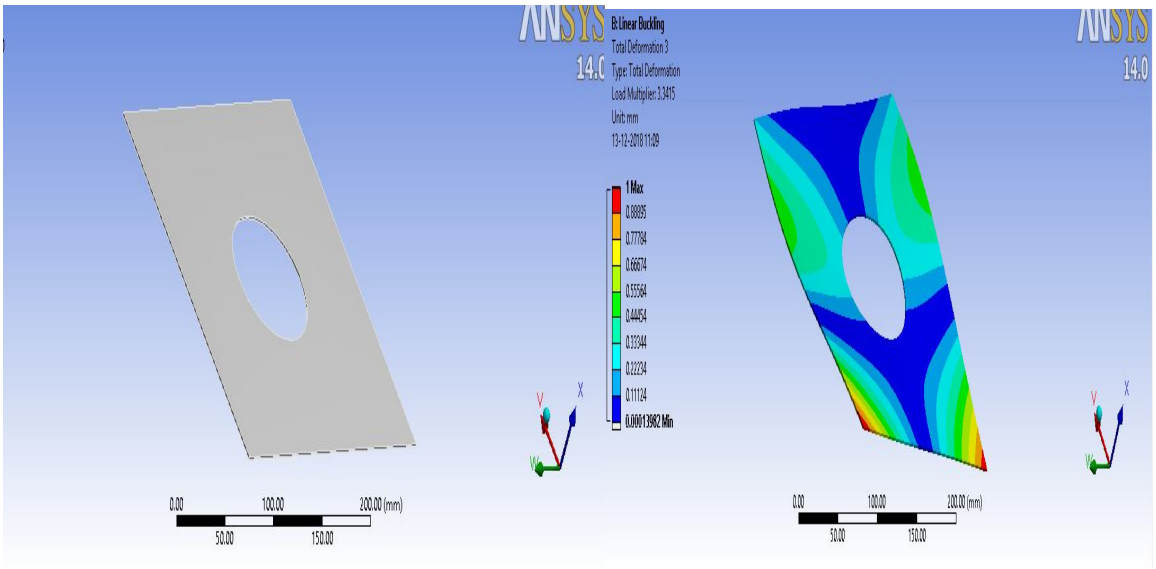

Figure [8] it shows the plate with circular hole and it's buckling behaviour. The dimension of the plate is indicated in table-1 fifth row

[No.of nodes=37905, no. of elements=18184]

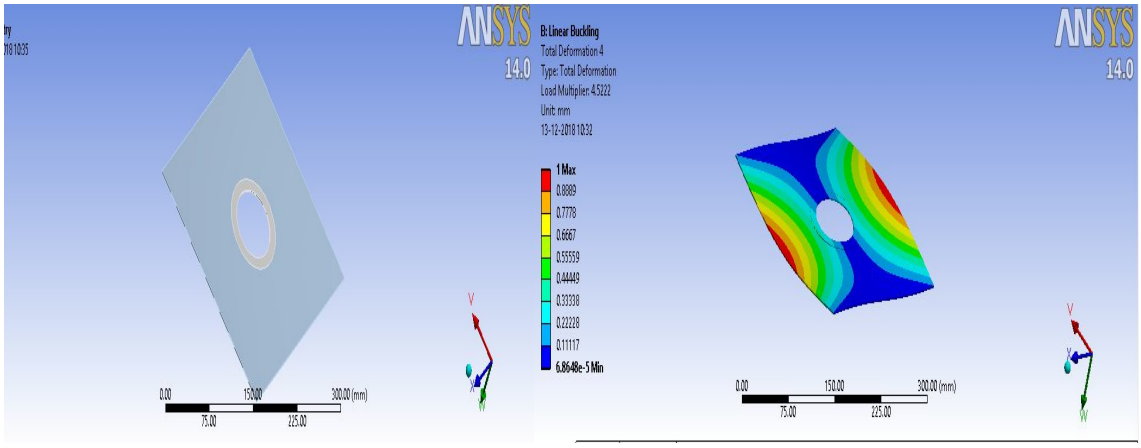

Figure [9] it shows the plate with circular strip and it's buckling behaviour. The dimension of the plate is indicated in table-1 sixth row.

[no. of nodes=38925, no. of elements=18489]

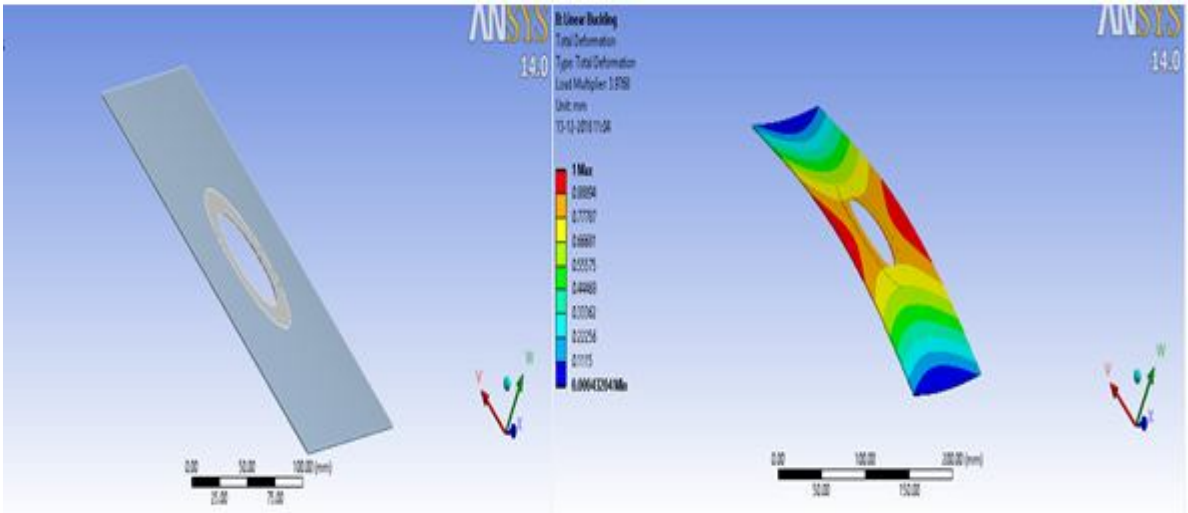

Figure [10]it shows the plate with circular strip and it's buckling behaviour. The dimension of the plate is indicated in table-1 seventh row.

[no. of nodes=41952, no. of elements=19930]

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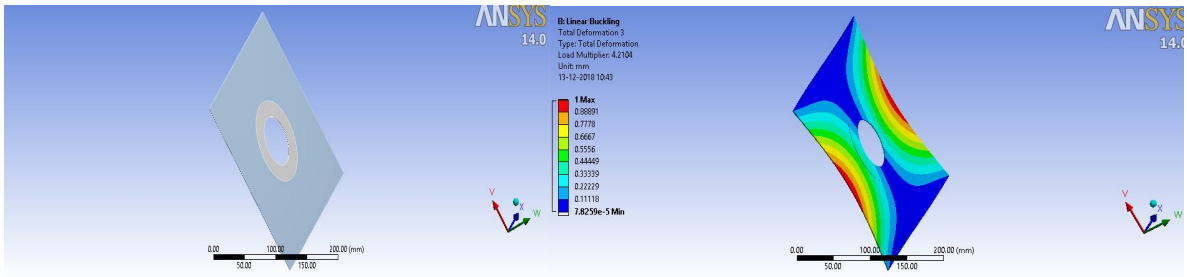

Figure [11] it shows the plate with circular strip and it's buckling behaviour. The dimension of the plate is indicated in table-1 eighth row.

[No. of nodes=44349,no. of elements=21131]

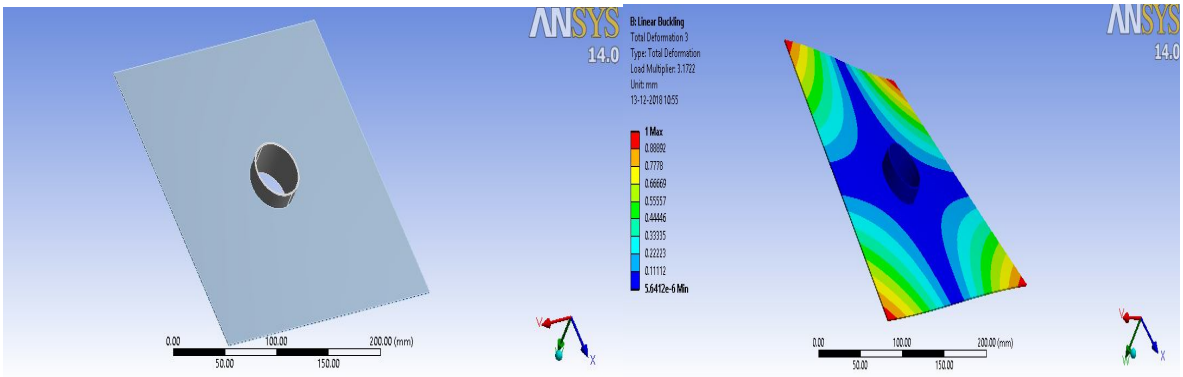

Figure [12] it shows the plate with circular tube and it's buckling behaviour. The dimension of the plate is indicated in table-1 ninth row.

[No. of nodes=43186, no. of elements=20726]

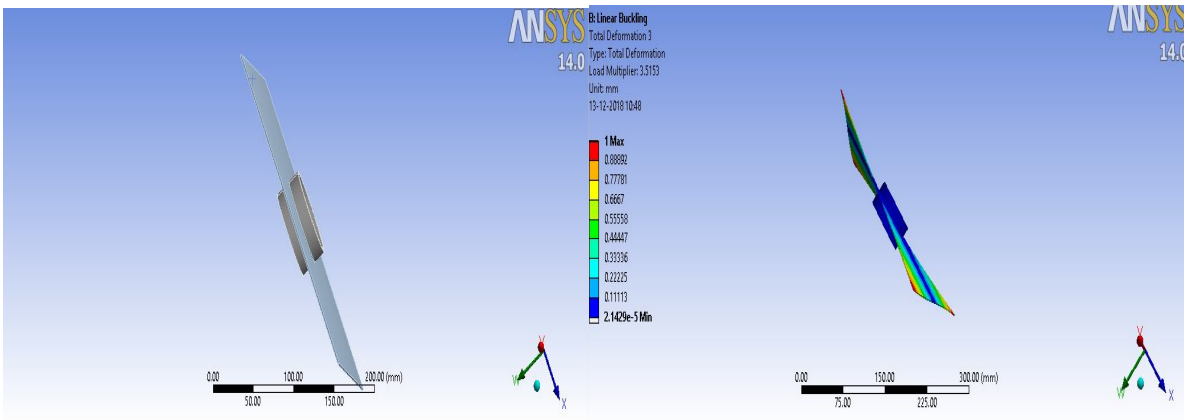

Figure [13] it shows the plate with circular tube and it's buckling behaviour. The dimension of the plate is indicated in table-1 tenth row.

[No. of nodes=39565, no. of elements=18906]

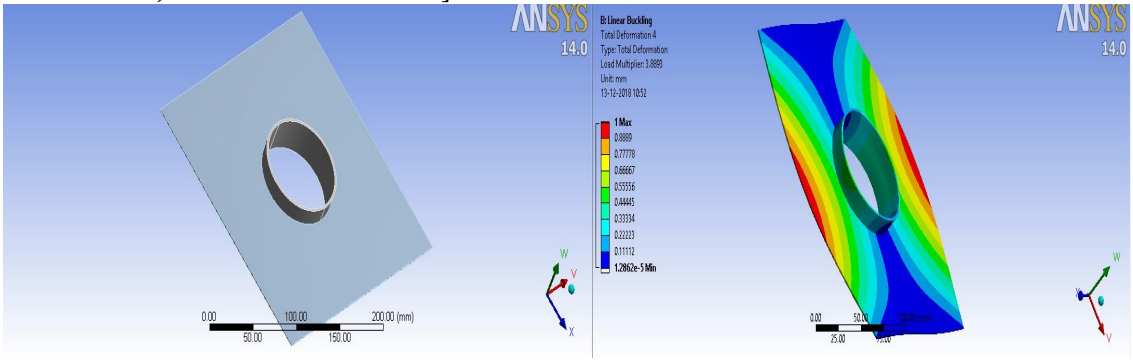

Figure [14] it shows the plate with circular tube and it's buckling behaviour. The dimension of the plate is indicated in table-1 eleventh row.

[No. of nodes=4387, no. of elements=20933]

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CRITICAL BUCKLING LOADS (IN NEWTON) FOR THE SIMULATED SPECIMENS WITH VARIOUS GEOMETRIES AND BOUNDARY CONDITIONS:

TABLE-2

Specimen	R_h (mm)	R_1 (mm)	R_2 (mm)	W (mm)	R_0 (mm)	t (mm)	CCFF	CSFF	SSFF
1.Simple plate							3043	1751.4	820
2. h_1	23			0			2898.4	1603.797	736.2
3. h_2	31.1			0			2749	1523.58	681.74
4. h_3	43.4			0			2741.5	1373.47	588.672
5. h_1s_1	23	23	33	10			3700	1811.616	911.232
6. h_1s_2	23	23	38	15			3894.4	1909.812	974.776
7. h_1s_3	23	23	43	20			4125	1972.815	1041.15
8. h_2s_1	31.1	31.1	41.1	10			3752.2	1865.97	966.672
9. h_2s_2	31.1	31.1	46.1	15			3976.8	1938.72	1026.153
10. h_2s_3	31.1	31.1	51.1	20			4210.4	2044.14	1084
11. h_3s_1	43.4	43.4	53.4	10			3812.4	1887.5	1017
12. h_3s_2	43.4	43.4	58.4	15			4062.23	2014.024	1100.3
13. h_3s_3	43.4	43.4	63.4	20			4315.31	2138	1211.83
14. h_1t_1	23				23	1.12	3172.2	1727.6	828.94
15. h_1t_2	23				23	2.03	3482.48	1734.43	843.2
16. h_1t_3	23				23	2.17	3542.112	1770.8	854
17. h_1t_4	23				23	3	3903.82	1877.75	949.784
18. h_2t_1	31.1				31.1	1.12	3436.28	1728.442	829.95
19. h_2t_2	31.1				31.1	2.03	3485.89	1735.187	846
20. h_2t_3	31.1				31.1	2.17	3515.3	1771.49	855.23
21. h_2t_4	31.1				31.1	3	3892.214	2009.99	1056.3
22. h_3t_1	43.4				43.4	1.12	3443.13	1730.72	830.416
23. h_3t_2	43.4				43.4	2.03	3889.3	1739.93	847.19
24. h_3t_3	43.4				43.4	2.17	3497.4	1776.35	860.43
25. h_3t_4	43.4				43.4	3	4918.334	2281.1	1288.41

2.3.3 VARIATION OF CRITICAL BUCKLING LOAD WITH HOLE RADIUS FORDIFFERENT STRIP WIDTHS AND EDGE CONDITIONS:

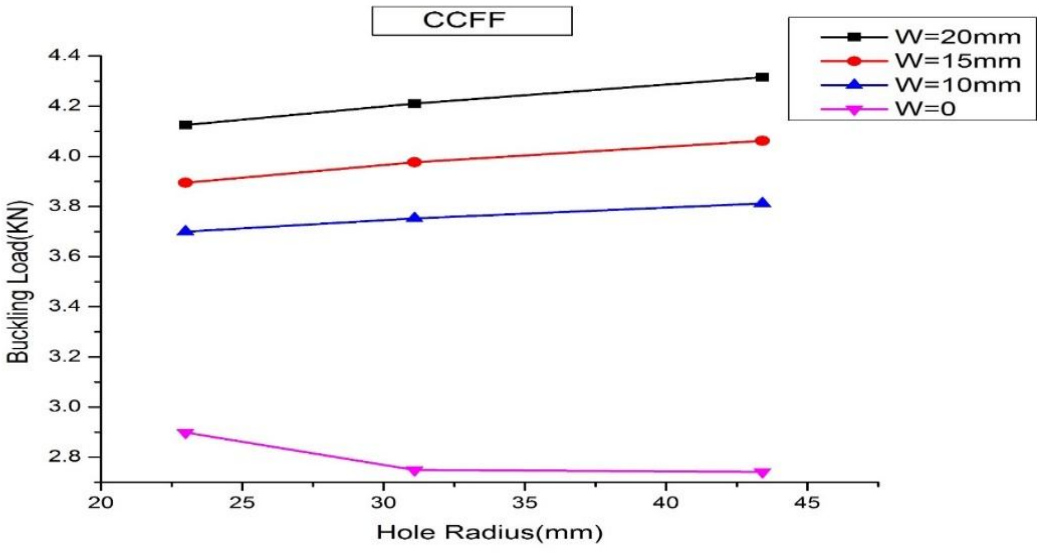

Figure [15] it shows the variation of critical buckling load with the radius of hole for different width of strip. Here the edge condition applied is CCFF.

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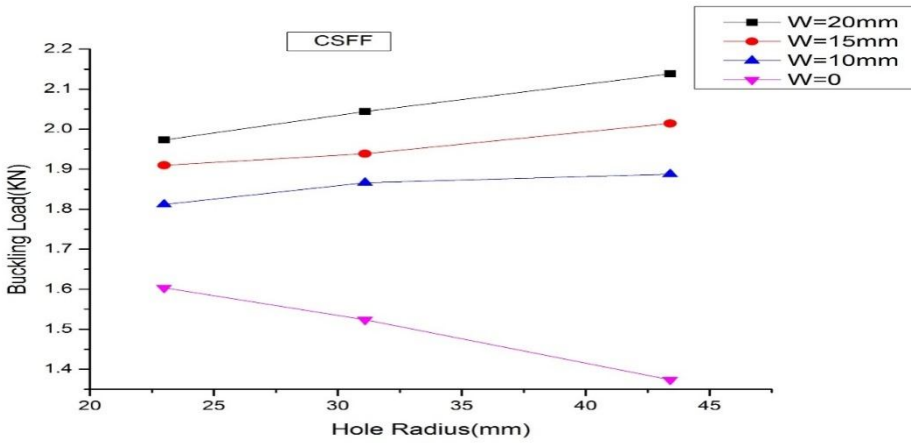

Figure [16] it shows the variation of critical buckling load with the radius of hole for different width of strip. Here the edge condition applied is CSFF.

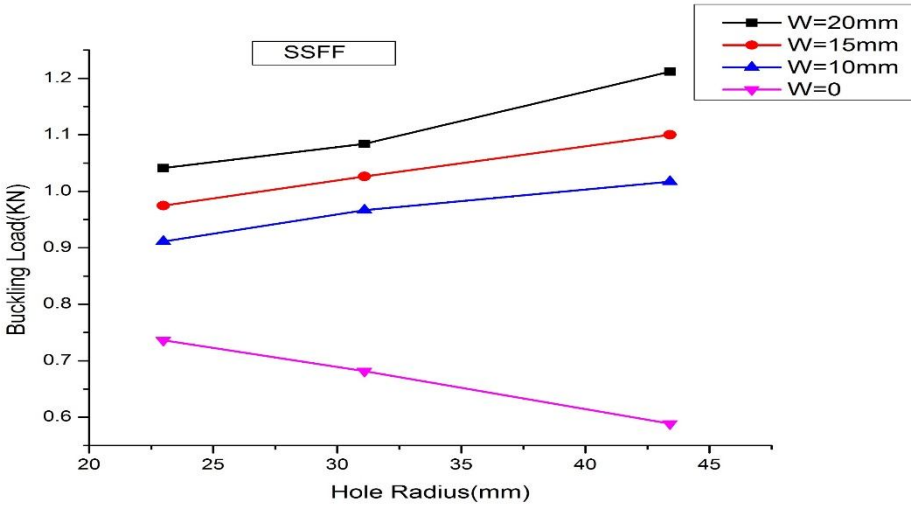

Figure [17]it shows the variation of critical buckling load with the radius of hole for different width of strip. Here the edge condition applied is SSFF.

From the above figures15, 16, 17 we can clearly observe that for a particular strip width as the radius of the hole increases critical buckling load increases.

2.3.4 VARIATION OF CRITICAL BUCKLING LOAD WITH HOLE RADIUS FOR DIFFERENT TUBE THICKNESS AND EDGE CONDITIONS:

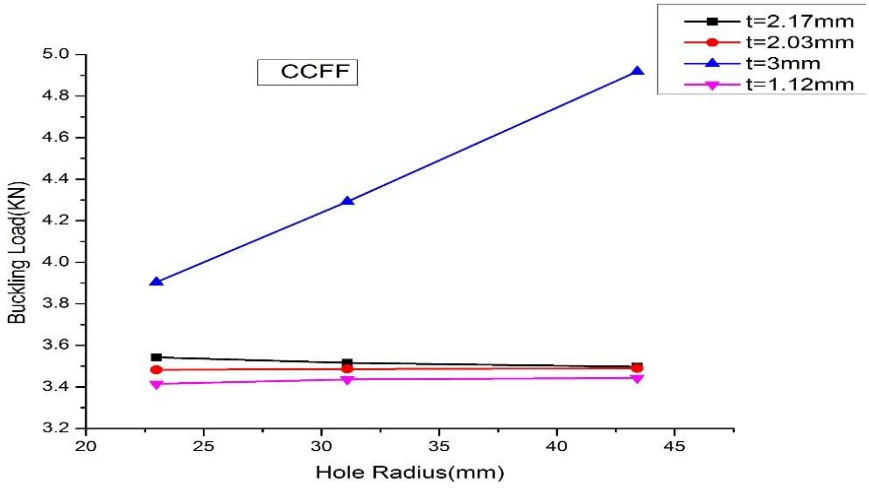

Figure [18]it shows the variation of critical buckling load with the radius of hole for different thickness of middle tube. Here the edge condition applied is CCFF.

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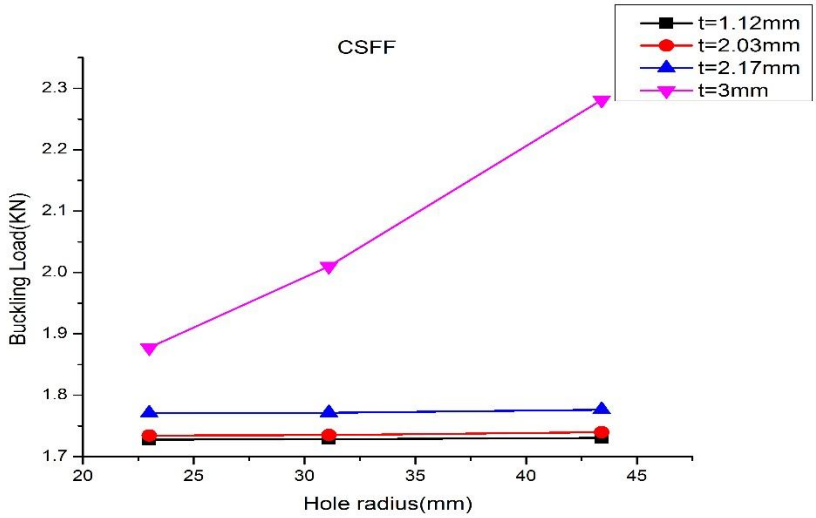


Figure [19]it shows the variation of critical buckling load with the radius of hole for different thickness of middle tube. Here the edge condition applied is CSFF.

