International Journal of
Advance and Innovative Research

(Conference Special)

(Part – 1)

INTERNATIONAL CONFERENCE

ON

Current Trends in Multidisciplinary Research

On 1st August 2021

Organized By

INDIAN ACADEMICIANS AND RESEARCHERS ASSOCIATION (IARA)

International Journal of Advance and Innovative Research

Editor- In-Chief   **Dr. Tazyn Rahman**

IJAIR

IMPACT FACTOR

7.36

ISSN : 2394-7780

Scientific Journal Impact Factor

CERTIFICATE OF INDEXING (SJIF 2018)

This certificate is awarded to

International Journal of Advance & Innovative Research
(ISSN: 2394-7780)

The Journal has been positively evaluated in the SJIF Journals Master List evaluation process
SJIF 2018 = 7.363

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Research Papers

A CROSS SECTIONAL STUDY TO EVALUATE THE KNOWLEDGE, ATTITUDE AND PRACTICES OF PHARM D STUDENTS ON PHARMACOVIGILANCE AND ADR

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ABSTRACT

Objective: The aim of this study was to assess and investigate the Knowledge, Attitude, and Practice of Pharmacovigilance (KAP) and ADR reporting among PHARM D students. The second objective was to determine the extent of awareness on adverse drug reaction reporting and attitudes towards the voluntary adverse drug reaction reporting.

Methods: A cross sectional questionnaire based study was conducted among 138 PHARM D students of VISTAS for a study period of six months with a predesigned questionnaire. Collected data were entered into Microsoft Excel (windows 8.1 version 2013). Evaluation was done by using Chi square test and Fischer exact test in graph pad. Graphical representations were used for visual interpretations of the analyzed data.

Results: Among 138 questionnaires only 110 duly filled completed questionnaires were received back. Awareness regarding "Pharmacovigilance Program of India" (PvPI) was found among 84% and 15.4% students were not aware of Pharmacovigilance Program. 46.2% of responders received some sort of formal training on ADR monitoring while only 53.8% of students didn't receive any sort of training regarding ADR monitoring. 69.2% students strongly agree that reporting ADR will improve patient care while 7.7% students have responded neutrally.

Conclusion: From the study we propose awareness about Pharmacovigilance and ADR reporting is on higher mark among PHARM D students. Improving awareness among other health professionals as well as the general population is necessary. The ADR reporting process should be in such a way that it is flawless, trouble free, commodious, and less time-wasting as possible.

KEYWORDS: Pharmacovigilance, ADR reporting, PHARM D students, awareness.

INTRODUCTION:

Pharmacovigilance (PV) is that the sum of activities associated with the detection, assessment, understanding, and prevention of ADRs caused by drugs [1]. In India, the national Pharmacovigilance Program of India (PvPI) was entrenched by the Central Drugs Standard Control Organization (CDSCO) in 2004 to watch ADRs and to supply drug safety reports to the WHO-ADR look up center in Uppsala, Sweden [2]. It is indisputable that under-reporting of suspected ADRs by health professionals may be a ubiquitous issue in India [3]. To achieve enhanced ADR reporting, it's highly salient to enhance the Knowledge, Attitude and Practice (KAP) of the healthcare professionals concerning ADR reporting and Pharmacovigilance. The First exposure to patients occurs during second year of PHARM D when the students go forward with postings. If we create proper awareness about the ADR reporting procedures during that period, it will be useful for improving the reporting rate and also they become completely aware of the importance of ADR reporting once they end up to be practitioners. Therefore this study was planned to evaluate the knowledge, attitude and practices (KAP) towards ADR reporting in PHARMD students. A dearth of knowledge of where, what and the way ADRs should be reported also affects reporting. The cause for reduced reporting additionally can include financial spur, legal outlook, assumption that the intense ADRs are before itself registered when a drug is brought about within the market and that one report would make no difference, ignorance (that only serious ADRs are to be reported) time shortage and over load. NCC has taken the initiative to undertake this by putting forward this matter in numerous forum and conferences, passing on questionnaire form, jotting down to professional bodies, scientific journals, etc. In the upcoming future, NCC may endorse Medical, Pharmacy and Nursing Councils of India to encompass Pharmacovigilance in their respective education curriculum. These initiatives could meliorate the number and quality of the reports. Pharmacovigilance Program of India can only be sparkling if it is brought about into the play functionally with active participation of

HCP's [4]. Adverse drug reactions (ADRs) are the foremost prevalent causes of perniciousness, mortality and impoverished outcomes. Hence, on this account after-marketing supervision is extremely predominant for observing and keeping an eye on the benefit-risk factors of the pharmaceutical marketed products. The responsibility of pharmacists has branched to other views of patients' care, which typically consists of ADR reporting, ameliorating patients' well-being and economic results. The pharmacists habitually have been portraying the part of formulating and dispensing medications, barely with lesser extent of providing services to the patients. Pharmaceutical care is something that is centered towards the patient and their outcome related proceedings that needs direct participation of pharmacists with the patients to stop diseases, improve health and drug therapy analysis to guarantee the well-fare and potency of medications. Community pharmacy is a healthcare organization that features a heightened opportunity for putting forth a trustworthy pillar of support and guidance on health and medicines to people and delivery of such professional services by community pharmacies come up with improved health results. Evaluating the knowledge, attitude and practice of community pharmacists concerning the spontaneous and voluntary reporting of ADRs is extremely crucial. Pharmacists with the required knowledge about ADR reporting process can also improve and encourage other healthcare professionals' knowledge regarding ADR reporting. In India studies concerned towards ADR reporting in a community like set-up are found to be in short terms as a result of less knowledge about the professional accountability. As Sufficient stimulation of the community pharmacists are likely to build up the system of reporting there's a requirement for structuring and bringing forth ADR monitoring and reporting system in community pharmacies. with these thoughts, the present study was formulated in such a way that it teaches and trains the community pharmacists in Pharmacovigilance services via continuing pharmacy education (CPE) and assessing the knowledge, attitude and practice of ADR monitoring and executing ADR reporting in their field of practice [5]. The rapid and constant advancement in medical and pharmaceutical sciences have made the prevalence of medicinal products in the Indian market to be safe and effective with proper surveillance. Disregarding the benefits that are analogous with the use of medicines, adverse effects are also connected with them. This has popped up the challenges of monitoring Adverse Drug Reactions (ADRs) over the wide population.

AIM AND OBJECTIVE:

Aim: The aim of this study was to assess the knowledge, Attitude, Practice of Pharmacovigilance (KAP) & ADR reporting among PHARM D students

Objective: Primary Objectives: To investigate the knowledge, attitudes, and practices concerned towads Pharmacovigilance (PV) and the reporting of adverse drug reactions (ADR) among PHARM D students.

Secondary Objective: the second objective was to show the extent of awareness on adverse drug reaction reporting and attitudes towards the voluntary adverse drug reaction reporting.

MATERIALS AND METHODS:

The site of the study was fixed to be VISTAS (Vels Institute of Science, Technology and Advanced Studies) the overall study was done here. We organized a cross sectional questionnaire based study to analyze the various segments of the knowledge, Attitude, Practice of Pharmacovigilance (KAP) & ADR reporting among PHARM D students along with it the extent of awareness the students had was also evaluated.

Nearly 138 students took part in the study which was conducted for a period of 6 months. Predesigned questionnaires containing the relevant questions based on the topic were used as a study tool to analyze the responders. Inclusion criteria included all PHARM D students who were willing to take part in the study.

Statistical analysis: Data were entered into Microsoft Excel (windows 8.1 version 2013) and Data will be collected and evaluated by using Chi square test & Fischer exact test in graph pad. Graphical representations were used for visual interpretations of the analyzed data.

Project work methodology: A predesigned questionnaire was distributed among PHARM D students and the data's were evaluated using graphical representation. A suitable validated Knowledge, Attitude, Practice (KAP) questionnaire based survey will be conducted among PHARM D students .KAP questionnaire was designed to assess the demographic details of PHARM D students ,their knowledge of Pharmacovigilance, attitudes towards Pharmacovigilance, and their practice on ADR reporting .Data will be collected and evaluated by using Chi square test & Fischer exact test in graph pad

RESULTS:

Demographic details

Gender
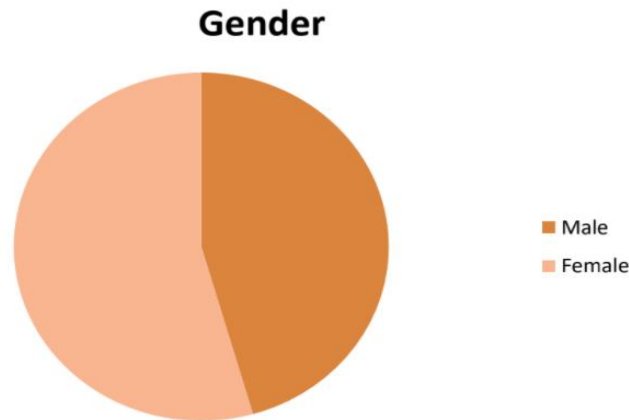
Among the response received 45.5% were male and 53.8% were female

Response rate

Among 138 questionnaires only 110 duly filled completed questionnaires were received back.