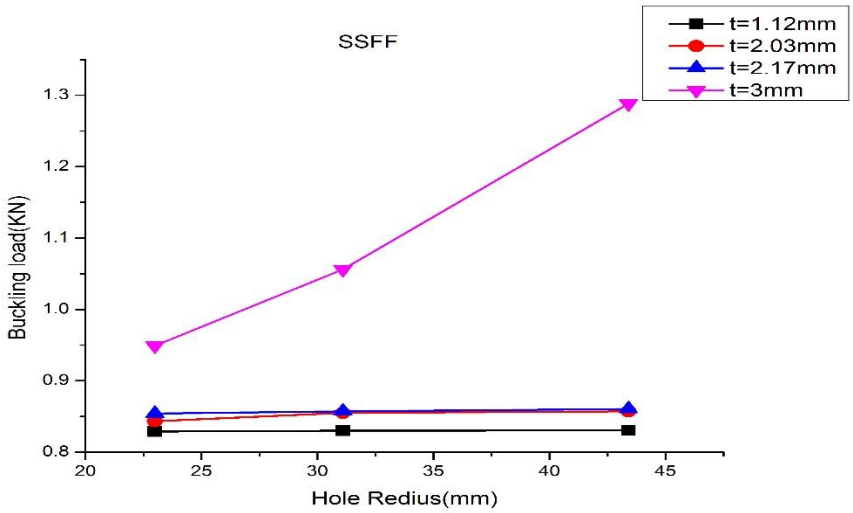
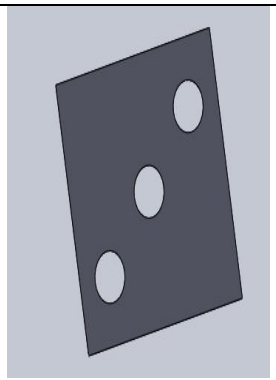
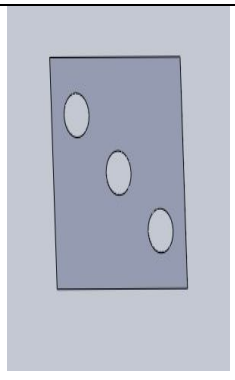
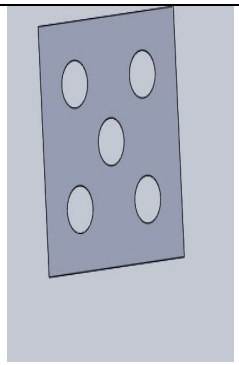
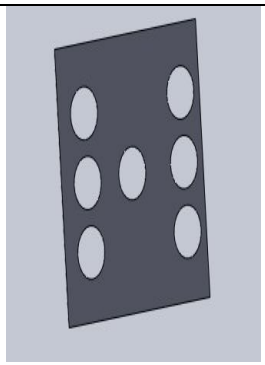


Figure [20]it shows the variation of critical buckling load with the radius of hole for different thickness of middle tube. Here the edge condition applied is CSFF.

From the above figures18, 19, 20 we can clearly observe that for a particular tube thickness as the radius of the hole increases critical buckling load increases.

2.3.5CRITICAL BUCKLING LOAD (N) FOR PLATES OF DIFFERENT PERFORATIONS AND SUPPORT CONDITIONS:

TABLE-3

				
CCFF	3961.2	3899	3645.2	3065.6
CSFF	6330.9	6325.4	4406.1	3343.1
SSFF	2386.6	2384.6	3645.3	1845.5

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This table shows the variation of critical buckling load i.e. stiffness of different pattern of perforated plates with the different edge conditions. This table is generated to determine the best edge condition which gives the maximum value of stiffness.

3. CONCLUSIONS

First the effect of central hole on the buckling of square plate was investigated and then the role of adding circular strips and cylindrical tubes on the buckling force of the perforated plates were found, and finally the effect of three different support conditions on the numerical results of four different pattern of perforations for the same dimension plates were investigated it was found that

1. For a particular strip width as the radius of the circular hole increases the critical value of buckling load increases.
2. For a particular tube thickness as the radius of the circular hole increases the critical value of buckling load increases
3. CSFF support condition gives the highest value of critical buckling load and hence provided the highest stiffness to the plate and best support condition.

REFERENCES

[1] R.Seifi, N. Khoda-Yari, Experimental and numerical studies on buckling of cracked thin- plates under full and partial compression edge loading, Thin-Walled Srtuct.49(2011) 1504-1607

[2] C.I. Perry, the bending of thin elliptical plates, Int Proc Symp applied mathematics (1950)131-139.

[3] P. Jana, K. Bhaskar, stability analysis of simply-supported rectangular plates under non-uniform uniaxial compression using rigorous and approximate plane stress solutions, thin-walled struct.44 (2006)507-516.

[4] J.K. Paik, ultimate strength of perforated steel plates under edge shear loading, thin-walled strut.45 (2007)301-306.

[5] J.K. Paik, ultimate strength of perforated steel plates under combined biaxial compression and edge shear loads, thin walled struct.46 (2008)207-213.

[6] C.D Moen, B.W. Schafer, elastic buckling of thin plates with holes in compression and bending, thin - walled struct.47 (2009)1597-1607.

[7] J. Loughlan, N.Hussain, the post buckle failure of steel plate with shear webs with centrally located circular cut-outs, structures8 (2016)252-263.

[8] Kumar MS, Alagusundaramoorty p, Sundaravadivelu R. Ultimate strength of square plate with rectangular opening under axial compression. J Nav Archit mar Eng. 2007; 4:15-26.

[9] R.seifi, S.Chahardoli, Ali Akhavan Attar, axial buckling of perforated plates reinforced with strips and tubes, thin-walled struct.49 (2011)1504-1516.

[10] M. Ayadin Komur, M. Sonmez, Elastic buckling of rectangular plates under linearly varying in-plane normal load with a circular cut-out, Mech.Res. Commun.35 (2008)361-371.

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SELF-FINANCE COURSES: POPULARITY & FINANCIAL VIABILITY MICROBIAL ANALYSIS OF WASTE WATER FROM INDUSTRY AND REDUCTION OF CHEMICAL OXYGEN DEMAND BY USING SELECTIVE ORGANISMS

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ABSTRACT
One of the major problems faced today is pollution and amongst all water is one of the most polluted natural resource at present. And one of the major factors causing this pollution is the industrial wastes containing hazardous substances that are disposed into the water bodies which further joins other bodies and this chain ends up only at oceans hence polluting everything in its way. This can be prevented by initial analysis of industrial waste before being dumped. Analysis such as pH test, colour, SS-BOD, oil and grease content and COD amongst others will help determine the quality level of the waste which can further be sent to waste water treatment plants before being discharged in case its not safe for regular disposal. There are several physico-chemical methods in place to bring down the contamination level of the waste water but owing to limitations of results and costs these are not implemented everywhere. Using microorganisms such as Pseudomonas aeruginosa, Bacillus subtilis, Enterobacter aerogenes which help in reduction of COD (chemical oxygen demand) significantly. These organisms are fit to reduces COD by 60-70% within few days for wastes generated from pharmaceutical, textile, milk and food industries.

Keywords: waste-water, analysis, COD (Chemical Oxygen Demand), reduction, microorganisms.

I. INTRODUCTION

One of the major challenges that exists for human kind is pollution and amongst all the resources that exists naturally on Earth, water is the most polluted resource. Maximum portion of the entire pollution found in water bodies come from wastes generated and discharged by industries. The nature of the pollutant discharged depend upon the process involved in the origination of the waste. Industries like pharma, liquor, milk and food discharge highly hazardous effluents that are poisonous and harmful to both land and aquatic creatures.

Though the level of untreated waste from pharma is small but that small amounts to a lot of harmful non-biodegradable organic products. Milk industry amounts to 4 to 11-million-meter-cube of waste per year and this is close to double the amount of milk produced. Most of the milk industry use a processing unit that uses "clean in place" system which pumps cleaning products (solutions) across all equipment, and these solutions are mostly acidic (sodium hydroxide, nitric acid). The textile wastes contain metals like zinc, copper among many others, which are capable to harming environment. Dyes' wastes cause bad colour and can even cause serious issues haemorrhage, nausea and ulceration of skin.

Conventional methods become more and more challenged in waste water treatment as contamination, population and activities increase. Hence what is required is - Advanced Oxidation Techniques to be implemented in industrial waste treatment.

II. CHEMICAL OXYGEN DEMAND REDUCTION

Chemical Oxygen Demand (further referred as COD) determines the requirement of oxygen that can be oxidized with the help of a strong chemical oxidant. It is an extremely noteworthy and necessary parameter, that measures water bodies based on their organic strength. In the below study, microorganisms are used to reduce the COD from waste water making it suitable for discharge.

The dichromate reflux method is suitable over other oxidant used procedures of the open reflux method. Organic content gets oxidized by potassium dichromate with catalyst being silver sulphate with hydrochloric acid being present to produce carbon dioxide and water. The excess potassium dichromate is titrated with ferrous ammonium sulphate, the consumed dichromate gives oxygen which is required for organic matter's oxidation.

THE INVOLVED REACTIONS ARE AS FOLOOWS:

i. $2K_2Cr_2O_7 (+) 8 H_2SO_4 \rightarrow 2 K_2 SO_4 (+) 2Cr_2(SO_4)_3 (+) 8 H_2O (+) 3O_2$ ii. $C_6H_{12}O_6 (+) 6O_2 \rightarrow 6CO_2 (+) 6H_2O$

iii. $Cr_2O_7^{--} (+) 6Fe^{++} (+) 14H^+ \rightarrow 6Fe^{+++} (+) 2Cr^{3+} (+) 7H_2O$

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I. METHOD

Take a pure culture (organisms living without the presence of other organisms) of the three bacteria- Enterobacter aerogenes, Pseudomonas aeruginosa and Bacillus subtilis.

Prepare a suspension of the culture and also sub-culture the organisms in separate nutrient media.

Prepare nutrient-broth that contains different concentrations of the samples like 5%, 15% etc and then sterilize it.

Pour 5ml of culture suspension of each organisms in different samples but with same concentration of nutrient-broth. Then incubate at 37ºC for 48 hours. After the incubation take sample from each organism inoculated at 5% concentration sample and place on nutrient agar plate. Now incubate it at 37ºC for 24 hours. Now monitor and observe the growth of particular organism in each plate.

Prepare another culture suspension from this latest nutrient plate and add 5ml of this to a new concentration sample of nutrient-broth and repeat the same steps and observer the growth in this case as well. Better growth with the nutrient-broth at a concentration will show that it is favourable for the organism.

II. PREPARATION OF THE SAMPLE

Take a 200ml sample into a 500ml conical flask and sterilize it at 15 p.s.i. at 121ºC. After the autoclaving, leave the sample to cool down to room temperature. Now introduce the sample with 30ml of culture suspension prepared from a 15% concentration sample of nutrient-broth. Warm the flask at room temperature on shaker at a rpm of 200. Post 24 hour, take sample for analysis of cod reduction. This needs to be continued for a period of 5 days.

III. CALCULATION

FAS=K2Cr2O7 N1V1=N2V2

Where,

N1 = Normality of FAS

V1 = Volume of FAS used for titration of Dichromate N2 = Normality of Potassium Dichromate

V2 = Volume of Potassium Dichromate taken for titration On using the above values, FAS norm

ality can be determined.

VI. Results and Discussions

Ten samples for industrial wastes (effluents) were tested for parameters like: pH, chloride, colour, TDS and TSS, BOD, COD and oil-grease content. It was found that few samples had permissible amount whereas the limits on few samples made them unfit and hence were suggested to go further treatment before the unloading.

The overall results are indicated in Table No.2

pH

This is a logarithmic value used to determine the nature of a solution, whether it is acidic, alkaline or neutral. The pollutant in almost all the chemical industries are large scale and is either in acid or alkaline form in manufacturing units. Variations in pH value of the effluent can alter the rates of reactions (mostly biological) and also the survival of various micro-organisms. In the current study, pH of final outlet samples are all within range.

Chloride

Chloride is present in all waters bodies with varying concentrations. Chloride in excess of 250 mg/L brings a salty taste in water. Organisms not accustomed to high chlorides content may be subjected to some or great extent of laxative effects.

Colour

Uses of colored water is limited and the severity of the situation can lead to complaints and probable breach of discharge limits. The intensity of the situation with colour is severe and can cause disturbances in water bodies.

TDS or Total Dissolved Solids and TSS or Total Suspended Solids

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This is a measure for salinity in the water. Many salts like carbonate, sulphate, Ca, Mg, Na, K, Fe, and Mn etc. are present. A high content of dissolved solids affects the water density and influences regulation of freshwater in organisms.

BOD or Biochemical Oxygen Demand

It is the measure of biodegradable material (organic) present in wastewater. BOD can be stated as the oxygen requirement of the micro-organisms in balancing the biologically degradable organic matter under aerobic conditions.

COD or Chemical Oxygen Demand

This analyses the measurement of oxygen depletion capacity of any water which is contaminated with organic effluents. Typically, it gets the equivalent amount of required oxygen to oxidize organic compounds in water.

Oil and Grease

Oil forms a surface level coating on water bodies causing reduced oxygen from the atmosphere above for organism living beneath. This coating also affects the sunlight penetration and hence affects the photosynthesis process directly. In either land or water animals, oil or grease can hamper the properties of fur and feathers.

Table-1: Materials and methods of physical, chemical and microbial parameters

PARAMETERS	MATERIALS	METHODS
PHYSICAL PARAMETERS		
pH	Electric pH meter	Electrometric method
Color	Color comparator	Visual comparison method (APHA ed. 22, pg. 2 – 5)
TDS & SS	Filter assembly , filter paper	Filtration & Gravimetric method (APHA ed. 22, pg. 2- 65,66)
CHEMICAL PARAMETERS		
BOD	Magnesium sulphate, Calcium chloride, ferric chloride, starch solution, sodium sulphate, phosphate buffer, seed culture	Alkali azide method , titrimetric method (APHA ed. 22, pg. 5- 4)
COD	Concentrated H2SO4 with AgSO4, Standard potassium dichromate(0.25N), Ferrous ammonium sulphate (0.25N), HgSO4 powder	Open reflux method (APHA ed. 22, pg. 5 – 16)
O & G	Hexane, sodium sulphate, HCL, separation funnel	Alkali Azide Method, Titrimetric method (APHA ed. 22, pg. 5 – 38)
Chloride	Potassium chromate, AgSO4(0.014N)	Argentometric Method (APHA ed. 22, pg. 4 – 72)
Sulphate	Conditioning reagent, BaCL2, D/W	Turbidimetric method (APHA ed. 22, pg. 4-188)
Ammonical nitrogen	Alkali solution, boric acid, phenolphthalein, H2SO4(0.02N)	Ammonia distillation & titrimetric method (APHA ed. 22, pg. 4 – 110)
MICROBIAL PARAMETERS		
Total coliforms	Lauryl Tryptose Broth, Brilliants Green Bile Broth	Multiple tube fermentation method (APHA ed. 22, pg. 9 -66)
Fecal coliforms	EC Broth	Multiple tube fermentation method (APHA ed. 22, pg. 9 – 74)

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Table-2: Results of all parameters

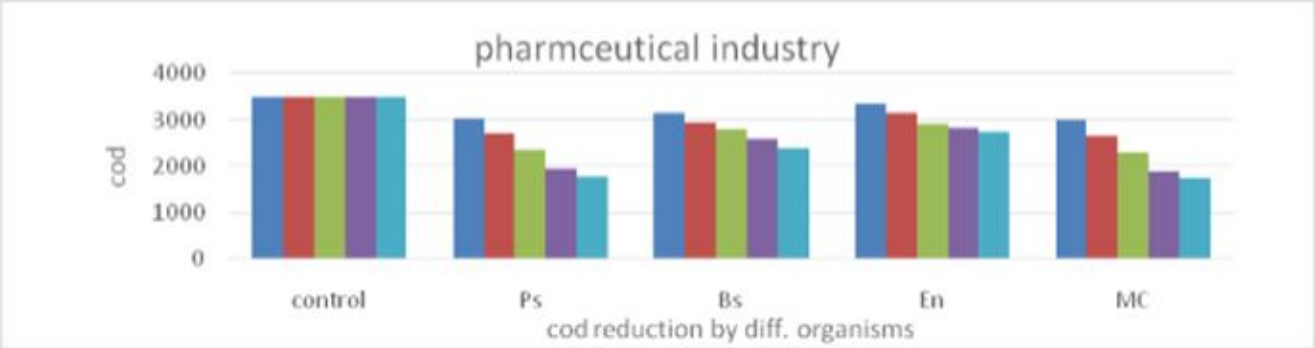
Samples	pH	Colour	Chloride	Sulphate	Bod	Cod	O&g	Nh3n	Tds	Ss	
DAIRY											
1	7.84	blackish	1890	240	744	1712	2	0.56	4092	16	ed. 22,
2	8.62	light black	1072	150	4	12	3.8	19.18	2340	22	
TEXTILE											HA ed.
3	12.09	blackish	990	570	80	275	2.8	2.82	3364	158	
4	7.54	greenish	1485	1070	211	456		31.02	5693	313	method
FOOD &FOOD											
5	8.1	greyish	608	502	110	321		29.93	2328	128	
6	5.84	light yellowish	507	123	946	1338	2.2	13.68	2230	640	pg. 5 –
PHARMACEUTICALS											
7	7.84	colourless	204	160	54	155	16.3	19.18	928	64	
8	6.98	blackish	700	237	568	5452	3.4	53.58	1780	4280	method

Chloride	Potassium chromate, AgSO4(0.014N)	Argentometric Method (APHA ed. 22, pg. 4 – 72)
Sulphate	Conditioning reagent, BaCL2, D/W	Turbidimetric method (APHA ed. 22, pg. 4-188)
Ammonical nitrogen	Alkali solution, boric acid, phenolphthalein, H2SO4(0.02N)	Ammonia distillation & titrimetric method (APHA ed. 22, pg. 4 – 110)
MICROBIAL PARAMETERS		
Total coliforms	Lauryl Tryptose Broth, Brilliants Green Bile Broth	Multiple tube fermentation method (APHA ed. 22, pg. 9 -66)
Fecal coliforms	EC Broth	Multiple tube fermentation method (APHA ed. 22, pg. 9 – 74)

Table.3 Results of cod reduction

SAMPLE		1ST DAY	15TH DAY	% REDUCTION
Pharmaceutical industry	*Pseudomonas* spp.	3096	1548	50%
	Bacillus spp.	3096	2388	24%
	Enterobactor spp.	3096	2726	18%
	MIXCULTURE	3096	1920	62%
Milk industry	*Pseudomonas* spp.	2279	878	64.75%
	Bacillus spp.	2388	1285	50.0%
	Enterobactor spp.	2365	1802	24.0%
	MIXCULTURE	2111	743	71.03%
Food industry	*Pseudomonas* spp.	1518	582	68.9%
	Bacillus spp.	1726	992	46.9%
	Enterobactor spp.	1776	1305	30.3%
	MIXCULTURE	1490	479	74.7%
Textile industry	*Pseudomonas* spp.	1843	1028	49.2%
	Bacillus spp.	1922	1435	29.0%
	Enterobactor spp.	1972	1584	26.0%
	MIXCULTURE	1827	744	63.3%

COD REDUCTION GRAPHS



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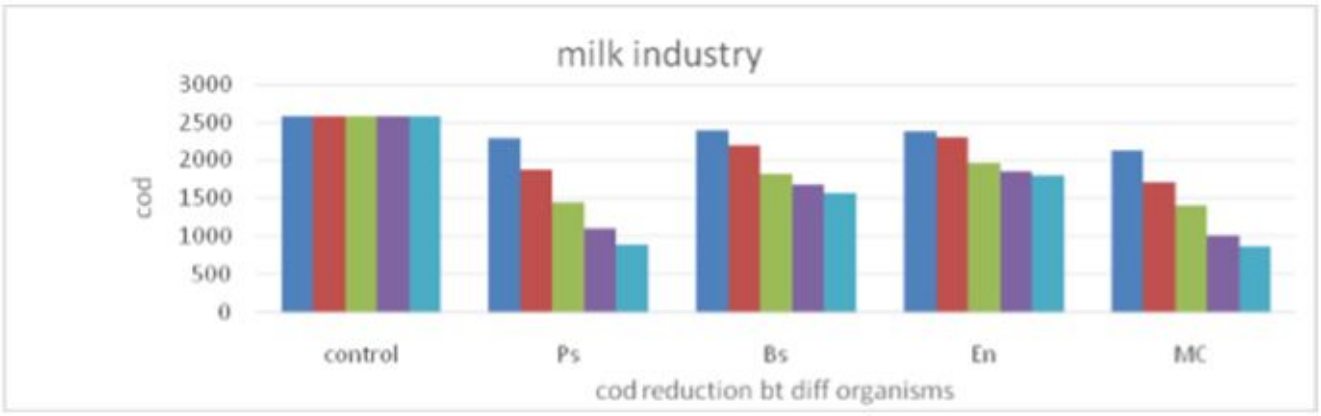
GRAPH: –Depicts that COD reduction of pharmaceutical waste water by different organisms are different such as Pseudomonas. Shows reduction during 1stday – 2 %, 3rdday – 13%, 6thday – 22 %, 9thday -32%, 12thday - 44 % ,15thday – 50%. Bacillus spp. Shows reduction during 1stday -2%, 3ndday – 10%, 6thday – 15%, 9thday

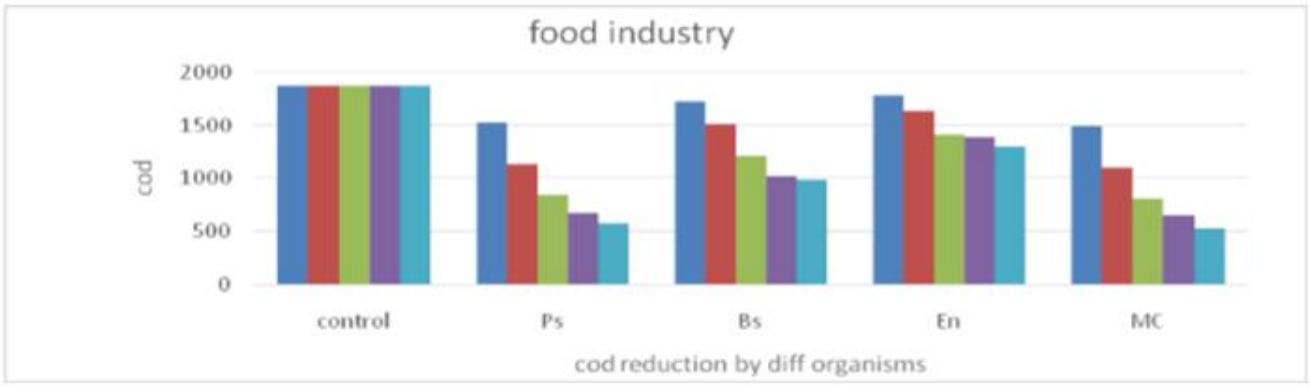
– 20% 12thday – 26, 15thday -24 %. Enterobacter spp. Shows that 1stday – 1 %, 3rdday – 4 %, 6thday – 10%,9thday – 17%, 12thday 19%,15thday – 18%. Mix culture shows during 1st day – 2%, 3rd day -13%, 6thday – 24%, 9thday -34%, 12thday -46%, 15th day – 62 %.