KNOWLEDGE

The responses to the knowledge-based questions in this study indicate an average degree of knowledge regarding diverse aspects of Pharmacovigilance. About 62.2% PHARM D students correctly spotted the WHO definition for Pharmacovigilance. Central Drug Standard Control Organization (CDSCO) was identified as the national body responsible for ADR monitoring by 93.3% students response and 6.3% students weren't aware of it. Awareness regarding "Pharmacovigilance Program of India" (PvPI) was found among 84% and 15.4% students were not aware of Pharmacovigilance Program
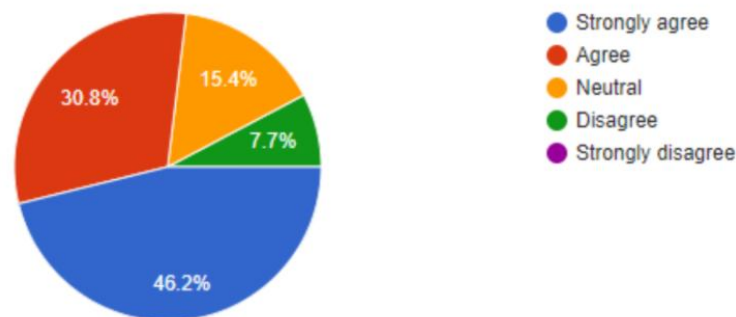
Figure 1: Reporting ADR a duty of healthcare professional. Majority of responders (i.e.46.2% students) believed healthcare professionals are responsible for ADR reporting as shown in figure 1.
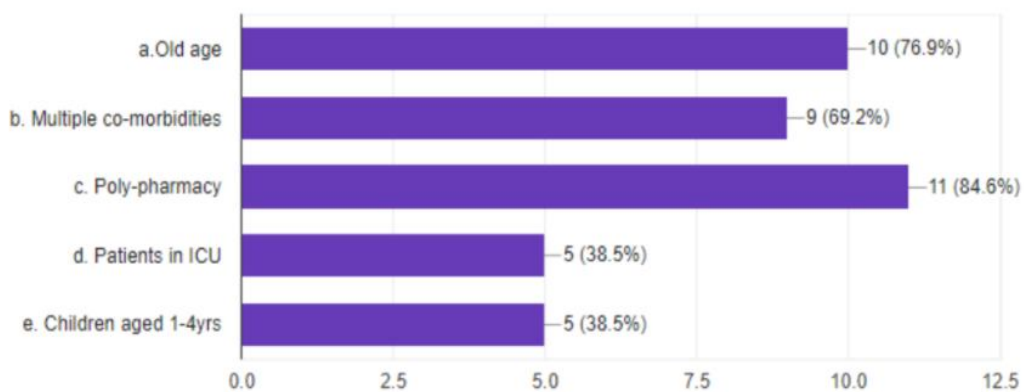
Figure 2: Reasons commonly associated with ADR

Majority of responders believe that poly-pharmacy, multiple co morbidities and old age are the main reasons for adverse drug reactions as shown in figure 2
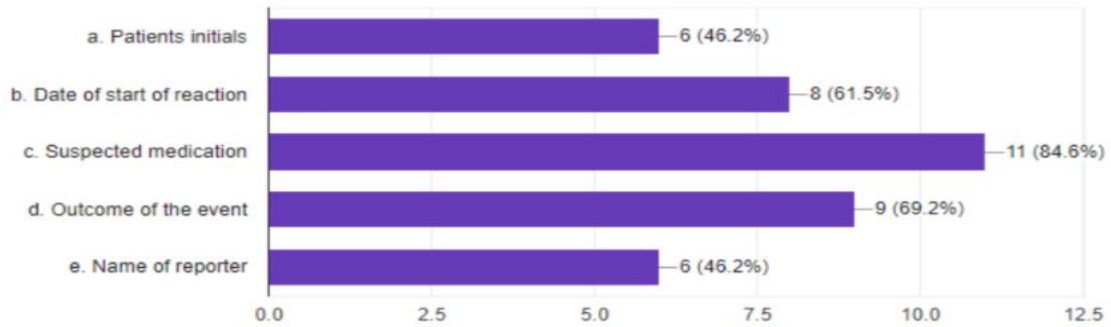
Figure 3: Information required while reporting an ADR

As per the data, suspected medication, outcome of the event and date of start of reaction were few among the high responded options for the needed information while reporting an ADR.

PRACTICE

Only 23% of the PHARM D documented a suspected ADR and documented it.. 46.2% of students read articles on prevention of ADRs. 46.2% of responders received some sort of formal training on ADR monitoring while only 53.8% of students didn't receive any sort of training regarding ADR monitoring.
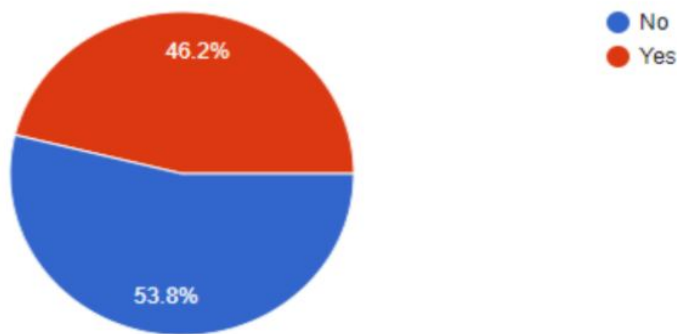
Figure1: PHARM D students trained on how to report ADRs.

ATTITUDE

Majority of the responders from both groups agreed that ADR reporting is a prime professional responsibility of a healthcare professionals and it should voluntarily be reported to a local ADR look up centre.
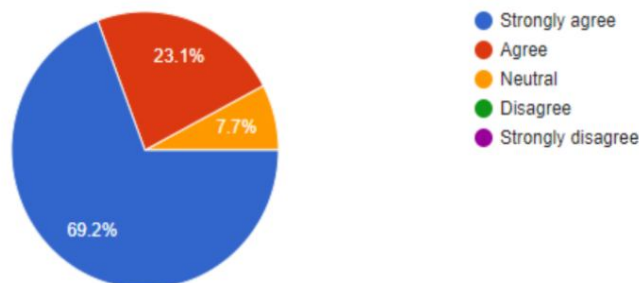
Figure1: ADR reporting enhances patient care.

However, lack of attitude, concern about regarding it as a medical negligence were also allied barriers cited. However serious and unusual reactions may encourage one to report the same. There's also a belief that the modern technology can be used to enhance ADR reporting. Strategies towards improvement in ADR reporting should be undertaken. Easy and accessible reporting mechanism followed by continuous medical education, training and proper sensitization were regarded as prime strategies.69.2% students strongly agree that reporting ADR will improve patient care while 7.7% students have responded neutrally .

DISCUSSION:

ADR-monitoring and reporting systems stimulates ADR surveillance, assist ADR documentation, advances the reporting of ADRs, contributes a processing system for observing the safety of drug use in high-risk patient populations, and also educates and encourages the health care professionals to identify and report potential ADRs. A complete, in progress ADR program must contain all possible workings for monitoring, identifying, assessing, documenting, and reporting ADRs with furthermore of stepping in and giving out valuable educational assessment as well as feedback to all prescribers, other health care professionals, including patients. Besides, ADR programs should have its attention on recognizing problems that paves way to ADRs, ground-working for a great positive alternate change and by evaluating and considering the results of these changed outcomes. Positive outcomes that have been resulted from an ADR program should be brought out in action to provide necessary support to the program's growth and progress. Spontaneous reporting of ADR is the most essential pre-requisite in maintaining patient safety. Being the basic component of national and international drug safety evaluation in post-approval phase, it may detect previously unrecognized adverse reactions and identify risk factors predisposing drug toxicity thereby investigating the causality. Various studies depict the incidence of ADR to be 2.4-6.5% in western countries, with only 6-10% of all ADRs being reported. The typical problem with Pharmacovigilance in India is overall less reporting of ADR which is chiefly a result of insufficiency in the amount of skilled resources; also there is only a scarce part of awareness about Pharmacovigilance between healthcare professionals [6]. The present study was thus aimed to analyze the Pharmacovigilance knowledge, ADR reporting behavior, and deterrents for ADR reporting, among pool of PHARM D students,. The study evaluated the knowledge, attitude and practices (KAP) of Doctor of pharmacy students about Pharmacovigilance. On equally distributing the questionnaires among PHARM D students, Knowledge regarding Pharmacovigilance was seen higher than the expected outcome. Determinants such as ability to correctly spot the WHO definition of Pharmacovigilance, identifying the national body responsible for ADR monitoring, awareness regarding national Pharmacovigilance program were all found to be on higher mark. There was a marked absence of sensitization regarding ongoing national Pharmacovigilance program, which is quite alarming. The dynamic and wide partaking of healthcare practitioners in the Pharmacovigilance program will polish up the reporting of ADRs [7]. Almost whooping amount of responders acknowledged that ADR reporting has to be the key skilled responsibility of a healthcare professional with regards to the society and it should be volitionally disclosed to the local ADR look up centre from where a proper feedback is expected. In spite of the continuous attempt by the Pharmacovigilance Program of India towards fostering the values of ADR monitoring; underreporting is yet widespread. It is found that only 6-10% of all ADRs are reported. Such high rate of underreporting is a matter of grave concern which can delay detection of serious ADRs and consequently have a major negative impact on the public health. PvPI recommends that all ADRs should be reported whether they are serious, non-serious, unusual, new, recognized and certain [8]. However there appears a deficiency in the knowledge and perception of physicians in relation to ADR reporting which should be removed in order to improve spontaneous reporting. Proper sensitization of the facts that all ADRs need to be reported is necessary. Multidisciplinary discussions can aid in dispersing the existing misinterpretation about Pharmacovigilance and ADR reporting, thereby this will pave way in modifying the attitudes of the practitioners who fail to report. Persisting attitude that single reporting makes no contribution also needs correction, as every single suspected ADR helps in 33 developing data base [9]. Such a change in attitude will be helpful in improving spontaneous ADR reporting in the long run. Another study in Eastern India also noted good knowledge about ADR reporting, but attitude and perception about the practice was a zone of consideration. 27 Majority (84%) of the respondents in this study did not receive any special training nor did they attend any educational seminar, workshop, continuing medical education (CME) on Pharmacovigilance, though all the respondents in the study did feel a necessity for the corresponding issue. Educational intercedes is one of the way to update knowledge and thereby bringing a large extent of consciousness regarding Pharmacovigilance [6, 8-10]. A Study done by Desai CK et al revealed the explanations quoted by prescribers for not reporting ADRs. shortfall of knowledge on how (68%) and where (70%) to report the ADRs and an absence of quick access to ADR reporting forms (49.2%) were the main prevalent factors that dispirited reporting. There are other factors that play a crucial role in ADR reporting like Human behavior, knowledge beliefs, and motivation. Under reporting of ADRs could be modified by various acts like educational interventions, which is primarily focused on modifying the above said factors. 39 Adverse drug reactions often go unnoticeable as the medical teams fail to acknowledge adverse drug events or to agree precisely with biochemical, pathological or radiological abnormality [10]. Thus, biochemical investigations and diagnostic tools can devour substantial number of ADRs and may play a crucial role in Pharmacovigilance

CONCLUSION:

The present study found the awareness about Pharmacovigilance and ADR reporting to be on higher mark among PHARM D students. To heighten ADR reporting, it is very essential to get continuous med – related education, further improvised training and proper sensitization of healthcare professionals. All these can improve the existing scenario and for a better tomorrow. The Pharmacovigilance Program of India must be widely publicized at a larger scope in the media both visually and via print, so that the general wide population can also be aware of it. Follow-up educational sensitization programs can also be conducted in all the ADR reporting centers daily, so that the need of Pharmacovigilance and ADR reporting can be emphasized. The process of reporting should be made flawless, trouble free, convenient, and less time-wasting as possible. The fact that majority of respondents agreed about reporting ADR being necessary and to enhance the awareness on Pharmacovigilance by educating about it in detail to healthcare professional points that they have already started to understand the importance of Pharmacovigilance.

CONFLICT OF INTEREST:

None

ETHICS STATEMENT:

None

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A COMPARATIVE STUDY ON LOGISTICS OF ONLINE AND OFFLINE MEDICINAL DRUGS

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ABSTRACT
Many countries have the matter of rising health care costs. Studies have shown that drug-related problems could cause additional health care expenses Johnson and Bootman have developed a model of drug-related morbidity and mortality to estimate health care costs associated with unresolved or unrecognized drug-related problems within the U.S. ambulatory care population. The estimate of the annual cost of drug-related morbidity and mortality in ambulatory care settings was $76.6 billion. The provision of pharmaceutical care in all ambulatory care Medicine settings would reduce the occurrence of negative therapeutic outcomes by 53-63% and avoid $45.6 billion in direct health care costs. One might consider this to be the cost of preventable drug-related morbidity and mortality. Therefore, something must be done to regulate both suffering and expenditure related to the drug-related problems. Pharmaceutical care role of Medicine can play an important role to manage a patient's drug therapy to improve patient outcomes in terms of clinical, economic and humanistic outcomes. However, there have been variety of barriers to supply pharmaceutical care. One of the most important barriers was lack of understanding of pharmaceutical care practice and of difference between traditional dispensing role of Medicine and new role of pharmaceutical care. It is essential for pharmacists to know the concept of latest practice before they adopt it. Thus, this paper was aimed to compare between the traditional and new roles of Medicine. Challenges of provision of pharmaceutical care were also described after the comparison.

Keywords: Pharmaceutical care, Observation, Simulation, Derived data

INTRODUCTION
This study was conducted to evaluate Medicine services to patients or customers with prescriptions issued by large hospitals. The primary purpose of this study is to assess patients 'perceptions and expectations of Medicine services with a view to standardizing community Medicinal drugs for better health care. Two groups of patients or Medicine patrons were evaluated, i.e. those who utilized Medicinal drugs adjacent to the hospitals (Group A) and those who utilized other community Medicinal drugs (Group B). The survey consisted of 26 evaluation functions ranging from location to services. Based on these functions, patients were requested to use a scale of 1 to 5 to rate the Medicine they are currently using ("Medicine Used Today") and their perception of an "Ideal Medicine". These evaluation functions were analysed and classified into seven dimensions which formed the evaluation index used in this study.

These are: (1) availability of over-the-counter drugs, (2) availability of special services such as delivery of medicines, acceptance of fax order, etc.,(3)facilities, (4) convenient location, (5) attitude of Medicine/pharmacist, (6) information management, and (7) convenient hours. In comparing the results of the study, it was revealed that both groups of patients/Medicine patrons have common expectations or perceptions as to what is an "Ideal Medicine". The results also revealed that of the seven dimensions mentioned above, the three most important to patients/patrons are: attitude of Medicine/pharmacist, convenient hours, and information management. In rating the "Medicine Used Today", Group A patrons gave lower ratings than Group B patrons in all dimensions except facilities. The variance between the "Medicine Used Today "and the "Ideal Medicine" is greater in Group A than in Group B. The results of this investigation indicate that the Group B patients/patrons have received greater amount of benefits of the "Bungyothan Group A ones, although the fact is that most outpatients use Medicinal drugs located adjacent to hospitals in order to obtain their medications.

EVOLUTION OF OFFLINE MEDICINE:
In an era of rapid change in health care delivery, the Medicine profession is experiencing significant growth and development. Although pharmacists represent a traditional health profession with ancient roots, they are often viewed with considerable ambiguity and uncertainty by those outside of the profession.

Traditionally, Medicine was regarded as a transitional discipline between the health and chemical sciences and as a profession charged with ensuring the safe use of medication. In the early 1900s, pharmacists fulfilled the role of apothecary —preparing drug products secundmartem (according to the art) for medicinal use. By the 1950s, large-scale manufacturing of medicinal products by the pharmaceutical industry, and the introduction of

prescription- only legal status for most therapeutic agents, limited the role of pharmacists to compounding, dispensing and labelling prefabricated products.