GRAPH: –Depicts that COD reduction of milk industrial waste water by different organisms are different such as Pseudomonas. Shows reduction during 1st day – 2 %, 3rd day – 11%, 6th day – 27 %, 9th day 44%, 12th day

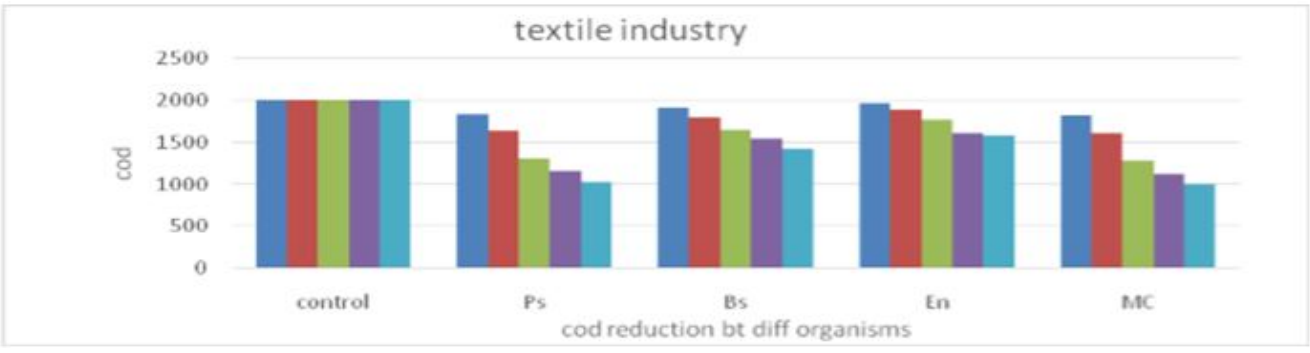
- 58 % ,15th day – 65%. Bacillus spp. Shows reduction during 1st day -2%, 3nd day – 7%, 6th day – 15%, 9th day – 30% 12th day – 35, 15th day -39 %. Enterobacter spp. Shows that 1st day – 1 %, 3rd day – 8 %, 6 th day

– 10%,9th day – 24%, 12th day 28%,15th day – 30%. Mix culture shows during 1st day – 2%, 3rd day - 18%, 6th day – 33%, 9th day -45%, 12th day -60%, 15th day – 66 %.



GRAPH: –Depicts that COD reduction of food industrial waste water by different organisms are different such as Pseudomonas. Shows reduction during 1st day – 2 %, 3rd day – 19%, 6th day – 39 %, 9th day 55%, 12th day

- 64 % ,15th day – 69%. Bacillus spp. Shows reduction during 1st day -2%, 3nd day – 8%, 6th day – 19%, 9th day – 35% 12th day – 45%, 15th day -47 %. Enterobacter spp. Shows that 1st day – 1 %, 3rd day – 5 %, 6 th day – 13%,9th day – 25%, 12th day 26%,15th day – 30%. Mix culture shows during 1st day – 2%, 3rd day - 20%, 6th day – 41%, 9th day -57%, 12th day -65%, 15th day – 72%.



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GRAPH: –Depicts that COD reduction of textile industrial waste water by different organisms are different such as Pseudomonas. Shows reduction during 1st day – 2 %, 3rd day – 9%, 6th day – 18 %, 9th day -35%, 12th day

- 42 % ,15th day – 49%. Bacillus spp. Shows reduction during 1st day -2%, 3nd day – 4%, 6th day – 10%, 9th day – 18% 12th day – 23%, 15th day -29 %. Enterobacter spp. Shows that 1st day – 1 %, 3rd day – 2 %, 6 th day – 6%,9th day – 12%, 12th day 19%,15th day – 21%. Mix culture shows during 1st day – 2%, 3rd day -9%, 6th day – 20%, 9th day -36%, 12th day -44%, 15th day – 50 %.

VII. **CONCLUSION**

The present-day study of the industrial effluent sample conclude that microorganisms are able to reduce the COD on utilization organic matter. It is clear from the study that COD content of effluents post shaking condition was reduced about 60%-70% by mix culture and individually reduced COD about 30%-50%, while Bacillus sp. And Enterobacter sp. reduces COD around 35% and 25% respectively.

It is well concluded that above used mixed culture or even individual organisms, the three bacteria, are highly effective in reducing COD and can be rigorously used at industrial level for effluent treatment.

REFERENCES

[1] Rana, R.S., Singh, P., Kandari, V., Singh, R., Dobhal, R., Gupta, S. 2014. A review on characterization and bioremediation of pharmaceutical industries' wastewater: An Indian perspective. Applied Water Sci., 1-1Editor-in-Chief Prof. S. S. Katiyar, EVERYMAN'S SCIENCE, Vol. XLVII No. 2 (June '12 – July '12)

[2] Watrous, R.M. 1947. Critical review: Health hazards of the pharmaceutical industry. British J. Industrial Med., 4(2): 111.

[3] Surti, H.S., 2016. Physico-Chemical and Microbial Analysis of Waste Water from different Industry and Cod Reduction Treatment of Industrial Waste Water by using Selective Microorganisms. Int.J.Curr.Microbiol.App.Sci. 5(6): 707-716

[4] Glassmeyer, S.T., Kolpin, D.W., Furlong, E.T., Focazio, M.J. 2008. Environmental presence and persistence of pharmaceuticals: an overview. Fate of pharmaceuticals in the environment and in water treatment systems, 3-51

[5] Imran, H. 2005. Wastewater monitoring of pharmaceutical industry: treatment and reuse options. Electron. J. Environ. Agric. Food Chem, 4(4): 994-1004.

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DESIGN AND IMPLEMENTATION OF COLOR RECOGNITION METHOD FOR INTELLIGENT VISION SYSTEMS

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ABSTRACT
Artificial intelligence has crept into almost all facets of life. Vision based decision making plays vital role in the design, development and implementation of artificial intelligence based vision guided intelligent systems. Color vision is a must in making appropriate and accurate decision. Color recognition adds value to the artificial vision systems. In this research article the authors presented a design and implementation of a cost effective color recognition method which can be a great asset to the vision guided robots, humanoids, semi or fully autonomous intelligent vehicles, vision based automation, product checking, quality management, robotic surgery, remote sensing and mapping, machine vision, and to the challenged vision of humans.

Keywords: color recognition, intelligent vision systems, bionic vision.

I. INTRODUCTION

A Robo is an intelligent vehicle. It can be autonomous or semi-autonomous. It can be blind or vision guided. Even in vision guided it can be sensor based or camera based. These Robos include Medi Robots, Industrial Robots, Agricultural Robots, Mobile Robots, Tele robots – which are used to conduct tasks in environments that are too hazardous for humans to work in, and Service Robots. As per Etymology of the word 'Robot.' It is from the word "robota" that means simply "work" "labor" or "corvée", "serf labor", and figuratively "drudgery" or "hard work" in Czech and many Slavic languages. The concept of Robot is there since 350 B.C. The brilliant Greek mathematician, Archytas ('ahr 'ky tuhs') of Tarentum builds a mechanical bird dubbed "the Pigeon" that is propelled by steam. It serves as one of history's earliest studies of flight, not to mention probably the first model airplane. Now the realization of drones with the capability of vision has become a great asset to the humanity. The global market of The global machine vision market size is expected to reach USD 18.24 billion by 2025 at a 7.7% CAGR during the forecast period, according to a new report by Grand View Research, Inc. The ability of machine vision systems to process massive amounts of information in a just a few seconds is a major factor driving the market. The quick processing ability of active [1], animated [2], machine vision systems is paving the way for manufacturers to achieve new milestones in manufacturing products with negligible defects. Moreover, increasing adoption of robots across industrial sectors is leading to application of vision-guided robotic systems. Industrial verticals, such as automotive, pharmaceutical, packaging, and food and beverage are prominent sectors where robotic systems are used, eventually fueling demand for machine vision systems. Optimization is a must for any automation [3]. The definition, evolution, importance and applications of the robotics are presented in brief in this section; and in the following sections, the definition, design, implementation of the color recognizing method, color recognizing vision guided robo(VGR), the embedding of software in the hardware, and ultimately realizing the practical Vision Guided Robo which can be modified and used in artificial vision systems is presented.

II. ARTIFICIAL VISION WITH VGR

A. VISION GUIDED ROBOTS

First, Flexibility is an increasingly high priority for many manufacturers, and the vision-guided robot (VGR) has become a powerful tool to meet this demand. Vision-guided robotic systems can be quickly adapted from one product to the next, facilitating new product introductions. VGR systems can enhance assembly, packaging, test and inspection processes, and they can perform in environments that are hazardous to humans.

B. PREFERENCE OF VGR OVER BLIND ROBOTS

The rich and powerful visual guidance instills new intelligence into modern robots. Robotic systems can not only identify and track a wide variety of parts within their visual field, but also successfully grasp them and complete most material-handling tasks. represent Vision-tracking routines are available with some robots as an integrated package that includes both hardware and software. Cameras can be connected directly to the robot controller to enable on-the-fly picking of parts or products from moving conveyors.

C. VISION GUIDED ROBOTS BENEFITS

Automates processes dealing with various products at various locations, Eliminates fixtures and therefore reduces cost, Increases reliability and efficiency through vision application [4], Greatly expands the flexibility

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of robotic systems, Vision guided robotics provides savings, Manage variation in part styles and part location , Eliminate costly precision featuring, mechanical part crowding and dunnage, Automate operations that previously required human interaction , Increases "Up-Time" and eliminates robot crashes by seeing the part on racks , and Enhances quality using basic inspection and part identification techniques.

D. VISION GUIDED ROBOTSAPPLICATIONS

Depalletizing – robot visually identifies individual products on a pallet and picks them off, Assembly – precisely locates different components and assembles them into one work piece, Inspection and quality control – vision monitors moving products on a conveyor and notifies robot to reject if a defective product is found, Automatic sortation – Robot picks products apart into separate spaces based on visual features such as shape, dimension, and color, Random bin-picking – large number of parts arrive randomly piled within a crate without separation; The robot visually locates each individual part and picks it out for sortation, Mixed-load palletizing – when incoming products have different sizes, the robot visually determines their dimensions and intelligently stacks the products on the same pallet.

III. VGR-DESIGN AND IMPLEMENTATION

Vision Guided Robotic design is mainly a creative activity which involves a rational decision making process [5]. Generally speaking, it is directed at the satisfaction of a particular need by means of a Vision Guided Robotic system, whose general configuration, performance specifications and detailed definition conform the ultimate task of the design activity. There is no unified approach or methodology to actually design a system, in so much as there does not exist a unified approach to creativity. Given a particular need, each individual designer would probably design something different. There are however, some common guidelines which can be useful in a very general way. These guidelines are variations of the so called 'design process' which is a stepwise description of the main tasks typically developed in a comprehensive design exercise.

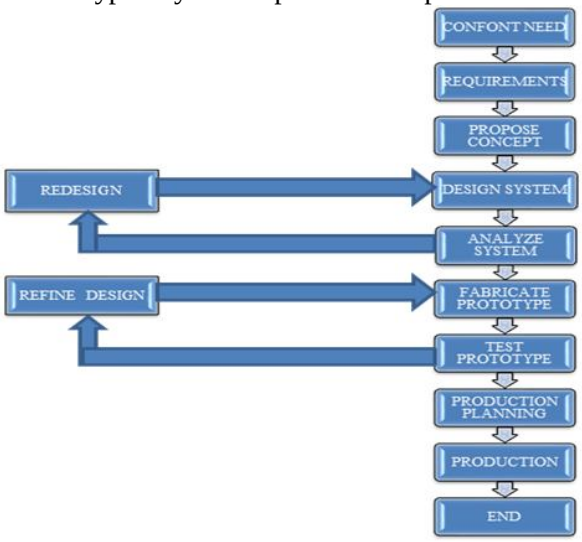

Fig-1: A sequential Design Process

The three core considerations in designing the Vision Guided Robot are - Designing A Robot System, Designing Vision Based System and Designing H/W & S/W Suitable for Application.

A. DESIGNING ROBOT SYSTEM

It is the platform for whole designing. The following aspects are essential: Desired Application and Designing a Control System. The Second part involves- defining the designing specifications and controller configuration. Design specifications include The design of control systems can be carried out in either the time domain and frequency domain. When the design is carried out in time domain ,the specifications the designer must have satisfy the following specification, for an unit step input : Maximum Overshoot, Rise Time, Peak Time and Settling Time. When the design is carried out in frequency domain analysis the design must meet following specifications: Gain margin and Phase margin. And the authors concentrated amply on Bandwidth, resonant peak, and cut-off frequency etc. after control configuration. After the controller configuration, the fundamental principle of design is to choose a controller type. The controller parameters are selected so that all the design specifications met.

B. DESIGNING VISION BASED SYSTEMS

A camera is a device that records and stores images [6], [7]. These images may be still photographs or moving images such as videos or movies. Three primary elements of a vision based robo system are shown in Fig.2.,

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Robot Vision-System to capture and process image, Robot learning-for robot manipulation and Robot Navigation-for tracking.

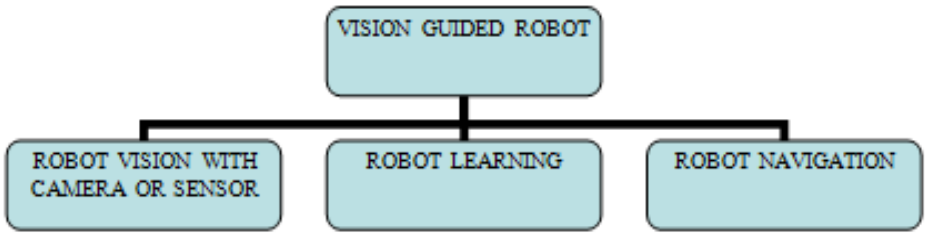

Fig-2: Steps of a VGR Design.

The authors instead of using color sensors, used an iBall Face2Face C8.0 camera, shown in Fig. 3., with 5G Wide angle lenses provides smooth video and clarity of video. And its specifications are - Image Sensor: High quality 1/4 CMOS sensor, Effective Pixels: 480K pixels (Interpolated 8M pixels still image & 4M pixels video), Video Resolution: Max. up to 2304 x 1728 pixels, Image Resolution: Max. up to 3264 x 2448 pixels Frame Rates: 30 frames per second Colour Depth: 24-Bit True Colour Interface: USB 2.0, backward compatible to USB 1.1, Focus: 5 cm to Infinity, Microphone: Built-in high sensitive microphone, Snap Shot Button: Built-in snap shot button Night Vision: 6 LED's for night vision, with brightness controller, Low Light Boost: Automatic low light boost White Balance: Auto, Auto Exposure: Auto, Auto Compensation: Auto, Auto Tracking: Auto face tracking function Zoom: 4X Digital Zoom, Video Effects: 10 photo frames and 16 special effects OS Compatibility: Windows XP / Vista & 7, Bundled Software : Driver for Windows with 10 Photo frames & 16 special effects.

Fig-3: Ball Face to Face C8.0 Camera

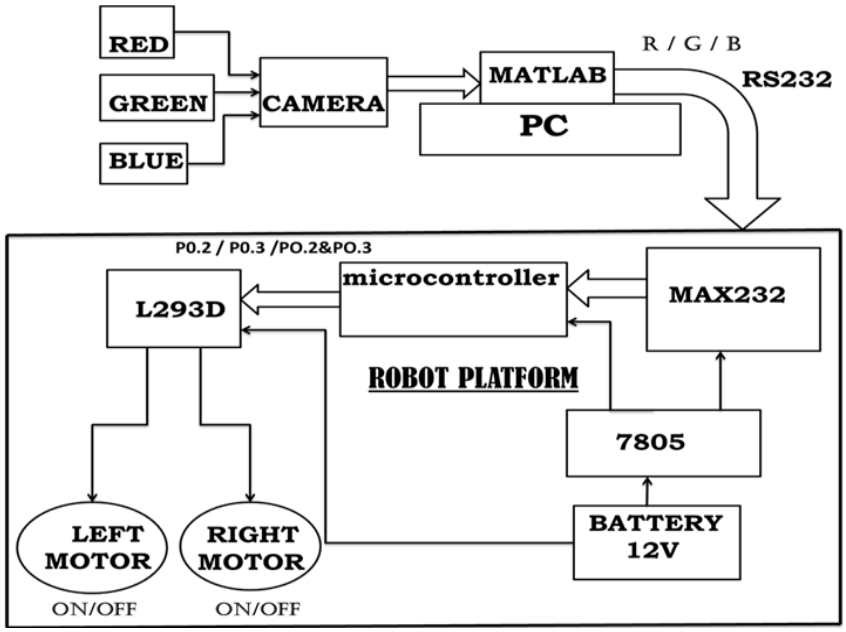

Fig-4: Block Diagram of Implemented VGR

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The Block diagram with various components and signal flow of the VGR designed and developed is shown in Fig. 4. Robo is trained to learn the primary colors and recognize them as per the predefined commands, and navigate as per the pre-defined training. The required software is embedded into the designed hardware.

IV. COLOR RECOGNITION METHOD

In the color recognition method, the essential parts are image capturing and color recognition. The authors designed and implemented a VGR which will recognize the primary colors red, green and blue. and the signal is fed to the PC where the MAT LAB program is written. It is programmed such that it can understand and follow the predefined commands. Embedded C and MATLAB languages are used for programming [8]. Camera is used to capture and store the images.

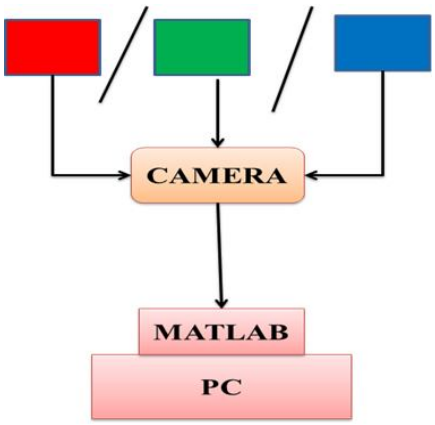

Fig-5: Recognition of Primary Colors-Flow Chart

V. RESULTS AND VERIFICATION

The Block diagram with various components and signal flow of the VGR designed and developed is shown in Fig. 4. Earlier. The color recognition method is shown in Fig. 5. The designed and developed system for primary color recognition is shown in Fig. 6., and Fig. 7.

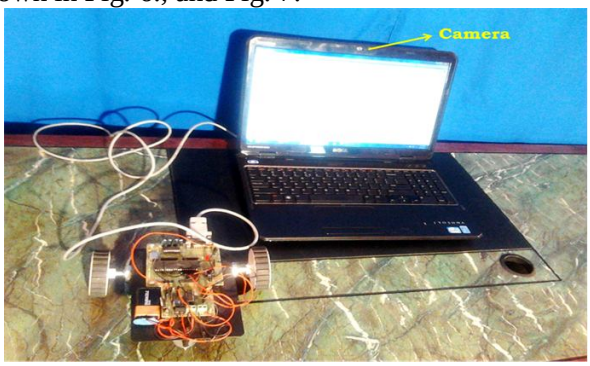

Fig-6: Implementation of Recognition of Primary Colors

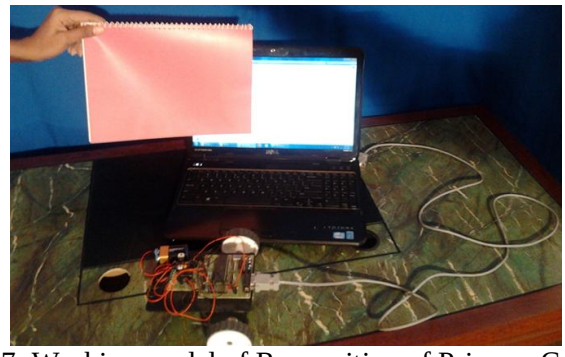

Fig-7: Working model of Recognition of Primary Colors

The VGR connected to the Laptop is shown in Fig. 6. The VGR recognizing the red color and following the predefined command of direction is shown in Fig. 7.

VI. CONCLUSION AND FUTURE WORK

From toy to the unmanned aerial vehicles (UAV), and autonomous intelligent vehicle for the blind, or self-driving vehicle for any individual; an industrial sewing machine to the laparoscopic surgery, addition of vision guided systems increases the efficiency, reliability, and flexibility of the particular system. In designing and

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implementing artificial vision system either for agricultural applications [9], machines or for human (Bionic Vision) the color recognition method developed by the authors contributes a lot.

BIBLIOGRAPHY

[1] J. Y. Aloimonos, I. Weiss, and A. Bandyopadhyay, "Active vision," Int. J.Comput. Vis., vol. 1, no. 4, pp. 333–356, 1988.

[2] D. H. Ballard, "Animate vision," Artif. Intell., vol. 48, no. 1, pp. 57–86,Feb. 1991.

[3] C. G. Broyden, "Quasi-Newton methods," in Optimization Methods in Electronics and Communications, vol. 1, Mathematical Topics in Telecommunications, K. W. Cattermole and J. J. O'Relly, Eds. New York: Wiley, 1984, pp. 105–110.

[4] T. Bucher, C. Curio, J. Edelbrunner, C. Igel, D. Kastrup, I. Leefken,G. Lorenz, A. Steinhage, and W. von Seelen, "Image processing and behavior planning for intelligent vehicles," IEEE Trans. Ind. Electron.,vol. 50, no. 1, pp. 62–75, Feb. 2003.

[5] K. S. Fu, R. C. Gonzales, and C. S. G. Lee, Robotics: Control, Sensing, Vision, and Intelligence. New York: McGraw-Hill, 1987, pp. 12–81.

[6] J. Weng, P. Cohen, and M. Herniou, "Camera calibration with distortion models and accuracy evaluation," IEEE Trans. Pattern Anal.Mach. Intell.,vol. 14, no. 10, pp. 965–980, Oct. 1992.

[7] Z. Zhang, "Flexible camera calibration by viewing a plane from unknown orientations," in Proc. Int. Conf. Comput. Vis., 1999, pp. 666–673.

[8] Camera Calibration Toolbox for Matlab. [Online]. Available: http://www.vision.caltech.edu/ bouguetj/calib_doc/

[9] Naveen P Singh and Ranjith PC, "Artificial Intelligence in agriculture issues and Prospects" Employment News, Vol.44, No.8, Pp.1,47.

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ENHANCING WORK PERFORMANCE UNDER STRESS FOR MERCHANT NAVY

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ABSTRACT
This paper aims to formulate a strategy for maximizing work performance for seafarers under stress. This paper concerns itself chiefly with seafarers in the merchant navy Based on study into the different kinds of existing job stressors, known stress factors and stress mitigation methods, this paper proposes a strategy for maximizing seafarer's work performance, at the same time drawing a distinction between reducing stress and optimizing performance.