In response, by the mid-1960s pharmacists had evolved toward a more patient-oriented practice and developed the concept of clinical Medicine. This marked the beginning of a period of rapid transition that was characterized by an expansion and integration of professional functions, as well as increased professional diversity and closer interaction with physicians and other health care professionals. By the early 1990s the pharmaceutical care model wasadopted to emphasize that the role of the pharmacist involves "the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life.

EVOLUTION OF ONLINE MEDICINE:

Medicines are available for sale both on sites identifying themselves as 'Medicinal drugs' and those that do not. In parallel with other types of online retailers, the market is split between those who extended their offline presence (like Boots and Walgreens) and those who entered the market as a purely online brand (like Medicine2U and Kwikmed). Gallagher and Colaizzi asserted in 2000 that 'As Internet Medicine has grown in the past year, it has become apparent to the major Medicine chains that they must pursue the online route as well to prevent a loss of market share. Information or advice might be personalised (through personal email/message board/live chat contact) or general (hosted on static pages and as FAQs).Information might also be self-generated or streamed/syndicated (suchas the partnership between Boots UK and WebMD,or Medicine 2Uand PatientUK).

A paper as early as 1999 indicated that 'the prototypical web consumer leads a wired lifestyle and is time starved', and that this was more likely to predict online purchasing behaviour than demographic factors2. The authors also asserted that looking for product information on the Internet was the most important predictor of online buying behaviour. A study of 300 UK consumers in 2004 resulted in a more sophisticated consumer typology that describes different motivations for buying medicines or healthcare products online.

An online Medicine might fulfill any or all of a number of functions:

- The sale or supply of medicines, including repeat prescriptionservices

- The sale or supply of other healthcareproducts

- Providing information aboutmedicines

- Providing advice aboutsymptoms

- Hosting online supportgroups

INDIAN PHARMA MARKET TRENDS 2015-2019
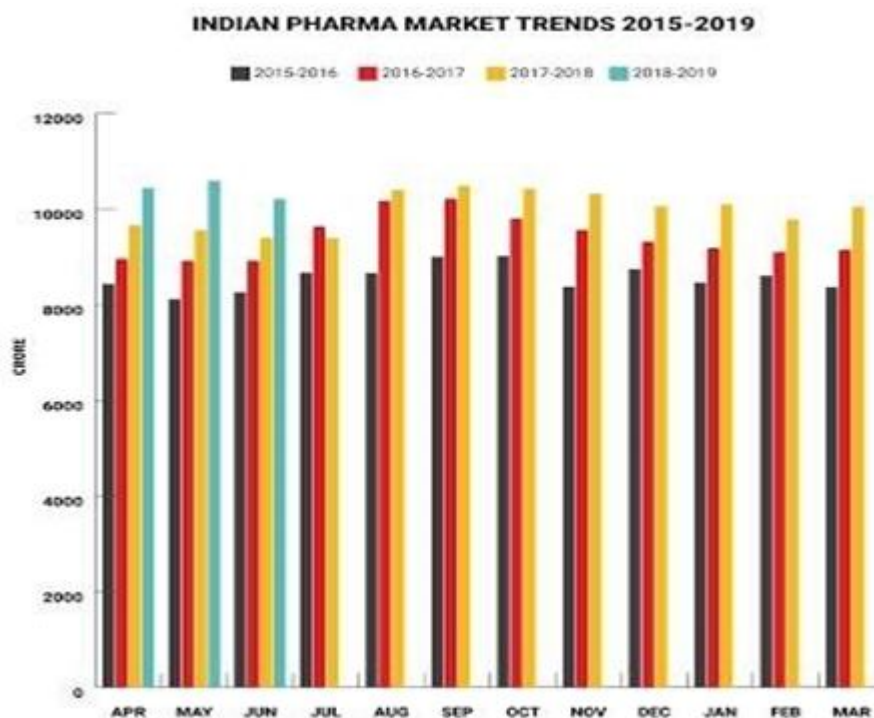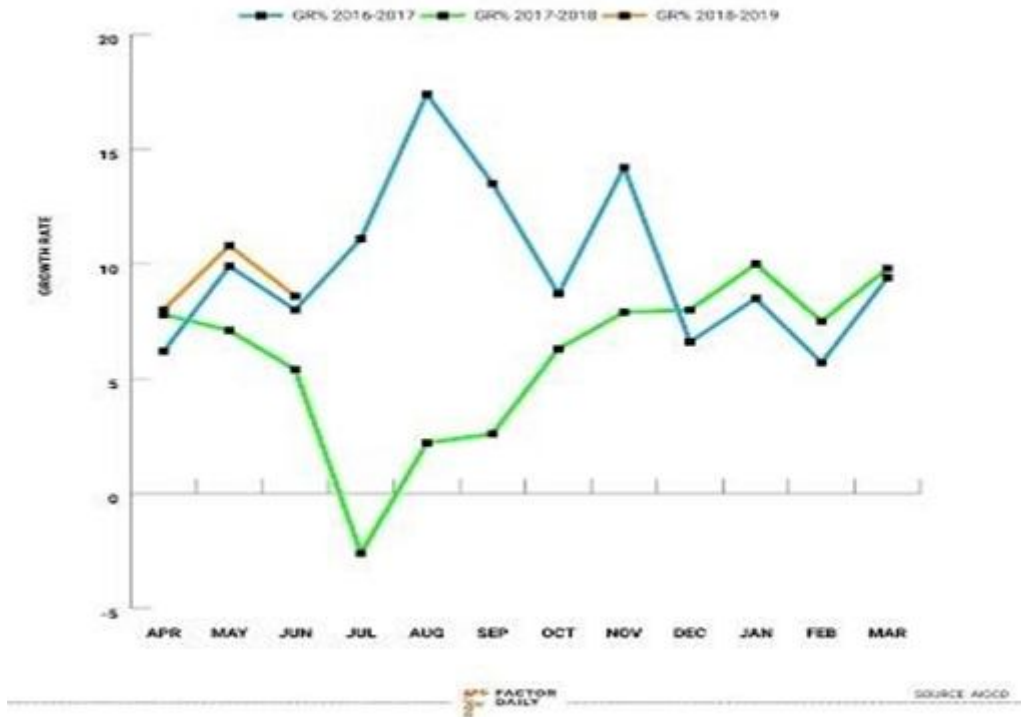
Online Medicinal drugs offer better pricing than offline stores, with increased access, lower transaction and product costs, convenience and greater anonymity for consumers. They offer accessibility to people with limited mobility and people in remote areas

Fig.3

Online pharmacy vs conventional pharmacy

	E-pharmacy/online pharmacy	Conventional/off-line pharmacy
Convenience	More convenient as one can order drugs online from anywhere	Less convenient as patients need to go to a store to buy medicines
Time	Saves time. Provide doorstep delivery	Time consuming
Cost	Offer lower prices by passing the savings on bulk buying to customers in the form of discounts	Margins are lower, so they are not in position to offer discounts like online pharmacies
Availability	Larger inventory and procurement ability	Limited inventory
Range	Many provide suggestions on substitutes and have a great range	Limited rage
Confidentiality	Maintain confidentiality and privacy of patients about drugs and diseases	Since patients ask for drugs while standing at store, they find it hard to describe their requirements on many specific diseases and drugs.
Medical information	Many e-pharmacies provide detailed information about drugs like ingredients, substitutes, drug uses, adverse effects, which are useful for evaluation purposes.	No such information is readily available.

Source: Televisory's Research
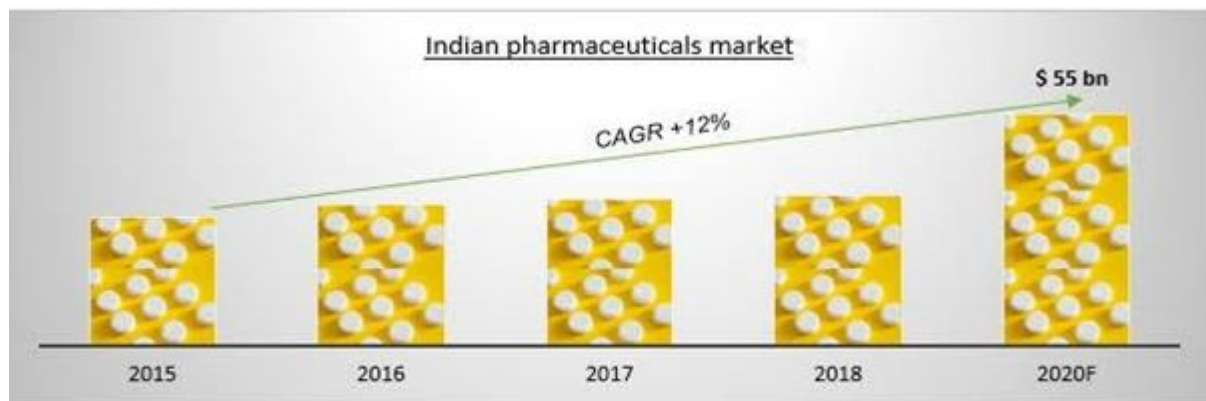
Source: Invest India, IBEF

RESEARCHMETHODOLOGY

Observational data are captured through observation of a behavior or activity. Experimental data are collected through active intervention by the researcher to produce and measure change or to create difference when a variable is altered. Simulation data are generated by imitating the operation of a real-world process or system over time using computer test models. Derived data involves using existing data points, often from different data sources, to create new data through some sort of transformation, such as an arithmetic formula or aggregation.