Keywords: work performance, job stressors, optimizing performance

INTRODUCTION
Due to the isolated work environment aboard ships, it is of paramount importance for seamen to be in optimum condition at all times, such that they can respond to any emergencies on board; after all, the ship is their home. However, rules governing the way of life aboard merchant ships, such as work scheduling, are less stringent than those of naval vessels, resulting in a possible neglect of the welfare of merchant seamen. This may lead to decreased job satisfaction and mental and physical wellbeing, thus contributing to the onset of stress which further exacerbates the problem of poor performance of duties. This paper aims to find a model that would allow for the seamen's optimum performance while under stress. Stress is defined here as the psychological and physical state that is induced due to various factors, as discussed later in this paper. This state results in the person being unable to perform his duties with the usual diligence, accuracy and efficiency; in order words, the „stressed" seafarer is unable to perform to his full, optimum potential. We first identify through literature reviews and a survey of seamen in the merchant navy, the key factors that result in stress when on board. We then develop a model that reduces the incidence of stress occurring, thus indirectly reducing the instances of poor performance due to stress. As to the dealing with performance while under stress, we take into account the notion that stress may actually help certain kinds of people work better, thus being under stress actually results in optimum overall performance with respect to the ship. It must be mentioned now, though, that this paper is focused on benefiting the individual rather than the company. Optimum overall performance with respect to ship may be negative in relation to our study because of this, because the stress level of the individual concerned may be raised and is consequently detrimental to them.

OBJECTIVES OF THE PROJECT
1. To understand concept of Stress.
2. To understand the Methods to maximize performance in merchant navy.

LIMITATIONS OF THE PROJECT
The topic is so vast but due to certain limitations couldn't express in depth.

RESEARCH METHODOLOGY
Primary Data was collected from Lal Bahadur Shastri College, Shipping companies like Elegant Ship Management & Anglo Eastern.

Secondary Data http://www.tandfonline.com/doi/abs/10.1080/03088838000000018?src=recsys& https://link.springer.com/article/10.1007/s13437-015-0078-0
http://www.nus.edu.sg/nurop/2009/FoE/U058502H.PDF

CONCEPT OF STRESS
Stress as a psychological factor has been studied at length by psychologists and organizational behavior practitioners. The type of stress discussed in this paper is slightly more complicated in that it does not deal solely with organizational stress (which may be alleviated automatically in a lesser or greater extent when the individual leaves the workplace) nor does it deal solely with psychological stress (because seafarers deal with stress within the framework of an organization: they are consistently within the organizer for extended periods of time). Although it may be argued that psychological stress is the all-encompassing term for stress that is experienced, the author would like to define here, that psychological stress as mentioned in this context, refers to the stress perceived or experienced by a person as a result of his personality and/or character; that is, what Tyagi(2003) term "personal trouble". It has been recommended that the idea of "organizational stress" be

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eradicated and replaced with “occupational stressors” due to the issue of “coping” with stress being different from the issue of “dealing” with stress.

Before proposing the eradication of the idea of organizational stress, Kenny and Cooper propose in their paper, Occupational Stress and Management, the idea of occupational stress as being influenced by two factors: “personal trouble” and “public concern”. The former concerns itself with the personality of the individual, while the latter is related to the work characteristics. In this paper, we will continue using this concept to define the causes of stress in seafarers, and address the issue of work performance through these two factors. In addition, there are various factors that have a significance difference for the merchant navy when we talk about organizational stress.

METHODS TO MINIMIZE STRESS AND MAXIMIZE PERFORMANCE UNDER MERCHANT NAVY

Several ways of reducing stress have been proposed by researchers. These include among others the Brief Stress and Coping Inventory (BSCI) stress management instrument to help determine an individual’s performance and the best way to implement a work site stress management program. Several factors have been targeted as the focus in stress management programs. These include personal work standards, commitment level, personal resources, optimism and job resources. Using these factors as a basis, and including the Parker and DeCotiis model, the model proposed seeks to help determine the methods of minimizing stress in the merchant navy and consequently maximize the performance of the merchant navy when they are working under stress whether or not they are in stressful conditions. THE MERCHANT NAVY The merchant navy is unique in the sense that they are economically oriented: their sailing schedules, port stays and remuneration are based on their work performance, which in turn translates to the company‟s profits and earnings. Unlike the defence navy, where high degrees of discipline are fostered due to the bureaucratic structure, pension scheme and the general discipline of a military force, the merchant navy lacks the military discipline that makes enforcing the bureaucratic structure and high discipline required of a seaman. The modern seaman differs from the traditional seamen in that they do not receive payouts based on the amount of profit garnered on a particular trip. Instead, they receive fixed paychecks based on their rank, length of services, and other factors that the crewing department takes into account, much like the way the human resource department determines salaries and pay raises. Thus, work performance does not directly translate into higher profits. The link is vague and indirect. One can liken it to the scenario where the good is never acknowledged but the bad is broadcasted all over the world. Imagine a tanker who has made several voyages, carrying hundreds of thousands of tons of fuel over the several trips. No notice is paid to this tanker until it collides and the crew dies, or an oil spill occurs. This leads to caution on the part of the seamen for they do not wish to deal with accident reporting.

However, is this resistance sufficient to spur them on to greater work performance? Measuring work performance among the merchant navy is an extremely tedious task, because of the variety of ranks and relevant duties, in addition to there being different requirements for different kinds of ships, for example, special provisions are made for tankers as opposed to those for a container ship or passenger ship. Using the regulations and definitions as set out in the Standards of Training, Certification and Watchkeeping (STCW) provide a solution to this problem: work performance will be based on the requirements of the STCW for the particular position or duty. Optimising work performance, then, would mean achieving a level of performance close to or exceeding that specified in the STCW. STCW requirements are the bare minimum for any ship that is sailing in international waters and are governed by the International Maritime Organisation (IMO). By achieving a performance level close to or exceeding that specified, the seaman would have exceeded the minimum expectations for safety on board merchant vessels and thus indirectly ensure that the cargo is delivered intact and in keeping with the deadline as much as possible, given that sometimes ships are given schedules that are impossible to meet unless the vessel travels at the speed of an aviation vessel. Stress for merchant navy officers does not gain a new definition; stress still implies the psychological, physiological or physical elements that affect performance. While some people may feel that they “work better under stress” (stress taking on a positive, motivational role), this paper seeks to address the issues and concerns of those to whom stress is a negative, affective factor that causes disruption to their normal work, be it through psychological, physiological or physical means. Causes of stress for the seamen are similar to those of land-bound workers, except with the added factor of home-sickness and worry when problems occur at home. The seamen have a much longer response time as compared to a land-bound worker because of the former‟s relative distance from land: should the vessel be in the middle of a trade route, it will need to dock at a port before the seamen can catch a flight or other transportation modes back to their families. Non-stress -induced fatigue also affects the seamen, due to the way their job functions. While on a vessel seamen are at work 24 hours a day; should the vessel dock at a port

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and prepare for loading/unloading, several seamen may have to forfeit their sleep in order to oversee the port operations and ensure that they are aware of any emergency situations onboard.

Fatigue induces stress and stress induces fatigue. This appears to be a chicken and egg problem. The nature of the problem and the role and background of fatigue is explored in the IMO‟s amendments. Readers interested in fatigue and its role on seamen may wish to consult the IMO amendment. Other factors causing stress are listed below and will be discussed individually. Seamen are most affected by stress that are caused by psychological factors, not least because these are the factors that are least able to be resolved on board ship, whether internally by the seamen, or with external help from his crew members or the shore management. At the top of the list of these psychological factors is the notification of problems or even emergencies at home. Reaction time for seamen to family emergencies are terrifyingly long, because of the time needed for the initial message to be reach the seaman, for the seaman to notify the company of his need to sign off from the vessel and for the vessel to reach a port of call such that he is able to make his way home from there, subject to flight/train availability. While these flight issues are usually outsourced to travel agents specializing in movement of merchant navy crew, thus reducing the need to jostle for tickets with the general public, the period after receipt of the message and prior to sign off is an extremely stressful period for the seamen. We call this period the “family emergency stress” period, occurring during the presignoff stage. Seamen have to undergo constant performance evaluation by the captain of the ship.

Coupled with the conflict and tension associated with long periods of confinement with the same group of people, this is another factor for stress. Promotion and the associated pay raise is gained not just through the recommendations of the executive members of the crew (Captain, Chief Mate) but also through competency training and grading conducted through maritime academies. While the worry of passing examinations may not be a huge weight on the sailor‟s mind while at sea, the worry of not getting a good performance grade bears greatly on the sailor. We term this “grading stress”, which occurs throughout the entire period on board ship, but peaks at the initial sign-on period and the pre-signoff period. Interpersonal relationships among the crew are a source of constant stress, particularly if the seaman is unable to get along with his crew members. There has been more than one case where the seaman has left the profession for good, signing off in the middle of a voyage because of his inability to continue working under the stress imposed upon him by uncooperative and (to him) unfriendly crew members1 . As the shipping network is closely connected, especially within the same company, negative interpersonal relationships tend to be viewed with more importance because negative feedback from one set of crew has the possibility of translating into negative reception by members of another crew on another vessel which the seamen has to join. We term this “peer stress”, occurring throughout the period at sea, peaking after a few weeks into the term, where enough time has passed for friendly/unfriendly relationships to develop within the crew. A stress factor that is common to seamen and land-bound staff is the stress associated with entering a new working environment. For seamen, this occurs as often as every 6 months or less, where they sign off a vessel, take a vacation and sign onto another vessel.

Although one might argue that one tanker is much the same as another tanker, we can liken this argument to one that says the finance department in company A is much the same as another finance department in company B. Each vessel, though of the same type, has its own quirks, and each captain has a different method of management. We term this “new environment stress”, occurring only during the initial weeks of joining ship.

Physiological factors causing stress are just as difficult to deal with as psychological factors because there is little or no way of improving environmental conditions to mitigate this form of stress: the crew of a container ship sailing through the waters near Alaska cannot simply turn off the refrigerant element of the gigantic freezer in which they find themselves. In the same way, the crew of ships sailing through the middle of an ocean on a hot, humid day can only have the air conditioner turned up to that level; they are still subject to the mercy of the sun overhead and the reflected heat from the ocean waters, while trapped in their standard uniforms. 1 Mani’s case Another instance of stress occurs during the loading/unloading of cargo at ports, where everyone is required to be present whether or not he has been on watch before the actual unloading period. This contributes to a lack of sleep and consequently fatigue. There is no doubt other factors exist that contribute to the stress experienced by seamen. However, we deal only with the factors mentioned above when we attempt to optimise the work performance of seamen under this form of stress. Understanding the role of job stress helps us identify the possible methods that can be used to optimise work performance. In the same way, the Stress Distribution Wheel below attempts to let the reader see the relationship between the five key areas and the method selected to deal with the stress problem. Stress sources can be differentiated between the physiological and psychological sources. In this paper, we concentrate on psycho and physiological methods of alleviating stress

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such that work performance can be optimized. Understanding the different methods allow us to know how we will use it for each part, as well as their role in the Stress Distribution Wheel (SDW).

CONCLUSION

Unfavourable working conditions onboard ships have led to dwindling interest in the seafaring profession among inhabitants of OECD countries as it is negatively affecting the attraction and recruitment of young people into the seafaring career. To attract young people into the maritime industry, there is a need for improvement in working conditions onboard ships in order to meet the expectations of the current generation of jobseekers. This should practically focus on the following areas: reducing long duty periods at sea and proportionately matching it with vacation periods without resorting to reduced salary, improving internet access, improving accommodation onboard, encouraging and increasing female presence onboard ships as well enhancing job security through improved social security initiatives. Working conditions at sea onboard ships may conflict with the expectations of seafarers and reasons why people take up a career in seafaring. Thus, shipping industry employers need to know the kind of people they are recruiting in order to effectively manage their expectations, and this requires a thorough understanding of the reasons and factors influencing people to enter into seafaring. Thus, improving working conditions onboard ships is essentially paramount for the retention of ship officers at sea.

To further obtain a clearer understanding of how the identified factors individually and collectively impact on the movement of seafarers from ships to landside jobs, future research must be aimed collecting empirical data on the predictive power of the identified factors through a web-based survey of seafarers. Given that seafarers are usually working far away from home, mail surveys may not be effective as web-based survey since most of them are now able to access internet connections onboard ship. Furthermore, industry interviews could be conducted for managers of seafarers to collect qualitative data to help articulate the range of retention issues and adequately explain the attrition process among seafarers.

REFERENCES

1. Singh, A.K., and Awasthi (in press), "Work-life Balance: Causes, Consequences and Interventions,"National HRD Network Journal.
2. Srikant, A and Tyagi, A. (2007), "Attrition Management in Merchant Navy" HRM Review, pp. 64-67.
3. Surana, S. and Singh, A.K. (2007), "Development and Factor Analysis of Job Burnout in the Indian Context"
4. Jailakshmi & Dr. Aditya gautam (2017) "Work life balance of bank employees related to age, gender and marital status" (2017)
5. Dr. Narayan Kayarkatte (2011), "Work-life Balance-Dilemma of Indian Bank Manager", The Journal of Indian Institute of Banking & Finance, April- June, pp. 20-24.
6. K.K Muthu. D. MA (2003), "Executive Stress". News Vol.25.
7. Mukherjee (2009), "HR Issues & Challenges in Indian Banking Sector", HRM Review, pp. 21-25.
8. Subha Imtiaz & Shakil Ahmad (2009), "Impact of Stress on Employee Productivity, Performance and Turnover; An Important Managerial Issue", International Review of Business Research Papers, Vol. 5, pp. 468-477.
9. Y.P.S. Kanwar, A.K. Singh and A. D. Kodwani, (2009), "work-life balance and burnout as predictors of job satisfaction in the IT-ITES industry", Vision-The Journal of Business Perspective, Vol. 13, No. 2, pp. 2-9.
10. The Shipping man ; Author Matthew Mccleery; Edition June 2002
11. Subha Imtiaz & Shakil Ahmad (2009), "Impact of Stress on Employee Productivity, Performance and Turnover; An Important Managerial Issue", International Review of Business Research Papers, Vol. 5, pp. 468-477.
12. Y.P.S. Kanwar, A.K. Singh and A. D. Kodwani, (2009), "work-life balance and burnout as predictors of job satisfaction in the Shipping industry", Vision-The Journal of Business Perspective, Vol. 13, No. 2, pp. 2-9.

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IMPLEMENTATION OF IOT BASED PLC IN SMART RELAYING APPLICATIONS

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ABSTRACT
This paper examines the use of Programming Logic Control in smart relaying techniques. With PLC's having firm-footed use in industrial automation, its application is also being extended to the power sector where protective devices like relays play a crucial role in maintaining stability keeping damages due to hazardous voltages or currents at bay as well as executing an operation after a certain time. For the presentation of this idea, a Solid State Time Delay Relay as well as an instantaneous relay has been considered as the execution of an operation will follow after a specific interval while instantaneous relay would immediately be triggered if a certain defined parameter reaches its rated value. The event being protection of an industrial motor from overheating. Further, the incorporation of the Internet of Things (IoT) will viably result in real time data acquisition, data processing and system control.

Keywords: PLC; IoT; Automation; smart relaying; ladder diagram

1 INTRODUCTION

Today, in the era of omnipresent technology, the introduction to automation has- in both obvious and latent capacities- become a big part of our collective lives. Machines have been a significant part of human reality for a long time. However, it was the industrial revolution that marked a major breakthrough in the adoption of automated machines or robots. Since the introduction of automation, work has been significantly shared between man and machine. A PLC is one such control technique. However, its use is not just limited to the industrial sector. It has extended its applications in electric power systems also. Hence, a programmable logic controller (PLC) can be defined as a small, modular solid state computer with customized instructions for performing a particular task [1]. Under the IEC 61131-3 standard, PLCs can be programmed using standards-based programming languages. The most commonly used programming language is Ladder diagram (LD) also known as Ladder logic. It uses Contact-Coil logic to make programs like an electrical control diagram. A graphical programming notation called Sequential Function Charts is available on certain programmable controllers. IEC 61131-3 currently defines five programming languages for programmable Control systems: function block diagram (FBD), ladder diagram (LD), structured text (ST; comparable to the Pascal programming language)), instruction list (IL; tantamount to assembly language), and sequential function chart (SFC) [2]. These strategies underline coherent association of process control activities. The different logic symbols are shown in Figure 1.

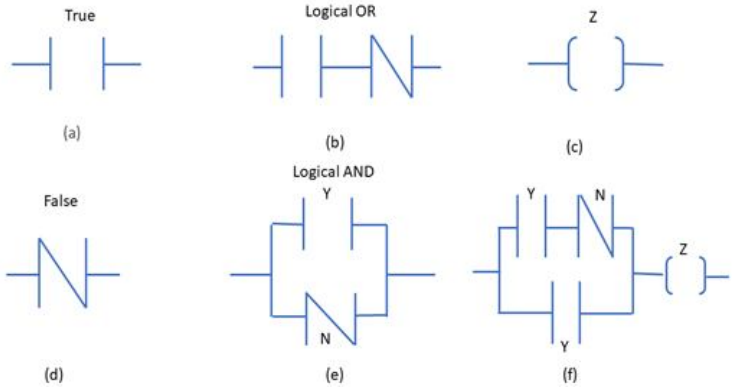

Figure-1: PLC Logic Gates

1.1 TIME DELAY RELAY

A solid state timer relay is ideal for direct control of a wide assortment of resistive and inductive loads, such as solenoids, motors, heaters, lights, etc., thus mitigating the requirement for interfacing relays. Available timing functions encompasses the popular ON Delay (Delay on Make), OFF Delay (Delay on Break), Single Shot and Repeat Cycle, in addition to other common functions [3]. Packaged solid-state relays use power electronic devices viz. thyristors and transistors, to switch currents up to around a hundred amperes. As there are no physical contacts that would be worn out with faster switching speeds, Solid State Relays are advantageous compared to the conventional electromechanical relay [4].

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Off-delay timers are triggered when the input voltage is applied. This energises the output which must be removed for the time delay to start. At the end of the delay period, the output gets de-energized. In the event that the trigger is applied amid the delay, it will reset [5].

1.2 INSTANTANEOUS RELAY

An instantaneous relay has no intentional time delay. To be specific, in an ideal case there should be no time required to operate the relay. In spite of the fact that there is some time delay which can't be nullified. As the current coil is an inductor, there would be a certain delay to reach the current in the coil to its maximum value. There is also some time required for mechanical movement plunger in the relay. These time delays are intrinsic in the instantaneous relays, yet no other time delay is purposefully included. They can be operated under 0.1 seconds [6].

1.3 INTEGRATION OF IOT WITH PLC

The Internet of Things (IoT) is simply the existence of an entity in cyberspace. IoT solutions implement a three tier architecture employing constrained devices, Smart de- vices/gateways, and IoT platforms as shown in Figure 2.

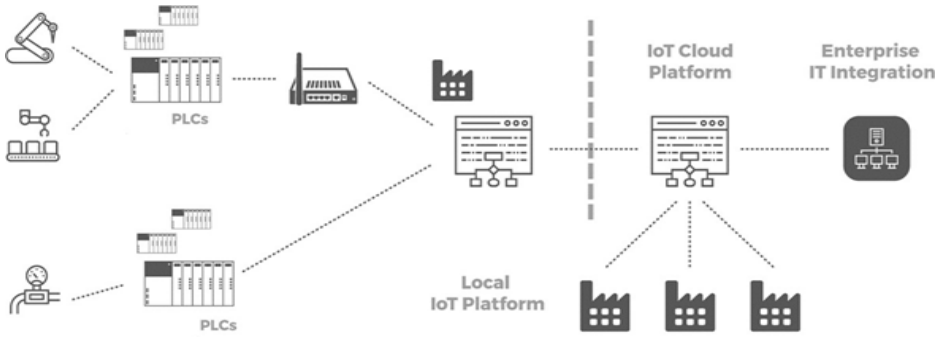

Figure-2: Sample integration of IoT architecture with PLC [7]

The manner in which a PLC exposes its inputs and outputs (sensors and actuators) to external hardware and software plays a vital role. The communication interfaces can be either wired or wireless. Any new system functionality that involves networking should be kept completely isolated from a PLC's core control loop as the external network communication is unsuitable for involvement in driving real-time controls owing to its non-deterministic nature. It should also be independent of the vendor which means that the module should work with any manufacturer given the specifications remain the same. Besides compatibility, data security is also a key factor [8].

2 METHODOLOGY

The setup involves a PLC, a time delay relay and a 5HP DC series motor. The motor's temperature rise results from the heat generated due to losses. If the motor prolongs its operation with an appreciable amount of temperature rise, the motor coils may be prone to damage with degradation in the motor's insulation [9]. In order to prevent this, the time delay relay equipped with a digital temperature sensor is used which senses the motor body temperature and compares it with a reference value based on the motor specifications and generates an output voltage which is then sensed by the relay and the action is triggered accordingly. On the basis of thermal modeling, the equation of temperature rise of the motor is given as:

$$\theta = \theta_{\mathrm{f}} - \left(\theta_{f} - \theta_{1}\right)e^{\frac{-t}{T}} \qquad (1)$$

Where,

θ_{f} = Final Temperature

θ_{1} = Initial Temperature

T = Heating Time Constant

If the motor is disconnected from the supply, there will be no losses taking place and so the final temperature reached will be the same as that of the ambient temperature [10, 11].

Hence,

$$\theta = \theta_{0}e^{\frac{-t}{T}} \qquad (2)$$

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As time ***t*** reaches ***T***, reaches to 63.33% of where ***T*** is approximated 90 minutes for motors up to 20 HP under normal operation. By setting the time delay of nearly the value of the time constant, the relay can be operated in this zone to enable the operation of the cooling fan. However, if the temperature still exceeds the rated limit, the instantaneous relay is triggered and the motor is shut down.

Likewise, there would be multiple number of such motors running in a shop floor. A cloud IoT platform based central server links all the motors with each having its own PLC with an inbuilt data acquisition system. Interfacing can be done bilaterally by exchanging analyzed data from the cloud to the production control. This continuous data communication enables a closed loop control for plant optimisation [12]. Figure 3 shows a schematic diagram of how multiple machinery can be controlled from a single cloud platform. The control process can be understood by the ladder diagram shown in Figure 4.

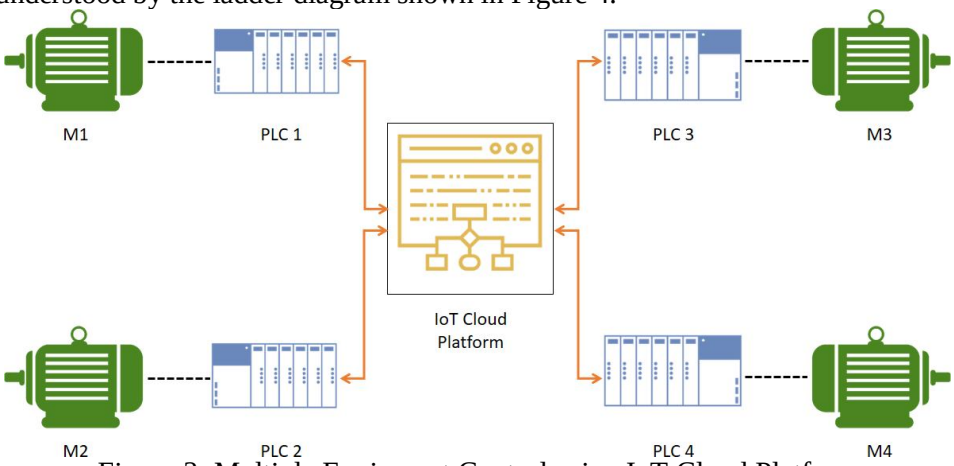

Figure-3: Multiple Equipment Control using IoT Cloud Platform

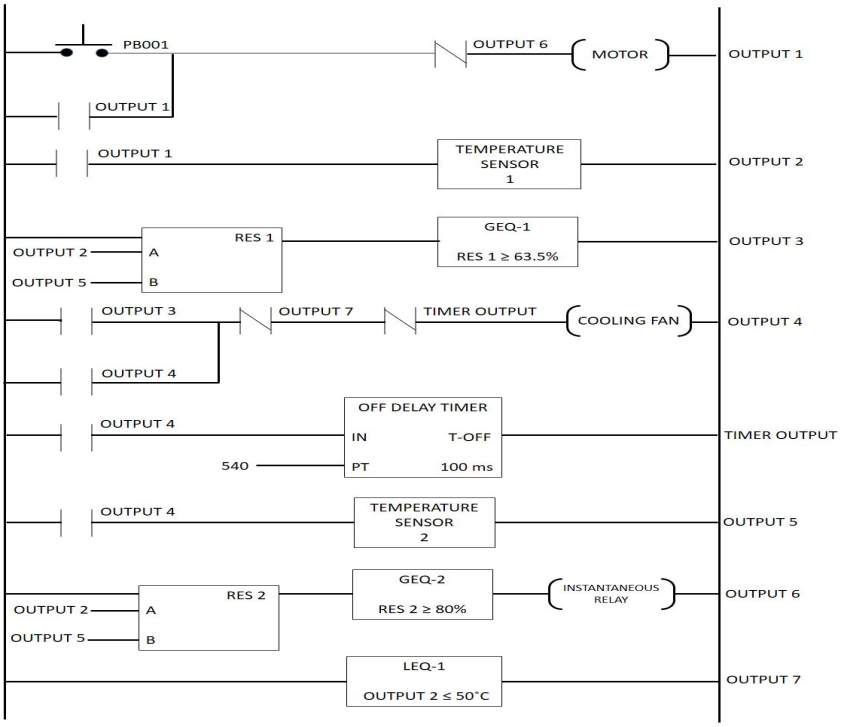

Figure-4: Equipment Overheating represented by Ladder Diagram

3 DISCUSSION

The equipment is equipped with a starter. As soon as Push Button PB001 is pressed, the switch OUTPUT 1 which is normally open is closed and supply is bridged between the equipment and the power source. The temperature sensor senses the body temperature and if the temperature rises to 63.5 % of the rated value as per the machine specification, the cooling fan turns on and simultaneously the off timer relay is enabled which allows the cooling fan to run for 90 minutes as preset in the timer configuration. However, it may happen that in spite of turning the cooling fan ON, the body temperature exceeds the rated value, then the Instantaneous relay will be triggered and the normally closed contact switch OUTPUT 6 will open thereby disconnecting the equipment from the supply thus preventing damage.

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4 CONCLUSIONS

In modern times controlling multiple processes can be a cumbersome task. With the help of intelligent control methods and integrating cyber- physical systems there is an appreciable saving of time and resources. The aforementioned procedure gives an idea about how PLC's can handle complex controls easily.

REFERENCES

[1] Park C.K, Kang JM, Choi MJ, Hong JWK, hun Lim Y, Ju S, suk Choi M. Definition of common PLC MIB and design of MIB mapper for multi-vendor PLC network management. IEEE International Symposium on Power Line Communications and Its Applications. 2008; 152–157.

[2] Patel J. PLC (Programmable Logic Controller) Based Automatic Bottle Filling. International Journal of Engineering Research and General Science 2015; 3(3):136–144.

[3] Kadah AS, Andrew S. Solid state/electromechanical hybrid relay. U.S. Patent 1997; 5699218.

[4] Jones FB, Nguyen NB, Laurandeau L, Westinghouse Electric Corp. Modular solid state relay. U.S. Patent 1995; 5463252.

[5] Majhi S. Relay based identification of processes with time delay. Journal of Process Control 2007; 17(2):93-101.

[6] Lee N, Wang C. Aligned interference neutralization and the degrees of freedom of the two-user wireless networks with an instantaneous relay. IEEE Transactions on Communications 2013; 61(9):3611–3619.

[7] Open Source Software for Industry 4.0, IOT ECLIPSE. https://iot.eclipse.org/white-papers/industry40; Last Accessed: 2019/05/15.

[8] What You Need to Know About PLC Programming in the Age of IoT. https://blog.temboo.com/plc-programming-for-iot-systems; Last Accessed: 2019/05/15.

[9] Venkataraman B, Godsey B, Premerlani W, Shulman E, Thaku M, Midence R. Fundamentals of a motor thermal model and its applications in motor protection. 58th Annual Conference for Protective Relay Engineers 2005; 127–144.

[10] Leonhard W. Control of electrical drives. Springer Science & Business Media 2001.

[11] Kissinger HE. Variation of peak temperature with heating rate in differential thermal analysis. Journal of research of the National Bureau of Standards 1956; 57(4):217–221.

[12] Zhang Y, Zhang G, Wang J, Sun S, Si S, Yang T. Real-time information capturing and integration framework of the internet of manufacturing things. International Journal of Computer Integrated Manufacturing 2015; 28(8):811-822.

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SUSTAINABLE FOOD SECURITY FOR TRIBAL AND OTHER COMMUNITIES OF JHARKHAND THROUGH WILD LEAFY VEGETABLES

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ABSTRACT
Weeds are integral part of the wilderness of forests and waste lands. Jharkhand is blessed with the availability of wide variety of edible leafy weeds which are consumed by the local tribal and other communities. These edible leafy vegetables are available in abundance on marshy border habitat of ponds, watersides of crop fields, its border areas, waste land, and cultivated land. Many of these edible leafy weeds are seasonal weeds and are the primary source of food and nutrition to the local inhabitants as well as for the fringe villages of the forests. Jharkhand state as the name suggests is a 'territory of forests' primarily moist and deciduous forests having a very rich biodiversity. Thus, biodiversity plays a significant role in providing food and nutritional security to the local tribal and other communities. The present study inventories' natural edible leafy weeds of the Jharkhand specifically with respect to their seasonal availability, use, and traditional knowledge regarding their mode of consumption. The diversity of wild leafy vegetables found in Jharkhand covers 105 species of 77 genera and 48 families. A food security calendar of their yearlong availability in one or other form has also been prepared.

Keywords: Food security, Wild Leafy vegetable, traditional knowledge, Food security calendar.

INTRODUCTION
Wild Leafy Vegetables are herbs, shrubs, or trees origin where leaf is the edible part and they grow naturally as weeds [1]. Most of the tribal and other forest dwelling communities do not have enough food to meet their daily requirements and thus are facing deficiency in one or more nutrients. [2,3]. Since ancient periods wild leafy vegetables are consumed as source of nutritious food as they contain many nutrients and minerals which are helpful in maintaining human health [4]. While the economic value of "hidden" harvests can vary, these foods also make significant and consistent contributions to livelihoods [5–8]. The aim of this study is to utilize traditional knowledge for enlisting WLVs of Jharkhand, which are eaten by the local inhabitants, with their habit, habitat, seasonal availability and mode of consumption. Wild leafy vegetables are of great value for many different reasons. These wild vegetables have a great cultural importance, they are very well adapted to the environment in which they grow by their own and they have significantly high nutritional value being richer in protein, iron and other minerals and vitamins in respect to the cultivated vegetable varieties commonly eaten by the locals [1,9,10,11]. Despite these advantages, most traditional plant foods are generally uncultivated and underutilized [12, 13]. This study is structured to make an inventory of all the wild leafy vegetables consumed by the local communities of Jharkhand with the data on diversity, traditional knowledge regarding seasonal abundance, economic potential, and conservation value. A yearlong consumption calendar would help in planning of their sustainable utilization through in-situ conservation and ex-situ cultivation possibility.

MATERIAL & METHODS
Study Area –
Jharkhand has an area of 79,714 km2 which constitutes 2.42% of the geographical area of India with 24 districts (**Fig 1**). The population of the state is 32.98 million (Census, 2011) which constitutes 2.72% of the country's population. The study area of Jharkhand State lies between latitude 22°00' and 24°37' N and longitude 83°15' and 87°01' E. Jharkhand being a newly formed state (28th) of India is characterized by thirty different tribes inhabiting the region and accounting for 27.66% of total population with the recorded forest area of the state 29.61% of its geographical area.

The study covered 120 villages of Jharkhand, 5 forest fringe villages from each of the 24 districts and 600 families of Jharkhand. In each village, 5 families were randomly selected from different tribal groups including at least one family from local community other than tribal.

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Data collection and Preparation of Inventory of Wild edible leafy vegetables

For the collection of data, a combination of tools and techniques such as questionnaire, PRA, focused group interviews, discussions and available literatures were utilized. All the information collected during field work was authenticated by repeated verification of data from different informants and in different areas at different times. Only the specific and reliable information cross checked with many informants have been incorporated in the study.

Since the availability of wild edible leaves extend throughout the year for one or other species; therefore a time to time visit to at least one major local market where the leaves are sold was also done so that seasonal availability and their quantum can be assessed. Data were collected about the habits and habitats of the plants, method of the collection of edible leaves, method of consumption and storage of such leaves, and also about their method of use.

RESULTS

An inventory of 105 wild edible leafy vegetable plant species belonging to 77 genera and 48 families was prepared. The list of wild edible leafy vegetable plant species with botanical name, vernacular names, family, habit, habitat, and mode of consumption is arranged in alphabetical order (**Table 1**). Photographs of all the species are given in **Fig 6**.Family wise number of wild leafy vegetables has been depicted through Radar diagram in **Figure 2**. Out of 48 families, Amaranthaceae has maximum 10 plant species, Polygonaceae with 6, Asteraceae and Scrophulariaceae each with 5 plant species and Fabaceae with 4 plant species tops the list.

Their growth habit includes tree, herb, shrub, and climber. Herbaceous plants make up the highest proportion of edible plants with 80 species (76.19 %), followed by trees with 12 species (11.43 %), climbers with 10 species (9.52%) and shrub with 3 species (2.86%). Composition of wild leafy vegetables in Jharkhand is given in **Fig 3**.

The study also reveals that out of the 105 species, 90 species are Dicotyledons, 10 species Monocotyledons and 5 species are Pteridophytes. Abstract of wild leafy vegetables is given in **Fig 4**.

Various ethnic communities have different preferences and modes of consumption of these wild leafy vegetables. Most of the vegetables are cooked before eating but their frequency of use varies from place to place and from one community to other depending upon the availability, preference in taste and food habit. Use of one or more vegetable is commonly part of the local meal. The fresh and tender leaves of some tree species like *Tamarindus indica* (Imli) and *Schleichera trijuga* (Kusum) are used by some of the tribal and other forest communities as vegetables. Kusum leaves are dried and powdered to be used mixing with the rice water (Manr) for enhancing taste and flavor.

The availability of wild leafy vegetables varies in different seasons. On the basis of availability, a yearlong availability calendar has been prepared which is depicted in **Fig. 5**. The calendar makes it clear that the rainy season and the period just after the rains is the best period as far as the abundance of such WLVs is concerned. Winter season is also a good season but with the rise in temperature the availability diminishes from February to June during which minimum species of WLVs are available.

DISCUSSION

In the state of Jharkhand, agricultural practices do not provide sufficient food to local people and therefore they are primarily dependent on natural food resources [14]. These foods do not necessarily require access to agricultural seeds, technological inputs, fertilizers or pesticides. The supply-side of wild food hinges on a different set of factors and production knowledge that influences availability such as seasonality, weather, harvesting or gathering and most importantly access to the forest [15].

The villagers consume these leafy vegetables as food but with the experience of generations, they developed the knowledge of medicinal value of such wild vegetables. These properties of leafy vegetables not only nourish them but also keep the tribal healthy and fit for hardworking labor throughout the day [16]. Much of the food security literature describes wild food consumption as a coping mechanism or adaptive strategy for increased household security when times are bad [17–19]. It is a proven fact that gathering and consumption of wild foods as a reliable option in general and at times of crisis caused due to environmental calamity or economic reasons in particular when social or economic access to food at the market has been compromised. This narrative regarding wild leafy vegetables seems more likely in rural areas where there is greater access to and reliance on the surrounding environment for gathering wild foods.

The attempt to enhance the food production and consumption are getting undermined by ever growing population and increasing demand of resources. This is going to be a threat for the very survival of living beings in the days to come. Traditional knowledge of utilizing natural leafy weed as major source of nutritious and

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healthy food without any significant cost will pave the way for their in-situ conservation through non destructive harvesting and possibility of ex-situ low cost cultivation. In a fight against the hunger and malnutrition in a state like Jharkhand, indigenous wild leafy vegetables can play an important role in future. These are important sources of proteins, minerals, micronutrients and vitamins. These hitherto under - utilized vegetables can transform the nutrition and health scenario in the tribal state of Jharkhand if a planned approach is designed to enhance the production and consumption of these wild leafy vegetables. Day to day increase in biotic pressure and subsequent increase in deforestation and environmental degradation, the change in landscape is inevitable in an economy in transition like India [20] and this is bound to present a challenge to the maintenance of environmental biodiversity, generation of livelihoods, and increase in agricultural production.

CONCLUSION

Wild leafy vegetables play a very significant role in supplementing the nutritional needs of the tribal population and other local communities in Jharkhand and thus provide food security to a great extent. Since wild leafy vegetables are generally more nutritious than cabbage and many other conventional vegetables, these two sources of essential nutrients is used together by the ethnic communities, even during the periods of relative abundance of conventional vegetables. WLVs are the nature's gift to the inhabitants of forests to fulfill their nutrition requirements. Though the availability of these foods relies on seasons, weather, and access to the surrounding tropical forest, many local communities continue to believe that the accessibility of wild foods is necessary for the preparation of routine meals.

Besides, these medicines have great medicinal potential known to local people as traditional knowledge passed from one generation to another. The findings of present study validates that the yearlong availability of wild leafy vegetables, as availability of calendar depicts, ensures its linkage with the poverty and socio-economic condition of the tribal and local communities in the entire state of Jharkhand . These are also some source of earning for them as they collect these wild leaves and after meeting their requirements, sell them in the local markets. For ex-situ cultivation, for many of such WLVs cultivated lands may prove to be more suitable for growth and development because many seasonal vegetables comes up in cultivated crop land .This is an indication that their availability could be enhanced by cultural practices associated with crop management. Hence, wild leafy vegetables may be amenable to domestication, and can be transformed into future potential crops that currently exist as weeds of conventional crops.

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REFERENCES

1. Sundriyal M, Sundriyal RC. Wild edible plants of the Sikkim Himalaya: Nutritive values of selected species. Economic Botany, 2001; 55(3): 377-390.
2. Food & Agricultural Organization of the United Nations. The state of food insecurity in the world, monitoring the progress towards the world food summit 2nd millennium development goals. Annual report, Rome, 2004.
3. Ogle B M , Grivetti L . Value of traditional foods in meeting macro and micro nutrient needs : the wild plant connection. Nutrition Research Reviews, 2000; 1331: 46.
4. Gupta K, Barat GK, Wagle DS, Chawla HKL. Nutrient contents and anti-nutritional factors in conventional and non-conventional vegetables. Food Chemistry, 1985; 31: 105-111.
5. Tieguhong JC, Ndoye O, Vantomme P, Grouwels S, Zwolinski J, Masuch J. Coping with Crisis in Central Africa: enhanced role for non-wood forest products. Unasylva, 2009**;** *223*: 49–54.
6. Malleson R, Asaha S, Sunderland T, Burnham P, Egot M, Obeng-okrah K, Ukpe I, Miles W. A Methodology for Assessing Rural Livelihood Strategies in West/Central Africa: Lessons from the Field. Ecol. Environ. Anthropol, 2008**;** 4: 1–12.
7. Oyono R, Blaise M, Kombo S. Beyond the Decade of Policy and Community Euphoria: The State of Livelihoods under New Local Rights to Forest in Rural Cameroon. Conservat. Soc.**,** 2012; *10*:173–181.
8. Scoones I, Melnyk M, Pretty JN. The Hidden Harvest: Wild Foods and Agricultural Systems .A Literature Review and Annotated Bibliography; International Institute for Environment and Development: London, UK, 1992.
9. Nordeide MB, Hatloy A, Folling M, Lied E, Oshoug A. Nutrient composition and nutritional importance of green leaves and wild foods in an agricultural district, Koutiala, in Southern Mali. Int J Food Sci Nutr, 1996; 47(6):455-468.

ISSN 2394 - 7780

10. Shackleton SE, Dzerefos CM, Shackleton CM, Mathabala FR. Use and trading of wild edible herbs in central lowveld savannah region, South Africa. Economic Botany, 1998 ; 52:251-259.
11. Orech FO, Aagaard-Hansen J, Friis H. Ethno-ecology of traditional leafy vegetables of the Luo people of Bondo district, western Kenya. Int J Food Sci Nutr, 2007; 58(7):522-530.
12. Kunwar RM, Nepal BK, Kshhetri HB, Rai SK, Bussmann RW. Ethno-medicine in Himalaya: a case study from Dolpa, Humla, Jumla and Mustang districts of Nepal. Journal of Ethnobiology and Ethnomedicine, 2006; 2:27.
13. Grivetti LE, Ogle BM. Value of traditional foods in meeting macro- and micro-nutrient needs: the wild plant connection. Nutrition Research Reviews, 2000; 13:31-46.
14. Singh LR. Food security through Wild Leafy Vegetables in Chotanagpur Plateau, Jharkhand. International Journal of Research in Environmental Science and Technology, 2014; 4(4):14-118.
15. Koppert GJA, Dounias E, Froment A, Pasquet P. Food Consumption in three forest populations of the Southern coastal area of Cameroon: Yassa, Mvae, Bakola. In Tropical Forests, People and Food: Biocultural interactions and applications to development; Hladik CM, Hladik A, Linares OF, Pagezy H, Semple A, Hadley S, Eds. ; The Parthenon Publishing Group: Paris, France, 1993; pp. 295–310.
16. Reddy B Mallesh. Wild edible plants of Chandrapur district, Maharashtra, India. Ind J Nat Prod Resources, 2012; 3(1): 110-117.
17. Compton J, Wiggins S, Keats S. Impact of the Global Food Crisis on the Poor: What Is the Evidence? UKAID: London, UK, 2010.
18. Institute of Development Studies. Accounts of Crisis: Poor People's Experiences of the Food, Fuel and Financial Crises in Five Countries; Hossain N, Ebyen R Eds; Institute of Development Studies: London, UK, 2009.
19. Corbett J. Famine and Household Coping Strategies. World Dev., 1988; 16: 1099–1112.
20. Hassan R, Scholes R, and Ash N, 2005. Ecosystems and human well-being: Current state and trends: Findings of the condition and trends working group of the millennium ecosystemassessment,2005.http://www.millenniumassessment.org/documents/document.766.aspx.pdf .

FIGURE AND TABLES

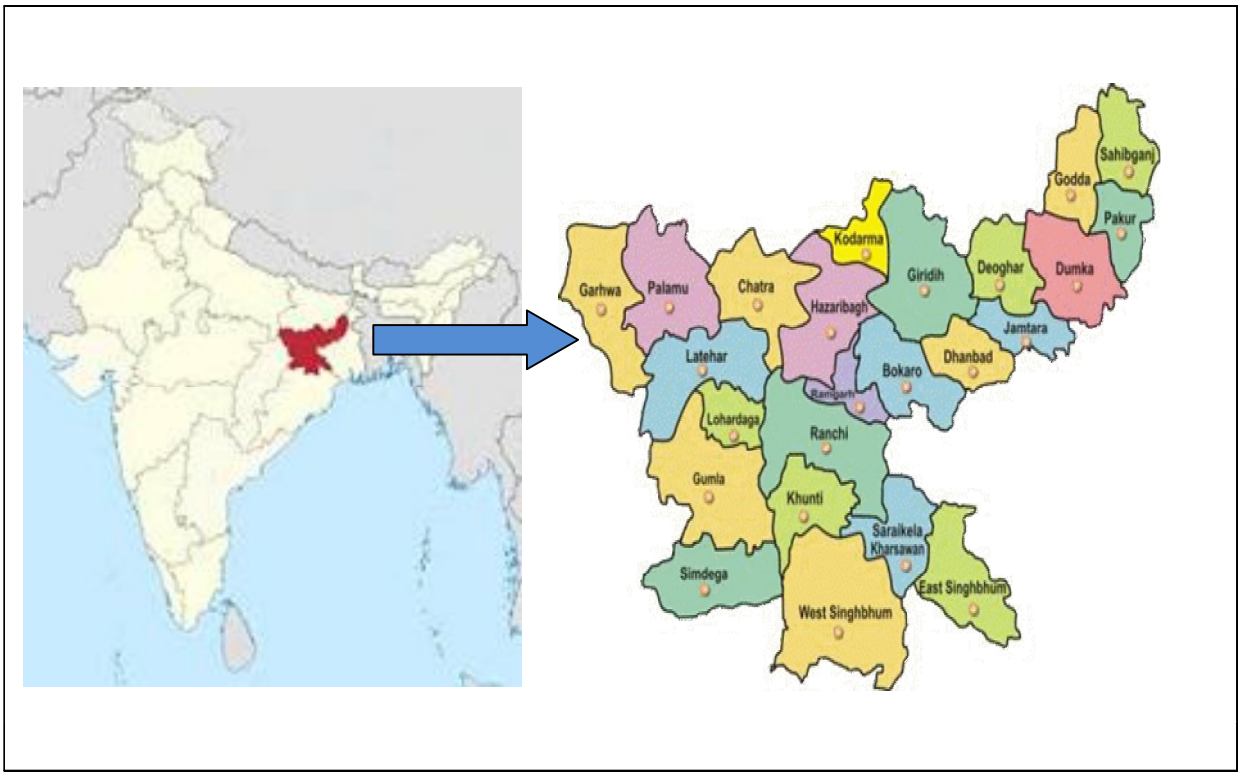

Fig-1: Map of Study of Area

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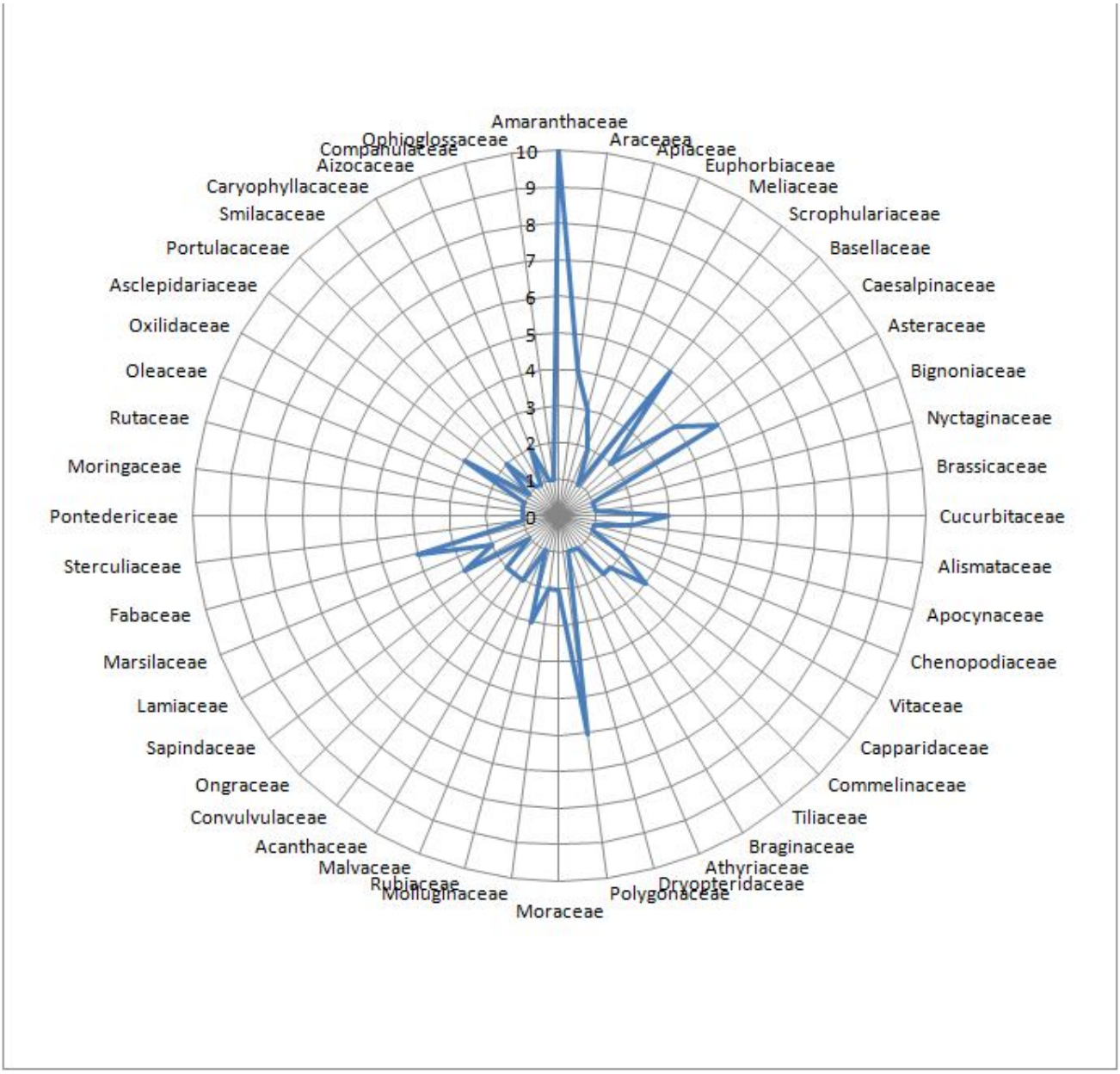