This study is done by Derives data basis.

Fig.4

OBJECTIVES OF STUDY:

The objective of the study is to examine and analyze present scenario -a) of both offline and online Medicinal drugs & b) Govt. role in this perspective.

First, At present there is a lot of misunderstanding about e- Medicinal drugs particularly those are doing offline business in this segment. At present the leading eMedicine players are- 1mg, Netmeds, MChemist, Myra, Medlife etc. Today around 150 startups are currently operating as online Medicine. India needs an effective regulatory mechanism regarding this aspect. this research focus on the present situation of retail Medicine sector of India.

Pharma retail industry is sensitive zone because it is related to patients' health.

Second we have analysed the advantages and disadvantages of pharma retail industry.

Third as no such guidelines are there particularly from Government level. Therefore, Government should look after the matter carefully.

Fourth as retail pharma chains are coming out(Offline) and lots of starts up business are already there, therefore how to reach more number of customers, generate revenues and brand development is extremely important and strategy formulations are also vital.

DATA COLLECTED:

Data's collected based on the comparison between online and offline Medicinal drugs based on various determinants are tabulated below.

Table 1: Factors Considered for Selecting the Present Location of Store

Sl. No.		Ranks						Total
		1	2	3	4	5	6	
1	Prime Location	2	24	0	14	0	6	109
2	Nearness to Doctors/Hospitals	6	4	0	8	22	0	109
3	Residential area	19	10	22	8	10	0	109
4	Demographic factor of the customers	16	24	55	0	2	0	109
5	Capital that I can allocate for hiring/buying the store	20	19	16	44	0	2	109
6	Absence/Less number of nearby pharmacy stores	30	26	8	4	25	0	109
7	Non-availability of a store either to buy/hire so I was forced to choose the present location	8	0	2	31	50	10	109
8	Inheritance	8	2	6	0	0	91	109
	Total	109	109	109	109	109	109	

Source: Primary data

Table 2: Weighted Garrett Score and Garrett Ranks on the Factors Considered for Selecting the Present Location of Store

Sl. No.		Ranks								Total Weighted Garrett Score	Weighted Average	Rank
		1	2	3	4	5	6	7	8			
1	Prime Location	1360	3128	120	1272	0	560	0	120	6560	60.18349	2
2	Nearness to Doctors/Hospitals	4640	748	360	212	0	320	726	0	7006	64.27523	1
3	Residential area	480	2312	1140	530	1034	320	330	0	6146	56.38532	3
4	Demographic factor of the customers	800	136	960	1272	2585	0	66	0	5819	53.38532	4
5	Capital that I can allocate for hiring/buying the store	640	0	1200	1007	752	1760	0	40	5399	49.53211	6
6	Absence/Less number of nearby pharmacy stores	0	1088	1800	1378	376	160	825	0	5627	51.62385	5
7	Non-availability of a store either to buy/hire so I was forced to choose the present location	640	0	480	0	94	1240	1650	200	4304	39.48624	7
8	Inheritance	160	0	480	106	282	0	0	1820	2848	26.12844	8

Source: Primary data

Table 3: Factors Considered While Purchasing Medicines for Your Shop

Sl. No.		Ranks					Total
		1	2	3	4	5	
1	Frequency of prescription by Doctors	71	30	8	0	0	109
2	Customer enquiry	24	34	43	8	0	109
3	Over the counter sales	14	45	41	9	0	109
4	Price factor	0	0	9	80	20	109
5	Any other reason	0	0	8	12	89	109
	Total	109	109	109	109	109	

Source: Primary data

Table 4: Weighted Garrett Score and Garrett Ranks

Sl. No.	Reason	Ranks					Total Weighted Garrett Score	Weighted Average	Rank
		1	2	3	4	5			
1	Frequency of prescription by Doctors	5325	1800	400	0	0	7525	69.0367	1
2	Customer enquiry	1800	2040	2150	320	0	6310	57.88991	2
3	Over the counter sales	1050	2700	2050	360	0	6160	56.51376	3
4	Price factor	0	0	450	3200	480	4130	37.88991	4
5	Any other reason	0	0	400	480	2136	3016	27.66972	5

Source: Primary data

Table 5: Financial Problems Faced by More Experienced and Lesser Experienced Medical Stores

Sl. No.	Problems	Type of Medical Stores		Total	F-Test Results
		More Experienced	Lesser Experienced		
1.	Fund Management	3.85	3.06	3.4	10.680*
2.	High rental	3.98	3.87	3.92	0.179
3.	inadequate capital	3.23	3.19	3.21	0.035
4.	Inadequate loan facility	2.66	2.87	2.78	0.661
5.	Higher interest rates for loan	2.74	3.03	2.91	0.873

Source: Computed data

LIMITATIONS:
This research has highlighted the present situation of the retail pharma sector of India. We have not discussed about OTC (Over the counter) drugs and its sales in India here. In India OTC drugs have a different meaning and future work on this aspect will give new dimension. Further quantitative research can be done from this.

FINDINGS
The sale and distribution of drugs in the country falls under the Drugs and CosmeticsRules,1945 However, the rules do not distinguish between offline and online sale of drugs. As a result, even after more than seven decades the matteris still debatable. In India mainly two categories of drugs are available a) Prescription drugs b) Nonprescription drugs. The issues are due to online sale of prescription drugs. The reasons for this debate is stated below-The Drugs and Cosmetics Rules 1945 identify certain drugs that can be sold only through on production of a prescription signed by Registered Medical Practitioner (RMP). Online Medicinal drugs must accept prescriptions through scanned or electronic form to process purchase orders of prescription drugs otherwise it will be difficult to adhere the rules. (Antani & Shukla,2015). According to the Information Technology Act 2000 ''if a document is required to be signed under law, the document would be deemed to be in compliance with the law only if such information or matter is authenticated by means of an electronic signature." (Antani & Shukla,2015).Therefore, a scanned copy of the prescription or the prescription in electronic form would be valid if the RMP affixes his electronic signature to it. This is really a mammoth task for these online Medicinal drugs because less than 1% of RMPsusingelectronicsignature.ApartfromthatUndertheDrugs and Cosmetics Rules, 1945 registered pharmacist is required, the drug has to be dispensed under his supervision and he has to make a note that based on the prescriptionthedrughasbeengiven.Nowthequestionishowsuchanotecanbe given on scanned or electronic copy of a prescription.

SUGGESTIONS
This study has a number of managerial implications, first of all this research focus on the present situation of retail Medicine sector of India. India needs a lot more of awareness and more facilities to succeed in online Medicine. Pharma retail industry is sensitive zone because it is related to patients' health. Second we have analyzed the advantages and disadvantages of pharma retail industry. Third as no such guidelines are there particularly from Government level. Therefore, Government should look after the matter carefully. Fourth as retail pharmachains are coming out(Offline) and lots of starts up business are already there, therefore how to reach more number of customers, generate revenues and brand developmentisextremelyimportantandstrategyformulationsarealsovital.This research provides valuable insights about the industry and the findings and insights will have important implications for the service providers and those who are expected to take entry in this field.

CONCLUSION
At present the leading e Medicine players are- 1mg, Netmeds, MChemist, Myra, Medlifeetc. Today around 150 startups are currently operating as online Medicine. India needs an effective regulatory mechanism regarding this aspect. Both the AICOD and IIPA have right to demand. Government should come with proper solution so that both the parties are benefitted. India is a vast country and online Medicinal drugs need to operate. At present e-Medicine is at its initial stage in India, but it has the great potential in the near future. The factors leading to the demand for e-Medicine in India is mainly because of unsatisfied medical needs due to larger population and increase the usage of internet. As the consumer behavior in India is fast changing, there is a huge

demand to access wide range of products at the click of computer, and at competitive prices. But we need to think that most of the rural places there are no internet facilities even today.)