Fig-2: Radar Diagram of the Family & species of Wild Leafy vegetables

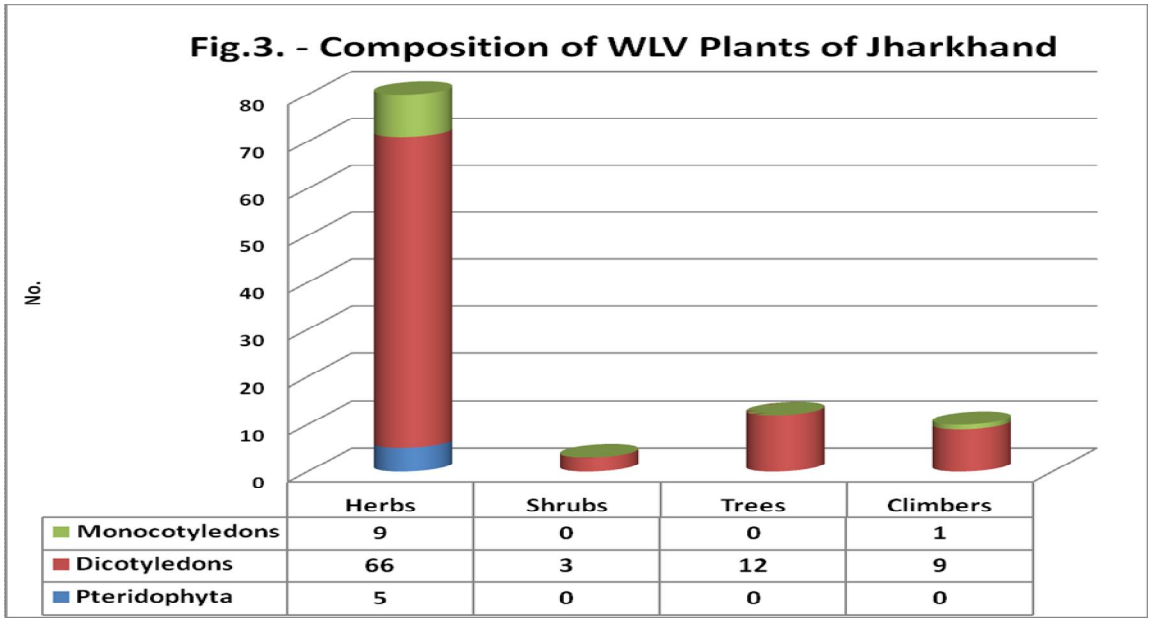

Fig-3: Composition of Wild Leafy Vegetable Plants of Jharkhand

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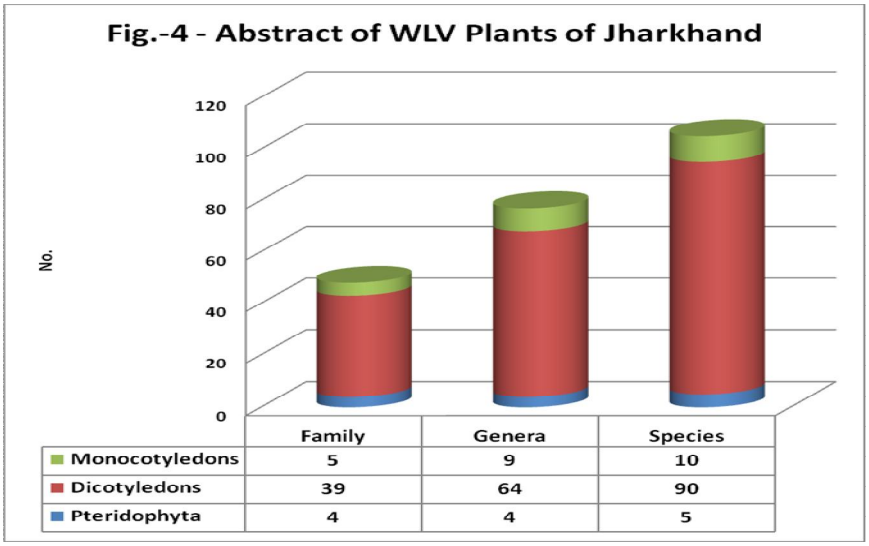

Fig-4: Abstract of Wild Leafy Vegetable Plants of Jharkhand

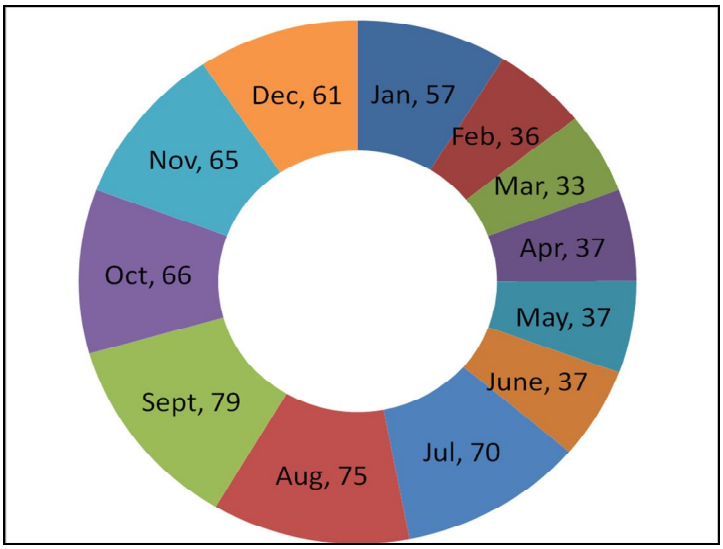

Fig-5: Calendar of number of species of WLVs available month - wise in Jharkhand

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Bauhinia retusa	*Bidens pilosa*	*Bigonia picta*	*Boerhaavia diffusa*	*Brassica juncea*
				
Bryonopsis lacinosa	*Butomopsis latifolia*	*Cassia occidentalis*	*Cassia tora*	*Catharanthus pusillus*
				
Celosia argentia	*Centella asiatica*	Chenopodium album	Cissus adnata	Cleome gynandra
				
Cleome monophylla	*Cleome viscosa*	*Coccinia grandis*	Colocasia esculenta	C. antiquorum

				
Commelina bengalensis	Corchorus capsularis	Corchorus olitorius	Cordia dichotoma	Cyanotis axillaris
				
Cyphostemma auriculatum	*Digera alternifolia*	*Diplazium esculentum*	*Dryopteris cochleata*	*Eclipta prostrata*
				
Euphorbia hirta	*Enhydra fluctuans*	*Eryngium foetidum*	*Fagopyrum esculentum*	*Ficus geniculata*

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Ficus infectoria	*Gamochaeta pensylvanica*	*Glinus lotoides*	*Glinus oppositifolius*	*Hedyotis scandens*
				
Hibiscus sibdariffa	*Hygrophila auriculata*	*Ipomoea aquatica*	*Jussiaea repens*	*Jussiaea suffructicosa*
				
Lasia spinosa	*Lepisanthes rubiginosa*	*Leucas aspera*	*Leucas cephalotes*	*Limnophila aromatic*
				
Limnophila gratioloids	*Limnophila confirta*	*Limnophila rugose*	*Lobelia alsinoides*	*Marsilia minuta*
				
Marsilia quadrifida	*Medicago lupulina*	*Medicago polymorpha*	*Mentha sativa*	*Merremia macrocalyx*
				
Melochia chorchorifolia	*Monochoria vaginalis*	*Moringa oleifera*	*Moringa koenigii*	*Olax scandens*
				
Ophioglossum reticulum	*Oxalis corniculata*	*Oxalis corymbosa*	*Oxalis latifolia*	*Paederia scandens*
				
Pergularia daemia	*Polygonum barbatum*	*Polygonum glabrum*	*Polygonum plebejum*	*Portulaca oleracea*

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Table-1: List of Wild Leafy Plants of Jharkhand

Table-1: List of Wild Leafy Plants of Jharkhand

S.N.	Botanical Name	Family	Vernacular names	Part consumed	Habit & Habitat	Season of availability	Method of consumption
1	2	3	4	5	6	7	8
1	*Achyranthus aspera* L.	Amaranthaceae	Chirchithi (Oraon) Chirchithi (Santhal) Chirchithi (Munda)	Leaves	Herb, Weed, Found in waste fields	August to February	Fresh leaves together with other spinach greens are cooked and eaten.
2	*Aerva lantana* (L.) Juss.	Amaranthaceae	Lopong Sag(Santhal) Lendra arxa(Oraon) Lupu aa (Ho)	Leaves	Herb, Weed found in waste land.	Rainy & Winter	Fresh Leaves are cooked and eaten.
3	*Alternanthera philoxiroids* (Mart.)Griseb.	Amaranthaceae	Saronchi (Oraon) Garundiarak (Santhal) Salanti (Bhumiz)	Young Plant	Herb, Weed, Found in wet places, waste & cultivated fields	July to January	Fried/Roasted then eaten.
4	*Alternanthera sessilis* (L.) R.Br. ex DC	Amaranthaceae	Saronchi (Oraon) Garundiarak (Santhal) Salanti (Bhumiz)	Young Plant	Herb, Weed, Found in wet places, waste & cultivated fields	July to January	Fried/Roasted then eaten.
5	*A.bilitum* Linn.	Amaranthaceae	Achpar aa/Leper aa (Ho) Achpar ara (Mundari)	Leaf and tender shoot	Herb, Weed, Found in waste places, cultivated & non cultivated fields.	Rainy and Winter	Young leaves and shoots are chopped into small pieces and fried in vegetable oil with tomato. Salt is added to taste.
6	*Amaranthus gangeticus* L.	Amaranthaceae	Lal Sag (Oraon)	Leaves	Annual Herb, Found on cultivated land, waste land, cultivated also.	April to June	Fresh leaves are cooked as spinach and have mild flavor.
7	*Amaranthus spinosus* Linn.	Amaranthaceae	Achcharaka (Oraon) Kanteli Chaulai (Santhal) Achparara (Mundari)	Leaf and tender shoot	Herb, Weed, Found in waste places.	Whole Year	Leaves and young shoots are cut into small pieces,

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							cooked with salt and chilly and then eaten.
8	*Amaranthus viridis* Linn.	Amaranthaceae	Bhaji Sag (Oraon) Lotia Sag (Santhal) Marshi (Bhumiz,Gond)	Leaf and tender shoot	Herb, Weed, Found in cultivated grounds.	WholeYear	Leaves and young shoots are cut into small pieces, cooked with salt and chilly and then eaten.
1	2	3	4	5	6	7	8
9	*Amorphophallus paeoniifolius* (Dennst.)Nicolson	Araceae	Oal (Oraon & santhal) Elephant foot yam	Tender Leaves & corm	Herb, found on waste places.	Before the rains and rainy season	Young leaves Cooked as vegetable. Young leaves are fried with Besan in vegetable oil.
10	*Anethum graveolens* Linn.	Apiaceae	Soya (Oraon) Sowa (santhal)	Leaves	Herb, found on waste ground, cultivated and non cultivated fields.	Winter season	Fresh or dried leaves are used for boiled or fried meats and fish, in sandwiches and fish sauces.
11	*Antidesma diandrum* (Roxb.) B.Heyne ex Roth	Euphorbiaceae	Kundui (Oraon) Matha arak (santhal) Mata ara (Munda)	Leaves	Shrub to tree, Weed, found near streams.	Rainy season	Young leaves are used in curry and as vegetable.
12	*Azadirachta indica* A.Juss.	Meliaceae	Neem	Leaves	Tree, Common around villages	March - April	New leaves are preferred. Cooked as vegetable.
13	*Bacopa monnieri* (L.) Wettst.	Scrophulariaceae	Brahmi Sag	Leaves	Herb, Wet lands	Rainy & winter season	Leaves are cooked as vegetable.
14	*Basella alba* Linn.	Basellaceae	Poi sag (Oraon) Poi Sag(Munda)	Leaves	Climber , Moist places	Rainy & Winter season	Stem and leaves are used to prepare curry.
15	*Basella alba var. rubra*	Basellaceae	Poi sag (Oraon), Poi Sag(Munda)	Leaves	climber, Weed, often cultivated	Rainy & Winter season	Stem and leaves are used to prepare curry.
16	*Bauhinia purpurea* L.	Caesalpiniaceae	Komaarxa (Oraon) Singarak (Santhal) Singara (Mundari)	Leaves	Tree, Forests	Rainy season	Young shoots along with leaves are collected, cooked as curry or fried and taken
17	*Bauhinia retusa* Roxb.	Caesalpiniaceae	Teor (Oraon) Teor (Santhal) Laba (Munda)	Leaves	Tree, Forests	Rainy season	Young shoots along with leaves are collected, cooked as curry or fried and taken
18	*Bidens pilosa* Linn.	Asteraceae	Maina Sag (Munda), Mayna arxa (Oraon)	Leaves	Herb, Waste land, moist forests and also in plains	Rainy season	Shoots, tips and young leaves are good potherbs. Its dry leaves are

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							also kept for use and flavour. Cooked as vegetable.
1	2	3	4	5	6	7	8
19	*Bigonia picta* Sm.	Bigoniaceae	Pakhanachatta(Oraon) Pakhanachatta(Santhal) Lundi Ara (Munda)	Leaves	Herb, Weed, found on wet land.	Aug. to Nov.	Leaves are collected, cooked as curry and taken.
20	*Boerhaavia diffusa* Linn.	Nyctaginaceae	Khapra arxa (Oraon) Khapra sag (Santhal) Kecho Ara (Mundari)	Fresh Whole Plant	Herb, Weed, Found in grassy waste grounds.	August to December	Tender leaves and young shoots are collected, fried/ roasted then eaten.
21	*Brassica juncea* (L.) Czern.	Brassicaceae	Indian mustard	Whole plant	Herb, Weed, Found in grassy waste grounds.	Winter season	Cooked as Vegetable
22	*Bryonopsis laciniosa*(L.) Naudin	Cucurbitaceae	Toktoyan Sag (Oraon) Toktoyan (Santhal)	Tender leaves and shoots	Perrenial climber, found on waste ground	Whole Year	Leaves cooked as vegetable.
23	*Butomopsis latifolia* (D.Don)Kunth	Alismataceae	Lundi ara (Munda)	Leaves	Annual Herb, Weed, Aquatic & Marshy	Whole Year	Boiled then water is squeezed out and then cooked as pot herb.
24	*Cassia occidentalis* L.	Caesalpiniaceae	Koha Chakonda (Oraon) Barka Chakonda (Santhal) Murang Chakonda (Munda)	Leaves	Herb, Weed, Found in waste places.	March to May	Tender leaves are cooked and eaten.
25	*Cassia tora* L.	Caesalpiniaceae	Chekor (Oraon) Chakoara (Santhal)	Leaves & Seeds	Herb, Weed, Found in waste grounds.	Rainy season	Leaves are cooked and eaten as vegetable.
26	*Catharanthus pusillus* Murr.	Apocynaceae	Marchi Sag (Santhal), Maricha arxa (Oraon)	Leaves	Herb, Waste land,cultivated land	Rainy season	Very tender leaves are cooked as vegetable.
27	*Celosia argentea* L.	Amaranthaceae	Kim Araxa (Oraon) Siliari (Santhal) Sirgiti Ara (Munda)	Leaves	Herb, Weed, found on agricultural fields.	August to Januaury	Young leaves and shoots are collected, roasted then eaten.
28	*Centella asiatica* (Linn.) Urb.	Umbelliferae	Mukha Arka (Oraon) Chauke Ara (Munda) Beng sag	Whole Plant	Herb, Weed, Found in wet places throughout the year	Whole year, mainly in rains and spring.	Leaves and young shoots are collected, roasted then eaten.
1	2	3	4	5	6	7	8
29	*Chenopodium album* Linn.	Chenopodiaceae	Bhathua arak (Santhal)	Leaves	Herb, Weed along with Rabi crops.	Rainy season	Leaves and young shoots are fried/ roasted then eaten.
30	*Cissus adnata* Roxb.	Vitaceae	Khatta Sag(Oraon) Jojo ara (Munda)	Leaves	Creeper, climbing shrub Weeds (Moist Forest)	Whole year	Leaves cooked as vegetable.
31	*Cleome gynandra* L.	Capparidaceae	Sad Hurhuria Sag (Santhal) Charmani aa (Ho), charmani (Munda)	Leaves	Herb, Weed, found in waste grounds.	July to Februry	Leaves and young shoots are collected, roasted then eaten.

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32	*Cleome monophylla* L.	Capparidaceae	Tota sirio (Oraon) Hurhuria Sag (Santhal), Hurhuria aa (Ho)	Leaves	Herb, Weed, found in waste grounds.	July to November	Leaves and young shoots are collected, roasted then eaten.
33	*Cleome vlscosa* Linn.	Capparidaceae	Sirioarkho (Oraon) Namkani (Santhal)	Young Plant	Herb, Weed, Found in cultivated & uncultivated fields	May to October	Leaves and young shoots are collected, fried/ roasted then eaten.
34	*Coccinia grandis (*L.) Voigt.	Cucurbitaceae	*Kundari (Santhal & Mundari),* Van Kundri (Ho)	Leaves and leafy shoots	Weed, climber found on waste lands.	Whole year.	Leaves and leafy shoots are collected, cut into small pieces, cooked with salt and chilly and then eaten.
35	*Colocasia antiquorum* Schott	Araceae	Pechki (Oraon)	Leaves	Perennial herb, Weed, found in wet lands	June to November	Young tender leaves and leafy shoots are collected, cut into small piece, cooked with salt and chilly then eaten.
36	*Colocasia esculenta* Schott	Araceae	Pechki Sag, Pechki arxa	Leaves	Herb, Weed, found in wet lands, Forests	Rainy	Young tender leaves and leafy shoots are collected, cut into small piece, cooked with salt and chilly then eaten.
37	*Commelina benghalensis* Linn.	Commelinaceae	Kenna Sag (Oraon) Kenna Sag (Munda) Upunda aa (Ho)	Leaves	Herb, Weed, common in Kharib season, Found in cultivated & uncultivated fields	September to January	Leaves and young shoots are collected, fried/ roasted then eaten.
1	2	3	4	5	6	7	8
38	*Corchorus capsularis* Linn.	Tiliaceae	Pat Sag (Oraon), Chench koha (Munda) Pat sag (santhal)	Leaves	Herb, Moist waste land	May to November	Tender Leaves and young shoots are collected, cooked then eaten. Usually it is lightly sauteed and eaten along with rice or rice gruel.
39	*Corchorus olitorius* L.	Tiliaceae	Koha Chanch (Oraon) Pat Sag (Munda)	Leaves	Herb, Weed, also Cultivated	June to November	Tender Leaves and young shoots are collected, cooked then eaten.
40	*Cordia dichotoma* G.Forst.	Boraginaceae	Dhanul (Oraon) Buch (Santhal) Bunch (Munda)	Leaves	Tree Forests	March to April	Tender leaves are cooked and eaten.
41	*Cyanotis axillaris* (L.) D.Don	Commenilaceae	Tena arxa (Oraon)	Leaves	Herb, Wet grounds,rice fields.	Rainy season.	Cooked as vegetable.