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A CONSEQUENCE OF FUZZY SOFT IDEAL SUBHEMIRING OVER t-CONORM

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ABSTRACT
In this manuscript, we made an endeavour to study the algebraic character of an S-fuzzy soft ideal subhemirings of a hemiring and a few of its properties. 2010 AMS Subject Classification: 03E72, 08A72, 06D72

Keywords: fuzzy soft subhemiring, S-fuzzy soft subhemiring, S-fuzzy soft ideal subhemiring.

1. INTRODUCTION

Uncertainty is present in almost every sphere of our daily life. Traditional mathematical tools are not sufficient to handle all the practical problems in fields such as medical science, social science, engineering, economics, etc. involving uncertainty of various types. The fuzzy set Theory approach is found most appropriate for dealing with uncertainties. In many complicated problems arising in the fields of engineering, social science, economics, medical science etc. involving uncertainties, classical methods are found to be inadequate in recent times. There are tools such as the Theory of Probability, Evidence Theory, Fuzzy Set Theory, Intuitionist Fuzzy Set Theory, Rough Set Theory etc. to deal with such problems. However these theories sometimes fail to handle uncertainty properly. The absence of any restrictions on the approximate description in Soft Set Theory is making this theory more convenient. In 1965, Zadeh [13] develops a theory called Fuzzy Sets whose objects extend with boundaries that are not precise. Based on the work of Molodtsov [9], Maji et al.,[8] initiated the theoretical study of the soft set theory. This includes, the definition of soft subset, soft superset, equality of soft sets, and complement of a soft set among others. Recently, Neog and Sut[10,11] have studied and improved the notions of fuzzy soft union, fuzzy soft intersection, complement of a fuzzy soft set and several other properties of fuzzy soft sets along with examples and proofs of certain results. In this manuscript we have deal with the properties of S-fuzzy soft ideals subhemiring of a hemiring.

2. PRELIMINARIES

2.1 Definition

A function $S:[0,1]\times[0,1] \to[0,1]$ is termed t-conorm as well as it accomplish the resulting axioms:

$S_1: S(x,0)$, for every $x \in [0,1]$ -'0' is neutral element

$S_2: S(x,y)$, for every $x,y \in [0,1]$- Commutativity

$S_3: S(x,S(y,z)) = S(S(x,y),z)$, for every $x,y,z \in [0,1]$- Associativity

$S_4: S(x,y) \le S(z,w)$, whenever $x \le z, y \le w$ -Monotonicity

2.2 Definition:

Let (A,M) as well as (U,P) be S- fuzzy soft subset of sets J & K, in that order. The product of (A,M) & (U,P) is , $(A,M)\times (U,P)=\{\langle (m_{(A,M)},h_{(A,M)}),Ƕ_{(A,M)} (m_{(A,M)} h_{(A,M)} \rangle$ /On behalf of each $m_{(A,M)}$ in J and $h_{(A,M)}$ in K }, wherever $Ƕ_{(A,M)} (m_{(A,M)} h_{(A,M)}) = S\{Ƕ_{(A,M)}(m_{(A,M)},Ƕ_{(A,M)}h_{(A,M)})\}$.

2.3 Definition:

Let (A,M) be a S-fuzzy soft subset in a set G, formerly fuzzy soft relation on (A,M) is (G,E) particular by $Ƕ_{(A,M)} (m_{(A,M)} h_{(A,M)}) = S\{ Ƕ_{(A,M)} (m_{(A,M)}, Ƕ_{(A,M)}h_{(A,M)})\}$, On behalf of each $m_{(A,M)}$ & $h_{(A,M)}$ in G.

2.4 Definition

Let $(R, +, \cdot)$ be a ring . A T –fuzzy soft subset (F,A) of R is said to be a**–fuzzy soft ideal (SFSI)** of R if the following conditions are satisfied:

1. $Ƕ_{(F,A)} (x+y) \ge S \{Ƕ_{(F,A)} (x) , Ƕ_{(F,A)} (y)\}$,

2. $Ƕ_{(F,A)} (xy) \ge S \{ Ƕ_{(F,A)} (x) , Ƕ_{(F,A)}(y)\}$, for all x and y in R.

2.5 Definition:

An S-fuzzy soft subhemiring (A,M) of a hemiring R be well-known as a S-fuzzy soft characteristic subhemiring of R circumstance $Ƕ_{(A,M)} (m_{(A,M)})= Ƕ_{(A,M)} (\tau(m_{(A,M)}))$, On behalf of each $m_{(A,M)}$ within R in addition to τ in Aut (R).

3. S-FUZZY SOFT IDEAL SUBHEMIRING OF A HEMIRING
3.1 Theorem:
Let $(R, +, .)$ be a hemiring. Intersection of any two S-fuzzy soft ideal of a hemiring R is a S-fuzzy soft ideal of R.

Proof:

Let (A,M) and $(E,К)$ be any two S-fuzzy soft ideal subhemiring of a hemiring R and

Let $i_{(A,M)}$ and $j_{(A,M)}$ in R.

Let $(A,M) \qquad = \{(i_{(A,M)}, Ħ_{(A,M)}(i_{(A,M)}) / i_{(A,M)} \in R \}$

$(E,К) \quad = \{(i_{(E,К)}, Ħ_{(E,К)}(i_{(E,К)}) / i_{(E,К)} \in R \}$ and also

Let $(X,O) \qquad = (A,M) \cap (E,К)$

$= \{(i_{(X,O)}, Ħ_{(X,O)}(i_{(X,O)}) / i_{(X,O)} \in R \}$ where

$Ħ_{(X,O)}(i_{(X,O)}) \qquad = S\{Ħ_{(A,M)}(i_{(A,M)}), Ħ_{(E,К)}(i_{(E,К)}) \}$

At this instant,

$Ħ_{(X,O)}(i_{(X,O)} + j_{(X,O)}) = S\{ Ħ_{(A,M)}(i_{(A,M)} + j_{(A,M)}), Ħ_{(E,К)}(i_{(E,К)} + j_{(E,К)}) \}$

$\geq S\{S\{Ħ_{(A,M)}(i_{(A,M)}, Ħ_{(A,M)}(j_{(A,M)}\},$

$S\{Ħ_{(E,К)}(i_{(E,К)}), Ħ_{(E,К)}(j_{(E,К)}) \}\}$

$= S\{S\{ Ħ_{(A,M)}(i_{(A,M)}), Ħ_{(E,К)}(i_{(E,К)}) \},$

$S\{ Ħ_{(A,M)}(j_{(A,M)}), Ħ_{(E,К)}(j_{(E,К)}) \}\}$

$= S \{ Ħ_{(X,O)}(i_{(X,O)}), Ħ_{(X,O)}(j_{(X,O)}) \}.$

$Ħ_{(X,O)}(i_{(X,O)} + j_{(X,O)}) \qquad \geq S\{ Ħ_{(X,O)}(i_{(X,O)}), Ħ_{(X,O)}(j_{(X,O)}) \},$

On behalf of entirely $i_{(X,O)}$ and $j_{(X,O)}$ in R.

And, $Ħ_{(X,O)}(i_{(X,O)} j_{(X,O)}) = S\{ Ħ_{(A,M)}(i_{(A,M)} + j_{(A,M)}), Ħ_{(E,К)}(i_{(E,К)} + j_{(E,К)}) \}$

$\geq S\{S\{ Ħ_{(A,M)}(i_{(A,M)}, Ħ_{(A,M)}(j_{(A,M)}) \}, S\{ Ħ_{(E,К)}(i_{(E,К)}), Ħ_{(E,К)}(j_{(E,К)}) \}\}$

$\geq S\{S\{ Ħ_{(A,M)}(i_{(A,M)}), Ħ_{(E,К)}(i_{(E,К)}) \}, S\{ Ħ_{(A,M)}(j_{(A,M)}), Ħ_{(E,К)}(j_{(E,К)}) \}\}$

$= S\{ Ħ_{(X,O)}(i_{(X,O)}), Ħ_{(X,O)}(j_{(X,O)}) \}.$

$ħ_{(X,O)}(i_{(X,O)} j_{(X,O)}) \geq S\{ Ħ_{(X,O)}(i_{(X,O)}), Ħ_{(X,O)}(j_{(X,O)}) \},$

On behalf of entirely $i_{(X,O)}$ and $j_{(X,O)}$ in R.

$(E,К)$ is a S-fuzzy soft ideal subhemiring of a hemiring R.

For that reason, intersection of any two S-fuzzy soft ideal of a hemiring R is a S-fuzzy soft ideal of R.

3.2 Theorem:
Let $(R, +, .)$ be a hemiring. The intersection of a family of S-fuzzy soft ideal of R is an S-fuzzy soft ideal of R.

Proof:

Let $\{(A,M)_u\} u \in U$ be a family of S-fuzzy soft ideal subhemiring of a hemiring R

and Let $(A,M) = \prod_{u \in U}(A, M)$ Let $i_{(A,M)}$ and $j_{(A,M)}$ in R. Then,

$Ħ_{(A,M)}(i_{(A,M)} + j_{(A,M)}) = \inf_{u \in U} Ħ_{(A,M) u}(i_{(A,M)} + j_{(A,M)})$

$\geq \inf_{u \in U} S\{ Ħ_{(A,M) u}(i_{(A,M)}), Ħ_{(A,M) u}(j_{(A,M)}) \}$

$= S\{ \inf_{u \in U} Ħ_{(A,M) u}(i_{(A,M)}), \inf_{u \in U} Ħ_{(A,M) u}(j_{(A,M)}) \}$

$= S\{ Ħ_{(A,M)}(i_{(A,M)}), Ħ_{(A,M)}(j_{(A,M)}) \}.$

$Ħ_{(A,M)} (i_{(A,M)} + j_{(A,M)}) \geq S\{ Ħ_{(A,M)} (i_{(A,M)}), Ħ_{(A,M)} (j_{(A,M)})\}$,

On behalf of entirely $i_{(A,M)}$ and $j_{(A,M)}$ in R .

$Ħ_{(A,M)} (i_{(A,M)} j_{(A,M)}) = \inf_{u \in U} Ħ_{(A,M) u}(i_{(A,M)} j_{(A,M)})$

$\geq \inf_{u \in U} S\{ Ħ_{(A,M) u}(i_{(A,M)}), Ħ_{(A,M) u}(j_{(A,M)}) \}$

$\geq S\{\inf_{u \in U} Ħ_{(A,M) u}(i_{(A,M)}), \inf_{u \in U} Ħ_{(A,M) u}(j_{(A,M)})\}$

$= S\{ Ħ_{(A,M)} (i_{(A,M)}), Ħ_{(A,M)} (j_{(A,M)})\}.$

$Ħ_{(A,M)} (i_{(A,M)} j_{(A,M)}) \geq S\{ Ħ_{(A,M)} (i_{(A,M)}), Ħ_{(A,M)} j_{(A,M)})\}$,

On behalf of entirely $i_{(A,M)}$ and $j_{(A,M)}$ in R .

i.e., (A,M) is an S-fuzzy soft ideal subhemiring of a hemiring R.

Hence the theorem.

3.3 Theorem:

If (A,M) and (O,E) are any two S-fuzzy soft ideal subhemiring of the hemirings R_1 and R_2 respectively, then (A,M) $\times$ (O,E) is an S-fuzzy soft ideal of $R_1 \times R_2$.

Proof:

Let (A,M) and (O,E) be two S-fuzzy soft ideal subhemiring of a hemiring R_1 and R_2 correspondingly. Let $i_{(A,M)1}$ and $i_{(A,M)2}$ be in R_1, $j_{(O,E)1}$ and $j_{(O,E)2}$ be in R_2. Then $(i_{(A,M)1}, j_{(O,E)1})$ and $(i_{(A,M)2}, j_{(O,E)2})$ are in $R_1 \times R_2$.

At this instant,

$Ħ_{(A,M) \times (O,E)} [(i_{(A,M)1}, j_{(O,E)1}) + (i_{(A,M)2}, j_{(O,E)2})]$

$= Ħ_{(A,M) \times (O,E)} (i_{(A,M)1} + i_{(A,M)2}, j_{(O,E)1} + j_{(O,E)2})$

$= S\{ Ħ_{(A,M)} (i_{(A,M)1} + i_{(A,M)2}), Ħ_{(O,E)} (j_{(O,E)1} + j_{(O,E)2}) \}$

$\geq S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)} (i_{(A,M)2}) \},$

$S\{ Ħ_{(O,E)} (j_{(O,E)1}), Ħ_{(O,E)} (j_{(O,E)2}) \}$

$= S\{S\{Ħ_{(A,M)} (i_{(A,M)1}), Ħ_{(O,E)} (j_{(O,E)1}) \},$

$S\{ Ħ_{(A,M)} (i_{(A,M)2}), Ħ_{(O,E)} (j_{(O,E)2}) \}\}$

$= S\{ Ħ_{(A,M) \times (O,E)} (i_{(A,M)1}, j_{(O,E)1}), Ħ_{(A,M) \times (O,E)} (i_{(A,M)2}, j_{(O,E)2}) \}.$

Now, $Ħ_{(A,M) \times (O,E)} [(i_{(A,M)1}, j_{(O,E)1}) + (i_{(A,M)2}, j_{(O,E)2})]$

$\geq S\{ Ħ_{(A,M) \times (O,E)} (i_{(A,M)1}, j_{(O,E)1}), Ħ_{(A,M) \times (O,E)} (i_{(A,M)2}, j_{(O,E)2}) \}.$

Also, $Ħ_{(A,M) \times (O,E)} [(i_{(A,M)1}, j_{(O,E)1})(i_{(A,M)2}, j_{(O,E) 2})]$

$= Ħ_{(A,M) \times (O,E)} (i_{(A,M)1} i_{(A,M)2}, j_{(O,E)1} j_{(O,E)2})$

$= S \{ Ħ_{(A,M)} (i_{(A,M)1} i_{(A,M)2}), Ħ_{(O,E)} (j_{(O,E) 1} j_{(O,E) 2})\}$

$\geq S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)} (i_{(A,M)2}) \},$

$S\{ Ħ_{(O,E)} (j_{(O,E)1}), Ħ_{(O,E)} (j_{(O,E) 2}) \}\}$

$\geq S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)}(j_{(O,E)1}) \},$

$S\{Ħ_{(A,M)}(i_{(A,M)2}), Ħ_{(A,M)}(j_{(O,E) 2}) \}\}$

$= S\{ Ħ_{(A,M) \times (O,E)} (i_{(A,M)1}, j_{(O,E)1}), Ħ_{(A,M) \times (O,E)} (i_{(A,M)2}, j_{(O,E) 2}) \}.$

$Ħ_{(A,M) \times (O,E)} [(i_{(A,M)1}, j_{(O,E)1})(i_{(A,M)2}, j_{(O,E)2})]$

$\geq S\{ Ħ_{(A,M) \times (O,E)} (i_{(A,M)1}, j_{(O,E) 1}), Ħ_{(A,M) \times (O,E)} (i_{(A,M)2}, j_{(O,E) 2}) \}.$

For that reason, (A,M) $\times$ (O,E) is an S-fuzzy soft ideal of hemiring of $R_1 \times R_2$.

3.4 Theorem:

Let (A,M) and (O,E) be S-fuzzy soft ideal of the hemirings R_1 and R_2 correspondingly. Presume so as to e and e_l are the identity element of R_1 and R_2 respectively. If $(A,M) \times (O,E)$ is a S-fuzzy soft ideal of $R_1 \times R_2$, then at least one of the following two statements must hold.

(i) $Ħ_{(O,E)}$ $(e_{l(O,E)}$ $) \geq Ħ_{(A,M)}$ $(i_{(A,M)})$ On behalf of entirely $i_{(A,M)}$ in R_1,

(ii) $Ħ_{(A,M)}(e_{(A,M)}) \geq Ħ_{(O,E)}$ $(j_{(O,E)}$ $)$,On behalf of entirely $j_{(O,E)}$ in R_2.