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42	*Cyphostemma auriculatum* Roxb.	Vitaceae	Lawai arxa (Oraon) Amad samad (Ho)	Tender leaves & shoots	Scandent shrub, Large climber. Evergreen Forests	Rainy & winter.	Tender leaves and shoots are cooked and taken as food
43	*Digera alternifolia* (L.)Aschers.	Amaranthaceae	Kari Bhanji (Oraon), Kari Gendhari (Santhal)	Tender leaves & shoots	Herb Grows wild in waste land.	Rainy season	Young plants are cooked and eaten as vegetable.
44	*Diplazium esculentum* (Retz.) Sw	Athyriaceae	Kukri Sag., Injjo arxa Lindung Bindung aa (Ho) Dhenki Sag	Leaves	Fern, Open marshy area, stream bank	May to July	Young and immature leaves are cooked as vegetable. It is eaten either after boiling or frying.
45	*Dryopteris cochleata* (D. Don.)C.Chr.	Dryopteridaceae	Kukri Sag, Kukri arxa Lindung Bindung aa (Ho)	Leaves	Fern, Grassland,Forest	March to May	Young and immature leaves are cooked as vegetable. It is eaten either after boiling or frying.
46	*Eclipta prostrata* L.	Asteraceae	Bringhraj	Leaves	Annual herb, Moist places on waste ground.	Rainy season to early winter	Cooked as vegetable.
47	*Euphobia hirta* L.	Euphorbiaceae	Dudhia (Oraon) Dudhia (Santhal) Marang Dudhi (Munda)	Leaves	Herb, Weed,Found on waste land and forest	Most part of the Year.	It is a famine food. Tender leaves are cooked and eaten.
1	2	3	4	5	6	7	8
48	*Enhydra fluctuans* Lour.	Asteraceae	Muchri ara (munda)	Leaves	A trailing marshy perennial herb	April to June.	It is washed, chopped Cooked/Steamed and eaten.
49	*Eryngium foetidum* L.	Apiaceae	Kanta Dhania, Accho Dhania	Leaves	Herb, Waste land	Rainy & Winter season.	The leaves are used fresh as a culinary herb which has a similar, but stronger flavor than Coriander (Coriandrum sativum).
50	*Fagopyrum esculentum* Moench	polygonaceae	Ugal sag	Leaves	Annual Herb, Found on waste ground	Summer months.	Eaten raw or cooked as vegetable.
51	*Ficus geniculata* Kurz	Moraceae	Putkal (Oraon) Putkal (Santhal) hesa Jait putkal (Munda)	Leaves	Tree Found in forest	March to April	Young leaves and buds are cooked and eaten. Pickle is also made.
52	*Ficus infectoria* Roxb.	Moraceae	Phutkal (Oraon) Phutkal (Santhal) hesa Hesa putkal (Munda)	Leaves	Tree Found in forest	March to April	Young leaves and buds are cooked and eaten. Pickle is also made.
53	*Gamochaeta pensylvanica* (Willd.) Cabrera	Asteraceae	Putam aa (Ho), Chitra sag, Ledra Sag	Leaves & tender shoots	Annual herb, Forests, Moist waste land	Rainy season .	Tender shoots with leaves are cooked and eaten as vegetable.

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54	*Glinus lotoides* L.	Molluginaceae	Punernova, Dusera sag	Leaves & tender shoots	Annual prostrate herb, Forests	March to October.	Cooked as Vegetable . Young shoots and leaves are collected, roasted and then eaten.
55	*Glinus oppositifolius*(L.) Aug.DC	Molluginaceae	Gima	Leaves & tender shoots	Annual prostrate or creeping herb, Forests	March to October.	Slightly bitter in taste. Cooked as Vegetable. Young shoots and leaves are collected, roasted and then eaten.
56	*Hedyotis scandens* Roxb.	Rubiaceae	Lata guji, Bislata (santhal)	Leaves	Perrenial climbing shrub. Forests in moist soil.	Whole Year.	Cooked as vegetable.
1	2	3	4	5	6	7	8
57	*Hibiscus sidariffa Linn.*	Malvaceae	Kudrum	Leaves & ten - der shoots	Annual or Perrenial shrub Disturbed grounds	Whole Year	Tender leaves and stem cooked as vegetable.
58	*Hygrophila auriculata* (Schum.)Hien e	Acanthaceae	Koila ara (munda)	Leaves	A stout aquatic perennial herb	October to February	It is washed, chopped Cooked/Stea med and eaten.
59	*Ipomoea aquatic* Forssk.	Convolvulaceae	Kalmi (Oraon)	Leaves	Herb Weed, Common in water bodies, floating on mud or trailing in water.	Whole Year	Leaves and tender shoots are collected, cooked and then eaten.
60	Jussiaea repens Linn.	Onagraceae	Machli Sag, Nalkim arxa	Leaves	Herb, Wet lands	Rainy season.	Tender leaves with shoot cooked as vegetable.
61	Jussiaea suffruticosa L.	Onagraceae	Machli Sag, Nalkim arxa	Leaves	Herb, Wet lands	Rainy season.	Tender leaves with shoot cooked as vegetable.
62	Lasia spinosa (L.) Thwaites	Araceae	Kantasaru	Tender leaves and stalk	Monocot weed,Perrenial River bank, ditches and moist places.	October to February	Peeled leaf stalked after removing the spines and tender leaves are eaten as vegetables.
63	Lepisanthes rubiginosa Roxb.	Sapindaceae	Jal Kusum	Leaves	Tree, found in forests, riverside , road side etc.	Spring season.	Young leaves are cooked and eaten as vegetable.
64	Leucas aspera (Willd.) Link	Labiatae	Guma (Chero&Kharwar)	Tender Young Plant	Herb, Annual Weed of Rabi season found in cultivated fields of Wheat,maize & Arhar crops	July to January.	Leaves and young shoots are roasted and taken as food.
65	Leucas cephalotes (Roth) Spreng	Labiatae	ChotiGuma (Chero&Kharwar)	Tender Young Plant	Herb, Annual Weed of Rabi season found in cultivated fields of Wheat, maize & Arhar crops	Rainy season.	Leaves and young shoots are roasted and taken as food.

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66	*Limnophila aromatica* (Lam.) Merr.	Scrophulariaceae	Lasodh Ara(Munda)	Tender leaves and shoots	Weed, aquatic & Marshy	September to February.	Cooked/Steamed and eaten.Chatni is also prepared.
67	Limnophila confirta Benth.	Scrophulariaceae	Muchari (Oraon) Hemcha Sag (Santhal)	Tender Leaves and shoots	Herb, Weed found in watery places and rice fields.	September to February.	Leaves and young shoots are roasted and taken as food.
1	2	3	4	5	6	7	8
68	Limnophila gratioloids R. Br.	Scrophulariaceae	Lasodh Ara (Munda) Kado sag, Chattor sag	Tender leaves and shoots	Perrenial Herb, Weed, aquatic & Marshy	Rainy & Winter season.	Rainy & Winter season. Cooked/Steamed and eaten.Chatni is also prepared .
69	*Limnophila rugosa* Roth.(Merr.)	Scrophulariaceae	Lasodh Ara (Munda)	Tender leaves and shoots	Perrenial Herb, Weed, aquatic & Marshy	Whole Year.	Cooked/Steamed and eaten.Chatni is also prepared Have essence of unripe mango.It is eaten as condiment raw or cooked.
70	*Lobelia alsinoides* Lam.	Companulaceae	Bari Ara (Munda)	Tender leaves and shoots	Herb, Weed, aquatic & Marshy	Oct. to Feb.	Cooked/Steamed and eaten, often cooked in curry.
71	*Marsilia minuta L.*	Marsiliaceae	Susuni (Oraon) Sunsunia (Santhal)	leaves	Herb, Perrenial fern, Found in wet places	Nov. to March.	Tender leaves and young shoots are roasted and taken as food.
72	*Marsilia quadrifida L.*	Marsiliaceae	Susuni (Oraon) Sunsunia (Santhal)	leaves	Herb, Perrenial fern, Found in wet places	Rainy & winter.	Tender leaves and young shoots are roasted and taken as food.
73	*Medicago lupulina* Linn.	Fabaceae	Neetho sag, Bindo sag	Leaves	Herb, found in lawns, gardens, waste areas, road side etc.	Winter.	Leaves are taken as vegetable.
74	*Medicago polymorpha* Linn.	Fabaceae	Neetho sag, Bindo sag	Leaves	Annual herb, found in lawns, gardens, waste areas, road side etc.	Winter.	Leaves are taken as vegetable.
75	*Mentha sativa* Linn.	Lamiaceae	Pudina	Leaves	Herb, found in wet places.	Whole Year.	Whole Year. Leaves are used for flavour and chatni.
76	*Merremia macrocalyx* (Ruiz & Pav.) O'Donnel	Convolvulaceae	Oye Munda aa (Ho)	Leaves	Perrenial herb, climber. Forests	Rainy season.	Young leaves and shoots are chopped into small pieces and fried in vege table oil with tomato.Salt is added to

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							taste.
77	*Melochia corchorifolia* Linn.	Sterculiaceae	Susuni (Oraon) Thuiak (Santhal)	Leaves	Shrub, Found in wet places	Rainy season.	Leaves are cooked and eaten
1	2	3	4	5	6	7	8
78	*Monochoria vaginalis* (Burm.F.)C.Presl	Pontederiaceae	Sadom Lochkor Ara (Munda)	Leaves	Weed, aquatic & Marshy	April to September.	Cooked/Steamed and eaten.
79	*Moringa oleifera* Lam.	Moringaceae	Munga sag (Oraon) Munga sag (Munda)	Leaves	Tree Cultivated in Backyards	Jan. to June.	Leaves are eaten after frying or roasting. Liquid curry is prepared with fermented rice water and rice granules.
80	*Murraya koenigii* (L.) Spreng.	Rutaceae	Curry Patta	Leaves	Shrub	Whole year.	Used as flavoring agent
81	*Olax scandens* Roxb.	Oleaceae	Rimil Bilee aa, Rimil tundu aa (Ho) , Bhadbhadalia (Oraon)	Leaves	Small tree, Open forests	March to December.	Leaves are collected, roasted and then eaten. The fresh young leaves are cooked as leafy vegetable and also chewed during mouth ulcer.
82	*Ophioglossum reticulum* L.	Ophioglossaceae	Sugga Sag	Leaves	Fern, on exposed sandy soil in wet places.	August to Januaury.	Young fronds are commonly eaten as a salad or vegetable.
83	*Oxalis corniculata* Linn.	Oxilidaceae	Netho Sag (Oraon) Tandi Chatom arak (Santhal)	Leaves	Herb, Weed, Found in Gardens	August to December.	Leaves are plucked, fried and taken.
84	*Oxalis corymbosa* (DC)Lourteig	Oxilidaceae	Netho Sag (Oraon) Tandi Chatom arak (Santhal)	Leaves	Herb, Weed, Found in Gardens	Winter months.	Leaves are plucked, fried and taken.
85	*Oxalis latifolia* Kunth	Oxilidaceae	Netho Sag (Oraon) Tandi Chatom arak (Santhal)	Leaves	Herb, Weed, Found in Gardens	August to December.	Leaves are plucked, fried and taken.
86	*Paederia scandens* (Lour.) Merr.	Rubiaceae	Gandalpatta, Guli gandhari	Leaves	Twinning vine on hill side, stream side, forest and its edges.	Whole Year.	Cooked as Vegetables. Leaves are boiled and made into soup, the odour disappearing.
87	*Pergularia daemia (*Forssk.) Chiov	Asclepiadaceae	Mausi sag	Leaves	Perrenial twinning herb, found in hill sides, in forests along forest edges, stream sides, twinning on trees.	Rainy season.	Leaves are cooked and eaten as vegetable.
1	2	3	4	5	6	7	8
88	*Polygonum barbatum* L.	polygonaceae	Sake arxa (Oraon) Sake Sag (Santhal) Madara (Munda)	Leaves	Herb, Weed, found ion wet lands.	June to December.	Young plants are cooked and

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							consumed.
89	*Polygonum glabrum* Willd.	polygonaceae	Sukripota (Munda) Sauri Arak (santhal)	Leaves	Herb, Weed, found near streams.	June to December.	Young plants are cooked and consumed.
90	*Polygonum plebejum* R.Br.	polygonaceae	Chimti Sag (Oraon) Mooze-ara (Munda)	Leaves	Herb, Weed common in Rabi season on waste ground & cultivated fields	Jan. to April.	Young plants are cooked and consumed.
91	*Portulaca oleracea* Linn.	Portulacaceae	Golgala (Santhal)	Young Plant	Herb, Weed, common on waste open grounds	Whole Year, abundant in rainy season.	Tender leaves and shoots are collected, roasted then eaten.
92	*Portulaca quadrifida Linn.*	Portulacaceae	Golgola sag, Noni sag	Leaves	Herb, Waste land	Whole Year.	Cooked as vegetable.
93	Rumex dentatus L.	polygonaceae	Tissa Palak arxa (oraon) Tissa palak (Santhal)	Leaves	Herb, Weed, found on waste places. Common in Rabi season.	Rainy season.	Leaves are cooked and eaten.
94	*Rumex vesicarius* L.	polygonaceae	Tissa Palak arxa (oraon) Tissa palak (Santhal)	Leaves	Herb, Weed, found on waste places.	May to July.	Leaves are cooked and eaten.
95	*Rungia parviflora* Nees.	Acanthaceae	Kawoa Sag (Oraon) Hasa-arak (Munda)	Young Plant	Herb, Weed, common on low land harvested rice fields	Whole Year.	Tender leaves and shoots are collected, cooked then eaten.
96	*Sagittaria sagittifolia* L.	Alismataceae	Luchkor (Munda)	Leaves	Weed, aquatic & Marshy	Whole year.	Boiled then water is squeezed out and then cooked as pot herb.
97	*Smilax ovalifolia* Roxb. Ex d.Don	Smilacaceae	Ramdatan	Leaves	Large climber, common in forest areas, cultivated in gardens.	Whole Year.	Cooked as vegetable.
98	*Solena amplexicaulis* (Lam.) GANDHI	Cucurbitaceae	Van Kakri	Leaves	Perrenial climbing herb, found in forests & plains.	September to December.	Cooked as vegetable.
99	Sphaeranthus hirtus Willd.	Asteraceae	Tonka Pudina, DanrPudina	Leaves	Annual herb highly scented. Weed of rice fields and moist places.	Rainy & Winter.	Tender shoots are cooked then taken as food.
1	2	3	4	5	6	7	8
100	*Spergula arvensis* Linn.	Caryophyllacea e	Kharika arxa	Leaves	Annual herb highly scented. Weed of rice fields and moist places.	November to february.	Leaves are collected , cooked and eaten.
101	*Trianthema decandra* Linn.	Aizoaceae	Purni (Munda)	Tender Young Plant	Herb, Weed, common with Kharif crops	July to December .	Leaves and young shoots are collected, fried then eaten.
102	*Trianthema monogyna* Linn.	Aizoaceae	Swet Punernova (Munda) Kecho	Tender Young Plant	Herb, Weed, common as a weed in wasteland, roadside, lawns,	Rainy season .	Leaves and young shoots are collected, fried then eaten.

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					grdens, cultivated fields & paddy fields.		
103	Vangueira spinosa roxb.	Rubiaceae	Sarla Kanta (Santhal) sarla achch (Munda)	Leaves	Shrub to small tree, Forests	May to July.	Leaves are cooked and eaten.
104	*Vicia hirsuta* (L.) Gray	Papilionaceae	Origara(Oraon), Chirinji Sag	Leaves	Annual herb, common in cultivated land, fallow land,wastegroun d,flower beds, road sides, rocky meadows	Whole Year.	Tender leaves are eaten as vegetable.
105	*Vicia sativa* Linn.	Papilionaceae	Jhilo sag (Santhal), Jhilo arxa (Oraon)	Leaves	Annual climbing herb, common in cultivated land, fallow land,wastegroun d,flower beds, road sides, rocky meadows	Winter season.	Tender leaves are eaten as vegetable.

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ON THE CONSTRUCTION OF THREE INFINITE CLASSES OF SKEW SYMMETRIC WEIGHING MATRICES OF ORDER 4N(N ODD,N≥3)WITH SKEW SYMMETRIC WEIGHING BLOCK STRUCTURE OF ORDER 4.

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ABSTRACT
Corresponding to Turyn'sinfinite series of Williamson matrices we have constructed three infinite classes of skew-symmetric weighing matrices,W(2(q+1),q), W(2(q+1),q+1) and W(2(q+1),q+2) where 2(q+1)=4n and n is odd natural number ≥3 in which all skew-symmetric weighing matrices have skew-symmetric sub-blocks of order 4.

Keywords: Weighing matrix, skew-symmetric weighing matrix, Hadamard matrix.

INTRODUCTION AND PRELIMINARIES
A weighing matrix of order '*n*'and weight 'k' is an $n\times n$ (0,1,-1)-matrix W such that $WW^T=k\,I_n$, where I_n is the identity matrix of order *n* and W^T denotes transpose of *W*.A weighing matrix of order *n* and weight *k* is denoted by *W*(*n*, *k*).If *n*=*k* ,then W(*n*, *n*) is Weighing matrix as well as Hadamard matrix, therefore we can say that all Hadamard matrices are weighing matrix with entries 1 and-1.A weighing matrix *W*(*n*, *n*-1) is equivalent to Conference matrix.

Existence of W(*n*,*k*) for every *n*(natural number) and $k\leq n$ is still a research problem. However Seberry and Zhang [6] have found the existence of weighing matrices of order 4t and weight 2t for all order less than 4000 for which Hadamard matrices are known.

Weighing matrices have long been studied because of their use in weighing experiments,see Banerjee[1] and Raghavarao [2].Sloane and Harwit [3] surveyed the applications of weighing matrices to improve the performance of optical instruments such as spectrometers,see also[4]. For more details and other applications of weighing matrices see [4]and [5].

Following definitions will be frequently used throghout this paper

Hadamard Matrices (Or *H*-Matrices):An n×n matrix with entries +1 and -1 is called a Hadamard matrix (or an *H*-matrix),if $HH^T=nI_n$ .If *n*>2 and *H*-matrix of order *n* exists ,then *n*=4*t* ,where *t* is a positive integer.

It is conjectured that *H*-matrix of order 4*t* exists for every $t\geq 1$ and it remains unsettled in spite of various methods of construction forwarded by different authors. For a brief surveys see Hall [9], Hedayat and Wallis[10].

Circulant Matrices:A matrix in which each row is obtained by shifting every entry in the previous row one place to its right.

Williamson Matrices(Craigen and Kharaghani[8]): Four $n\times n$ symmetric and circulant (1,-1) matrices A,B,C,D are called Williamson matrices if$A^2+B^2+C^2+D^2=4nI_n$.

Conference Matrix: An *H*-matrix is said to be conference matrix if all the entries in main diagonal are zero only.

There are several infinite series of weighing matrices constructed by Georgiou and Koukouvinos [13], Ming Xia [14], Seberry[15] etc. But none of these have as nice property as the ones constructed in this paper. Our construction is motivated by the paper of Singh and Topno [12] on Hadamard matrices. We have provided an algorithm to construct three infinite classes of weighing matrices with block structure of order 4 and constructed some of the matrices based on the algorithm.

The Algorithm

We offer the following algorithm for the Construction of Infinite Classes of Weighing Matrices with Block Structure of order 4:

We consider the vectors of the form $[a\ b\ c\ d]$ and denote it by the symbol $v_o, v_1, v_2 \ldots$ etc , where a, b,c, d ϵ {0,1,-1}.Define the scalar product of two vectors $v_i=[a_i\ b_i\ c_i\ d_i]$ and $v_j=[a_j\ b_j\ c_j\ d_j]$ as

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$v_i v_j = \left[a_i\, a_j + b_i\, b_j + c_i\, c_j + d_i\, d_j\right]$ and $v_i v_i = v_i^2, v_j v_j = v_j^2$.Now we follow the following steps to find the weighing matrix :

Step 1 : We define a function f([a b c d])= $\begin{bmatrix} a & b & c & d \\ -b & a & -d & c \\ -c & d & a & -b \\ -d & -c & b & a \end{bmatrix}$.

Step 2: Find vectors $v_o, v_1, v_2 \ldots$ such that matrix $W = circ(f(v_1), f(v_2), \ldots f(v_o) \ldots f(v_2), f(v_1))$ has orthogonal rows. Then clearly W is weighing matrix.

Step 3: Let us consider matrices:

Case 1: $f(v_0) = f([00-0]), f(v_1) = f([00+-])$ and $f(v_2) = f([00++])$

Case 2: $f(v_0) = f([0+-0]), f(v_1) = f([00+-])$ and $f(v_2) = f([00++])$ and

Case 3: $f(v_0) = f([+\,+-0]), f(v_1) = f([00+-])$ and $f(v_2) = f([00++])$ with properties: $v_1^2 = v_2^2 = 2, v_0 . v_1 = v_0 . v_2 = -1, v_1 . v_2 = 0, v_0^2 = 1$. Then obviously matrix *W* in***step2***is weighing matrix for each cases.

Turyn[11]constructed an infinite series of Hadamard matrices with the help of five Williamson matrices $\hat{1}$, $\overset{+}{1}$, $\overset{-}{1}$, $\overset{+}{2}$ *and* $\overset{-}{2}$ with entries 1 and -1as

$H_{12} = Circ(\hat{1}\ \overset{+}{1}\ \overset{+}{1}) = (I_3 \times \hat{1}) + (W_1 \times \overset{+}{1}),$

$H_{20} = Circ(\hat{1}\ \overset{+}{1}\ \overset{+}{2}\ \overset{+}{2}\ \overset{+}{1}) = (I_5 \times \hat{1}) + (W_1 \times \overset{+}{1}) + (W_2 \times \overset{+}{2}),$

$H_{28} = Circ(\hat{1}\ \overset{-}{2}\ \overset{+}{2}\ \overset{-}{1}\ \overset{-}{1}\ \overset{+}{2}\ \overset{-}{2}) = (I_7 \times \hat{1}) + (W_1 \times \overset{-}{2}) + (W_2 \times \overset{+}{2}) + (W_3 \times \overset{-}{1})$ and *so on.*

Where, $\hat{1} = f[+\ +\ +\ +] = \begin{bmatrix} + & + & + & + \\ - & + & + & - \\ + & - & + & + \\ + & + & - & + \end{bmatrix}$,

$\overset{+}{1} = f[+\ -\ -\ -] = \begin{bmatrix} + & - & - & - \\ + & + & + & - \\ + & - & + & + \\ + & + & - & + \end{bmatrix}$, $\overset{-}{1} = f[-\ +\ +\ +] = \begin{bmatrix} - & + & + & + \\ - & - & - & + \\ - & + & - & - \\ - & - & + & - \end{bmatrix}$

$\overset{+}{2} = f[-\ +\ -\ -] = \begin{bmatrix} - & + & - & - \\ - & - & + & - \\ + & - & - & - \\ + & + & + & - \end{bmatrix}$, $\overset{-}{2} = f[+\ -\ +\ +] = \begin{bmatrix} + & - & + & + \\ + & + & - & + \\ - & + & + & + \\ - & - & - & + \end{bmatrix}$.

Step4: Now,we are replacing $\hat{1}$ *by* $f(v_0), \overset{+}{1}$ *by* $f(v_1), \overset{-}{1}$ *by* $f(-v_1), \overset{+}{2}$ *by* $f(v_2), \overset{-}{2}$ *by* $f(-v_2)$ in Turyn's construction described above we get three infinite classes of weighing matrices: $I_n \times f(v_0) + \sum_{i=1}^{m} W_i \times f(v_i) = W(2(q+1), q)$ or $W(2(q+1), q+1)$ or $W(2(q+1), q+2)$ …(9)

corresponding to three cases in **Step 3.**For proof see [12].

In equation (9) ,2(q+1)=4n('n' odd natural number ≥3) and m belonging to the set of naturalnumbers.

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Hence we get the three infinite classes of weighing matrices:

$$W(12,k) = Circ[f(v_0)\ f(v_1)\ f(v_1)]$$
$$= [f(v_0)\times \mathbf{I}_3) + (f(v_1)\times w_1]; k = 5,6,7.$$
$$W(20,k) = Circ[f(v_0)\ f(v_1)\ f(v_2)\ f(v_2)]$$
$$= [f(v_0)\times \mathbf{I}_5) + (f(v_1)\times w_1) + (f(v_2)\times w_2]; k = 9,10,11.$$
$$W(28,k) = Circ[f(v_0)\ f(-v_2)\ f(v_2)\ f(-v_1)\ f(-v_1)\ f(v_2)\ f(-v_2)]$$
$$= [f(v_0)\times \mathbf{I}_7) - (f(v_2)\times w_1) + (f(v_2)\times w_2) - (f(v_1)\times w_3]; k = 13,14,15.$$

And so on.

Where, $f(v_0) = \begin{bmatrix} 0 & 0 & - & 0 \\ 0 & 0 & 0 & - \\ + & 0 & 0 & 0 \\ 0 & + & 0 & 0 \end{bmatrix}$ or $\begin{bmatrix} 0 & + & - & 0 \\ - & 0 & 0 & - \\ + & 0 & 0 & - \\ 0 & + & + & 0 \end{bmatrix}$ or $\begin{bmatrix} + & + & - & 0 \\ - & + & 0 & - \\ + & 0 & + & - \\ 0 & + & + & + \end{bmatrix}$

$$f(v_1) = \begin{bmatrix} 0 & 0 & + & - \\ 0 & 0 & + & + \\ - & - & 0 & 0 \\ + & - & 0 & 0 \end{bmatrix}, f(-v_1) = \begin{bmatrix} 0 & 0 & - & + \\ 0 & 0 & - & - \\ + & + & 0 & 0 \\ - & + & 0 & 0 \end{bmatrix}$$

$$f(v_2) = \begin{bmatrix} 0 & 0 & + & + \\ 0 & 0 & - & + \\ - & + & 0 & 0 \\ - & - & 0 & 0 \end{bmatrix}, f(-v_2) = \begin{bmatrix} 0 & 0 & - & - \\ 0 & 0 & + & - \\ + & - & 0 & 0 \\ + & + & 0 & 0 \end{bmatrix}.$$

The Constructions

(1) Weighing matrices of order 4n (n=3) and weight k=q,q+1,q+2(q=5). i.e. W(12,5),W(12,6),W(12,7): We take $v_0 = f([00-0])$, then $W(12,5) = Circ(v_0\ \ v_1\ \ v_1)$

$$= \begin{bmatrix} 0 & 0 & - & 0 & 0 & 0 & + & - & 0 & 0 & + & - \\ 0 & 0 & 0 & - & 0 & 0 & + & + & 0 & 0 & + & + \\ + & 0 & 0 & 0 & - & - & 0 & 0 & - & - & 0 & 0 \\ 0 & + & 0 & 0 & + & - & 0 & 0 & + & - & 0 & 0 \\ 0 & 0 & + & - & 0 & 0 & - & 0 & 0 & 0 & + & - \\ 0 & 0 & + & + & 0 & 0 & 0 & - & 0 & 0 & + & + \\ - & - & 0 & 0 & + & 0 & 0 & 0 & - & - & 0 & 0 \\ + & - & 0 & 0 & 0 & + & 0 & 0 & + & - & 0 & 0 \\ 0 & 0 & + & - & 0 & 0 & + & - & 0 & 0 & - & 0 \\ 0 & 0 & + & + & 0 & 0 & + & + & 0 & 0 & 0 & - \\ - & - & 0 & 0 & - & - & 0 & 0 & + & 0 & 0 & 0 \\ + & - & 0 & 0 & + & - & 0 & 0 & 0 & + & 0 & 0 \end{bmatrix}$$

We take $v_0 = f([0+-0])$, *then* $W(12,6) = Circ(v_0\ \ v_1\ \ v_1) =$

$$\begin{bmatrix} 0 & + & - & 0 & 0 & 0 & + & - & 0 & 0 & + & - \\ - & 0 & 0 & - & 0 & 0 & + & + & 0 & 0 & + & + \\ + & 0 & 0 & - & - & - & 0 & 0 & - & - & 0 & 0 \\ 0 & + & + & 0 & + & - & 0 & 0 & + & - & 0 & 0 \\ 0 & 0 & + & - & 0 & + & - & 0 & 0 & 0 & + & - \\ 0 & 0 & + & + & 0 & - & 0 & - & - & 0 & + & + \\ - & - & 0 & 0 & + & 0 & 0 & - & - & - & 0 & 0 \\ + & - & 0 & 0 & 0 & + & + & 0 & + & - & 0 & 0 \\ 0 & 0 & + & - & 0 & 0 & + & - & 0 & + & - & 0 \\ 0 & 0 & + & + & 0 & 0 & + & + & 0 & - & 0 & - \\ - & - & 0 & 0 & - & - & 0 & 0 & + & 0 & 0 & - \\ + & - & 0 & 0 & + & - & 0 & 0 & 0 & + & + & 0 \end{bmatrix}$$

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We take $v_0 = f([++-0])$ $W(12,7) = Circ(v_0 \ v_1 \ v_1)$

$$
\begin{pmatrix}
+ & + & - & 0 & 0 & 0 & + & - & 0 & 0 & + & - \\
- & + & 0 & - & 0 & 0 & + & + & 0 & 0 & + & + \\
+ & 0 & + & - & - & - & 0 & 0 & - & - & 0 & 0 \\
0 & + & + & + & + & - & 0 & 0 & + & - & 0 & 0 \\
0 & 0 & + & - & + & + & - & 0 & 0 & 0 & + & - \\
0 & 0 & + & + & - & + & 0 & - & - & 0 & + & + \\
- & - & 0 & 0 & + & 0 & + & - & - & - & 0 & 0 \\
+ & - & 0 & 0 & 0 & + & + & + & + & - & 0 & 0 \\
0 & 0 & + & - & 0 & 0 & + & - & + & + & - & 0 \\
0 & 0 & + & + & 0 & 0 & + & + & - & + & 0 & - \\
- & - & 0 & 0 & - & - & 0 & 0 & + & 0 & + & - \\
+ & - & 0 & 0 & + & - & 0 & 0 & 0 & + & + & +
\end{pmatrix}
$$

(2) Weighing matrices of order 4n (n=5) and weight k=q,q+1,q+2(q=9).

i.e. W(20,9),W(20,10),W(20,11):

We take $v_0 = f([00-0])$. Then, $W(20,9) = Circ(v_0 \quad v_1 \quad v_2 \quad v_2 \quad v_1)$

$$
\begin{pmatrix}
0 & 0 & - & 0 & 0 & 0 & + & - & 0 & 0 & + & + & 0 & 0 & + & + & 0 & 0 & + & - \\
0 & 0 & 0 & - & 0 & 0 & + & + & 0 & 0 & - & + & 0 & 0 & - & + & 0 & 0 & + & + \\
+ & 0 & 0 & 0 & - & - & 0 & 0 & + & + & 0 & 0 & + & + & 0 & 0 & - & - & 0 & 0 \\
0 & + & 0 & 0 & + & - & 0 & 0 & - & + & 0 & 0 & - & + & 0 & 0 & + & - & 0 & 0 \\
0 & 0 & + & - & 0 & 0 & - & 0 & 0 & 0 & + & - & 0 & 0 & + & + & 0 & 0 & + & + \\
0 & 0 & + & + & 0 & 0 & 0 & - & 0 & 0 & + & + & 0 & 0 & - & + & 0 & 0 & - & + \\
- & - & 0 & 0 & + & 0 & 0 & 0 & - & - & 0 & 0 & + & + & 0 & 0 & + & + & 0 & 0 \\
+ & - & 0 & 0 & 0 & + & 0 & 0 & + & - & 0 & 0 & - & + & 0 & 0 & - & + & 0 & 0 \\
0 & 0 & + & + & 0 & 0 & + & - & 0 & 0 & - & 0 & 0 & 0 & + & - & 0 & 0 & + & + \\
0 & 0 & - & + & 0 & 0 & + & + & 0 & 0 & 0 & - & 0 & 0 & + & + & 0 & 0 & - & + \\
+ & + & 0 & 0 & - & - & 0 & 0 & + & 0 & 0 & 0 & - & - & 0 & 0 & + & + & 0 & 0 \\
- & + & 0 & 0 & + & - & 0 & 0 & 0 & + & 0 & 0 & + & - & 0 & 0 & - & + & 0 & 0 \\
0 & 0 & + & + & 0 & 0 & + & + & 0 & 0 & + & + & 0 & 0 & + & - & 0 & 0 & 0 & - \\
0 & 0 & + & + & 0 & 0 & - & + & 0 & 0 & - & + & 0 & 0 & + & + & 0 & 0 & 0 & - \\
- & - & 0 & 0 & + & + & 0 & 0 & + & + & 0 & 0 & - & - & 0 & 0 & + & 0 & 0 & 0 \\
+ & - & 0 & 0 & - & + & 0 & 0 & - & + & 0 & 0 & + & - & 0 & 0 & 0 & + & 0 & 0
\end{pmatrix}
$$

We take $v_0 = f([0+-0])$. Then, $W(20,10) = Circ(v_0 \quad v_1 \quad v_2 \quad v_2 \quad v_1)$

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$$\begin{pmatrix}
0+-00\ 0+-0\ 0++0\ 0++0\ 0+- \\
-00-0\ 0++0\ 0-+0\ 0-+0\ 0++ \\
+00--\ 00-+\ 00-+\ 00--\ 00 \\
0++0+-\ 00--\ 00--\ 00+-\ 00
\end{pmatrix}$$

$$\begin{pmatrix}
00+-0+-00\ 0+-0\ 0++0\ 0++ \\
00++-00-0\ 0+-0\ 0-+0\ 0-+ \\
--00+00-\ --00-+\ 00-+\ 00 \\
+-000++0+-\ 00--\ 00--\ 00
\end{pmatrix}$$

$$=\begin{pmatrix}
00++0\ 0+-0+-00\ 0+-0\ 0++ \\
00-+0\ 0++0-00-0\ 0++0\ 0-+ \\
-+00--\ 00+00-\ --00-+\ 00 \\
--00+-\ 000++0+-\ 00--\ 00
\end{pmatrix}$$

$$\begin{pmatrix}
00++0\ 0++0-0+-00\ 0+- \\
00-+0\ 0-+0\ 0++-00-0\ 0++ \\
-+00-+\ 00--\ 00+00-\ --00 \\
--00--\ 00+-\ 000++0+-\ 00
\end{pmatrix}$$

$$\begin{pmatrix}
00+-0\ 0++0\ 0++0\ 0+-0+-00 \\
00++0\ 0-+0\ 0-+0\ 0++-00- \\
--00-+\ 00-+\ 00--\ 00+00- \\
+-00--\ 00--\ 00+-\ 000++0
\end{pmatrix}$$

We take $v_0 = f([++-0])$. Then, $W(20,11) = Circ(v_0 \quad v_1 \quad v_2 \quad v_2 \quad v_1)$

$$\begin{pmatrix}
++-00\ 0+-0\ 0++0\ 0++0\ 0+- \\
-+0-0\ 0++0\ 0-+0\ 0-+0\ 0++ \\
+0+---\ 00-+\ 00-+\ 00--\ 00 \\
0+++-\ 00--\ 00--\ 00+-\ 00
\end{pmatrix}$$

$$\begin{pmatrix}
00+-+-00\ 0+-0\ 0++0\ 0++ \\
00++-+0-0\ 0+-0\ 0-+0\ 0-+ \\
--00+0+---\ 00-+\ 00-+\ 00 \\
+-000+++-\ 00--\ 00--\ 00
\end{pmatrix}$$

$$=\begin{pmatrix}
00++0\ 0+-++-00\ 0+-0\ 0++ \\
00-+0\ 0++-+0-0\ 0++0\ 0-+ \\
-+00--\ 00+0+---\ 00-+\ 00 \\
--00+-\ 000++++-\ 00--\ 00
\end{pmatrix}$$

$$\begin{pmatrix}
00++0\ 0+-++0\ 0++-00\ 0+- \\
00-+0\ 0-+0\ 0++-+0-0\ 0++ \\
-+00-+\ 00--\ 00+0+---\ 00 \\
--00--\ 00+-\ 000++++-\ 00
\end{pmatrix}$$

$$\begin{pmatrix}
00+-0\ 0++0\ 0++0\ 0+-++-00 \\
00++0\ 0-+0\ 0-+0\ 0++-+0-0 \\
--00-+\ 00-+\ 00--\ 00+0+- \\
+-00--\ 00--\ 00+-\ 000+++
\end{pmatrix}$$

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(3) Weighing matrices of order 4n (n=7) and weight k=q,q+1,q+2(q=13).i.e. W(28,13),W(28,14),W(28,15):

$$
\begin{array}{l}
0\,0-0\,0\,0--0\,0++0\,0-+0\,0-+0\,0++0\,0--\\
0\,0\,0-0\,0+-0\,0-+0\,0--0\,0--0\,0-+0\,0+-\\
+0\,0\,0+-0\,0-+0\,0++0\;0++0\;0-+0\,0+-0\,0\\
0+0\,0++0\,0--0\,0-+0\;0-+0\;0--0\,0++0\,0
\end{array}
$$

$$
\begin{array}{l}
0\,0--0\,0-0\,0\,0--0\,0++0\,0-+0\,0-+0\,0++\\
0\,0+-0\,0\,0-0\,0+-0\,0-+0\,0--0\,0--0\,0-+\\
+-0\,0+0\,0\,0+-0\,0-+0\,0++0\;0++0\;0-+0\,0\\
++0\,0\,0+0\,0++0\,0--0\,0-+0\;0-+0\;0--0\,0
\end{array}
$$

$$
\begin{array}{l}
0\,0++0\,0--0\,0-0\,0\,0--0\,0++0\,0-+0\,0-+\\
0\,0-+0\,0+-0\,0\,0-0\,0+-0\,0-+0\,0--0\,0--\\
-+0\,0+-0\,0+0\,0\,0+-0\,0-+0\,0++0\;0++0\;0\\
--0\,0++0\,0\,0+0\,0++0\,0--0\,0-+0\;0-+0\;0
\end{array}
$$

$$
W(28,13)=\begin{array}{l}
0\,0-+0\,0++0\,0--0\,0-0\,0\,0--0\,0++0\,0-+\\
0\,0--0\,0-+0\,0+-0\,0\,0-0\,0+-0\,0-+0\,0--\\
++0\;0-+0\,0+-0\,0+0\,0\,0+-0\,0-+0\,0++0\;0\\
-+0\;0--0\,0++0\,0\,0+0\,0++0\,0--0\,0-+0\;0
\end{array}
$$

$$
\begin{array}{l}
0\,0-+0\,0-+0\,0++0\,0--0\,0-0\,0\,0--0\,0++\\
0\,0--0\,0--0\,0-+0\,0+-0\,0\,0-0\,0+-0\,0-+\\
++0\;0++0\;0-+0\,0+-0\,0+0\,0\,0+-0\,0-+0\,0\\
-+0\;0-+0\;0--0\,0++0\,0\,0+0\,0++0\,0--0\,0
\end{array}
$$

$$
\begin{array}{l}
0\,0+-0\,0--0\,0-+0\,0-+0\,0++0\,0--0\,0-0\,0--\\
0\,0--0\,0-+0\,0--0\,0--0\,0-+0\,0+-0\,0\,0-\\
+-0\,0-+0\,0++0\;0++0\;0-+0\,0+-0\,0+0\,0\,0\\
++0\,0--0\,0-+0\;0-+0\;0--0\,0++0\,0\,0+0\,0
\end{array}
$$

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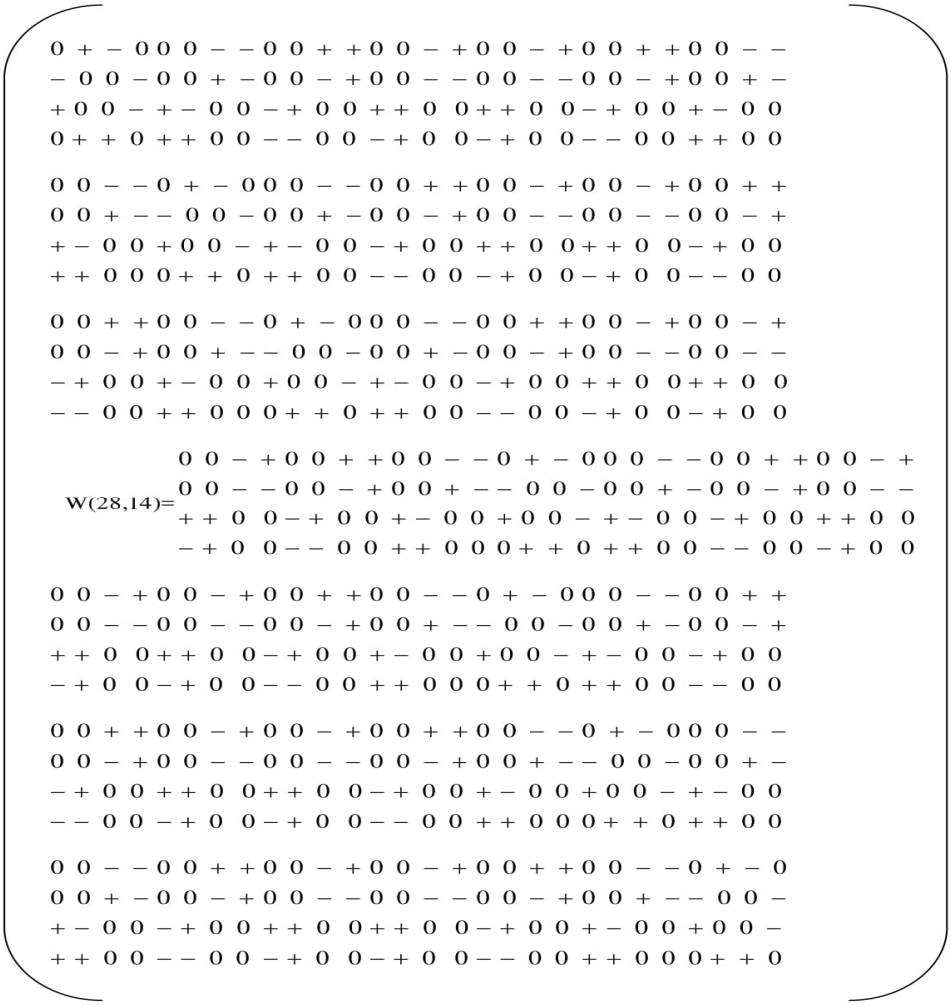

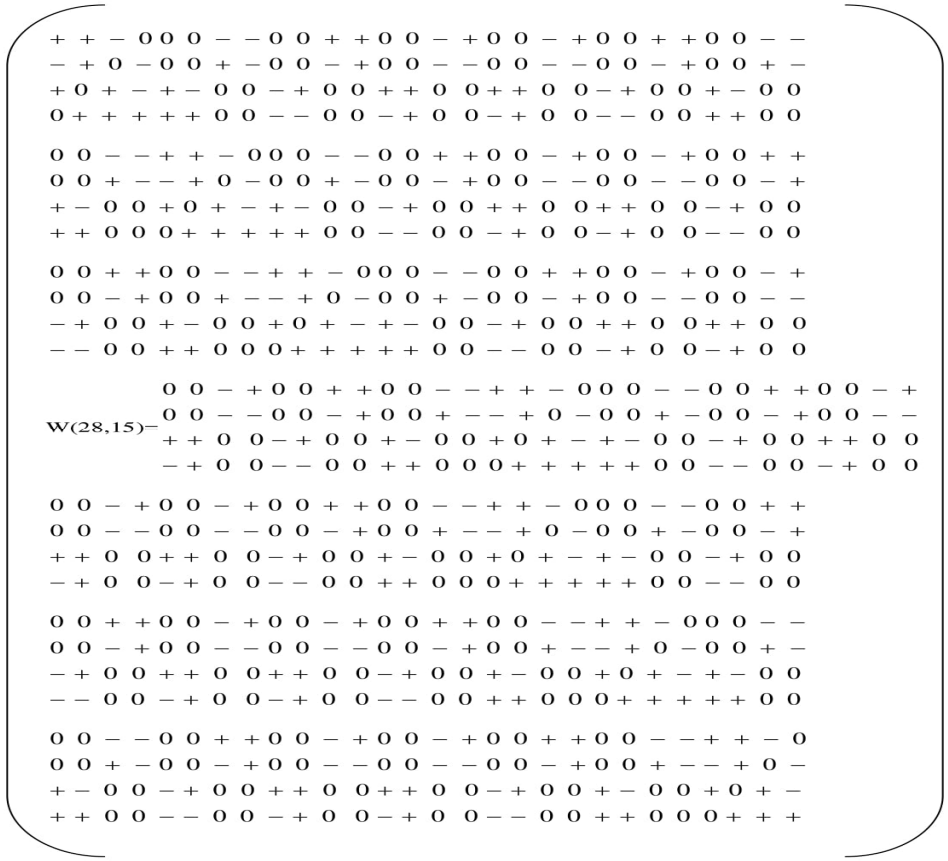

And so on.

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REFERENCES

1. Banerjee,K.S.,*Weighing design for chemistry,medicine,economics,operation research and statistics*,Marcel Dekker,New York,1975.
2. Raghavarao.D.,*Constructions and combinatorial problems in design of experiments*,J.Wiley and Sons,New York,1971.
3. Sloane ,N.J.A. and Harwit, *Masks for Hadamard transform optics and weighing design*,Appl. Optics,15,107-114,1975.
4. Harwit,M. andSloane, N.J.A.,*Hadamard transfom optics*,Academic Press,New York 1979.
5. KouKouvinos, C.and Seberry, J.,*Weighing matrices and their application* to appear.
6. Seberry,J. and Zhang,*Semi Williamson tpe matrices and W(2n,n) conjecture*,J.Comb.math and Comb.computing,11,65-71,1992.
7. [w8]Cysin,M. and Seberry,J.,On the weighing matrices of order 4n and weight 4n-2 and 2n-1,March 21,1995.
8. Germita, A.V. andSeberry, J.,*Orthogonal designs:Quadratic form and Hadamard matrices*,Marcel Dekker,New Yok-Basel,1979.
9. Craigen , R. and Kharghani ,H., *Hadamard Matrices and Hadamard Designs* in Handbook of Combinatorial designs (eds. C.J.Colbourn and J.H. Dinitz)2nd edition,Chapman and Hall/CRC, Boca Raton (2007).
10. Hall,M. Jr., *Combinatorial Theory* , Wiley, New York 2nd edition,(1986).
11. Hedayat, A. and Wallis ,W.D. ,*Hadamard Matrices and their applications*,Ann.Statist.,6(1978)1184-1238.
12. Turyn,R. J., *An infinite class of Williamson Matrices* , Raytheon Co., Sudbury,Mass a chusetts 01776, Communicated by Marshall Hall, Jr. Received 30,1969.
13. Singh and Topno, *On the construction of Hadamard matrices of order 4n(n odd,n≥3) with Hadamard blocks of order 4*,Acta Ciencia Indica,vol XL M, No.3.309(2014).
14. Georgiou and Koukouvinos, *New infinite classes of weighing matrices*, Sankhya, Volume 64, Series B, Pt.1, pp 26-36,2002.
15. Xia, Ming-Yuan, Some Infinite Classes of Williamson Matrices and Weighing Matrices, Australasian journal of Combinatorics, 6, pp 107-110, 1992.
16. Seberry, J., An infinite family of skew-weighing matrices, Ars Combinatoria, 10, 323-329, 1980.

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