Proof:

Let $(A,M) \times (O,E)$ be an S-fuzzy soft ideal of $R_1 \times R_2$. By contraposition, suppose that none of the statements (i) and (ii) holds. Then we can find $q_{(A,M)}$ in R_1 and $p_{(O,E)}$ in R_2 such that

$Ħ_{(A,M)} (q_{(A,M)} > Ħ_{(O,E)}$ $e_{l(O,E)}$ $)$, and $(Ħ_{(O,E)}$ $(p_{(O,E)}$ $)) > Ħ_{(A,M)} (e_{(A,M)}$ $)$,

$Ħ_{(A,M) \times (O,E)}$ $(q_{(A,M)}$ $p_{(O,E)}$ $) = S\{ Ħ_{(A,M)} (q_{(A,M)}$ $Ħ_{(O,E)}$ $(p_{(O,E)}$ $)\}$

$> S \{ Ħ_{(O,E)}$ $(e_{l(O,E)}$ $), Ħ_{(A,M)} (e_{(A,M)}$ $) \}$

$= S \{ Ħ_{(A,M)} (e_{(A,M)}$ $), Ħ_{(O,E)}$ $(e_{l(O,E)}$ $) \}$

$= Ħ_{(A,M) \times (O,E)}$ $(e_{(A,M)}, e_{l(O,E)}$ $)$.

Thus $(A,M) \times (O,E)$ is not an S-fuzzy soft ideal of $R_1 \times R_2$.

3.5 Theorem:

Let (A,M) and (O,E) be two S-fuzzy soft subsets of the hemirings R_1 and R_2 correspondingly and $(A,M) \times (O,E)$ is an S-fuzzy soft ideal of $R_1 \times R_2$. Then the following are true:

(i) if $Ħ_{(A,M)} (i_{(A,M)}$ $) \leq Ħ_{(O,E)}$ $(e_{(O,E)})$, then (A,M) is an S-fuzzy soft ideal of R_1.

(ii) if $Ħ_{(O,E)} (i_{(O,E)}$ $) \leq Ħ_{(A,M)} (e_{(A,M)}))$, then (O,E) is an S-fuzzy soft ideal of R_2.

(iii) either (A,M) is an S-fuzzy soft ideal of R_1 or (O,E) is an S-fuzzy soft ideal of R_2.

Proof:

Let $(A,M) \times (O,E)$ be an S-fuzzy soft ideal of $R_1 \times R_2$ and $i_{(A,M)}$ and $j_{(A,M)}$ in R_1 and $e_{l(O,E)}$ in R_2. Then $(i_{(A,M)}, e_{l(O,E)})$ and $(j_{(A,M)}, e_{l(O,E)})$ are in $R_1 \times R_2$.

At this instant,

$Ħ_{(A,M)} (i_{(A,M)}$ $) \leq Ħ_{(O,E)} (e_{l(O,E)})$ On behalf of entirely $i_{(A,M)}$ in R_1.

$Ħ_{(A,M)} (i_{(A,M)} + j_{(A,M)}$ $) = S\{ Ħ_{(A,M)} (i_{(A,M)} + j_{(A,M)}$ $), Ħ_{(O,E)} (e_{l(O,E)} + e_{l(O,E)}\}$

$= Ħ_{(A,M) \times (O,E)}(i_{(A,M) \times (O,E)} + j_{(A,M) \times (O,E)}), (e_{l(A,M) \times (O,E)}$ $+ e_{l(A,M) \times (O,E)}$ $))$

$= Ħ_{(A,M) \times (O,E)}[(i_{(A,M) \times (O,E)}$ $, e_{l(A,M) \times (O,E)}$ $) + (j_{(A,M) \times (O,E)}$ $, e_{l(A,M) \times (O,E)}$ $)]$

$\geq S\{ Ħ_{(A,M) \times (O,E)}(i_{(A,M) \times (O,E)}, e_{l(A,M) \times (O,E)}), Ħ_{(A,M) \times (O,E)}(j_{(A,M) \times (O,E)}, e_{l(A,M) \times (O,E)})\}$

$= S\{S\{Ħ_{(A,M)}(i_{(A,M)}, Ħ_{(O,E)}$ $(e_{l(O,E)}$ $)\}, S\{Ħ_{(A,M)} (j_{(A,M)}$ $), Ħ_{(O,E)}$ $(e_{l(O,E)}$ $) \}\}$

$= S\{ Ħ_{(A,M)} (i_{(A,M)}$ $), Ħ_{(A,M)} (j_{(A,M)}$ $)\}$

$\geq S\{Ħ_{(A,M)} (i_{(A,M)}$ $), Ħ_{(A,M)} (j_{(A,M)}$ $)\}$.

$Ħ_{(A,M)}(i_{(A,M)} + j_{(A,M)}) \geq S\{Ħ_{(A,M)} (i_{(A,M)}$ $), Ħ_{(A,M)}(j_{(A,M)}$ $)\}$,

On behalf of entirely $i_{(A,M)}$ and $j_{(A,M)}$ in R_1.

Also, $Ħ_{(A,M)} (i_{(A,M)} j_{(A,M)}$ $) = S\{Ħ_{(A,M)}(i_{(A,M)} j_{(A,M)}), Ħ_{(O,E)}(e_{l(O,E)} e_{l(O,E)}) \}$

$= Ħ_{(A,M) \times (O,E)}((i_{(A,M) \times (O,E)} j_{(A,M) \times (O,E)}$ $), (e_{l(A,M) \times (O,E)}$ $e_{l((A,M) \times (O,E)}$ $))$

$= Ħ_{(A,M) \times (O,E)}[(i_{(A,M) \times (O,E)}, e_{l(A,M) \times (O,E)})(j_{(A,M) \times (O,E)}, e_{l(A,M) \times (O,E)})]$

$\geq T\{ Ħ_{(A,M) \times (O,E)}(i_{(A,M) \times (O,E)} e_{l((A,M) \times (O,E)}), Ħ_{(A,M) \times (O,E)}(j_{(A,M) \times (O,E)} e_{l(A,M) \times (O,E)}\}$

$= T\{S\{Ħ_{(A,M)}(i_{(A,M)}, Ħ_{(O,E)}$ $(e_{l(O,E)}$ $)\}, S\{ Ħ_{(A,M)} (j_{(A,M)}$ $), Ħ_{(O,E)}$ $(e_{l(O,E)}$ $)\}\}$

$= T\{ Ħ_{(A,M)}(i_{(A,M)}), Ħ_{(A,M)}(j_{(A,M)})\}.$

$Ħ_{(A,M)}(i_{(A,M)} j_{(A,M)}) \geq T\{ Ħ_{(A,M)}(i_{(A,M)}), Ħ_{(A,M)}(j_{(A,M)})\},$

On behalf of entirely $i_{(A,M)}$ and $j_{(A,M)}$ in R_1.

Consequently (A,M) is an S-fuzzy soft ideal of R_1. Thus (i) is proved.

At this instant $Ħ_{(O,E)}(i_{(O,E)}) \leq Ħ_{(A,M)}(e_{(A,M)})$ On behalf of entirely $i_{(O,E)}$ in R_2,

Let $i_{(O,E)}$ and $j_{(O,E)}$ in R_2 and $e_{(A,M)}$ in R_1.

Then $(e_{(A,M),} i_{(O,E)})$ and $(e_{(A,M),} i_{(O,E)})$ are in $R_1 \times R_2$.

$Ħ_{(O,E)}(i_{(O,E)} + j_{(O,E)}) = S\{ Ħ_{(O,E)}(i_{(O,E)} + j_{(O,E)}), Ħ_{(A,M)}(e_{(A,M)} + e_{(A,M)})\}$

$= S\{ Ħ_{(A,M)}(e_{(A,M)} + e_{(A,M)}), Ħ_{(O,E)}(i_{(O,E)} + j_{(O,E)})\}$

$= Ħ_{(A,M)\times(O,E)}((e_{(A,M)\times(O,E)} + e_{(A,M)\times(O,E)}), (i_{(A,M)\times(O,E)} + j_{(A,M)\times(O,E)}))$

$= Ħ_{(A,M)\times(O,E)}[(e_{(A,M)\times(O,E)}, i_{(A,M)\times(O,E)}) + (e_{((A,M)\times(O,E)}, j_{(A,M)\times(O,E)})]$

$\geq S\{ Ħ_{(A,M)}(e_{(A,M)}, i_{(O,E)}), Ħ_{(A,M)}(e_{(A,M)}, j_{(O,E)})\}$

$= S\{S\{Ħ_{(A,M)}(e_{(A,M)}, Ħ_{(O,E)}(u_{(O,E)})\}, S\{Ħ_{(A,M)}(e_{(A,M)}, Ħ_{(O,E)}(j_{(O,E)})\}$

$= S\{Ħ_{(O,E)}(i_{(O,E)}), Ħ_{(O,E)}(j_{(O,E)})\}$

$\geq S\{ Ħ_{(O,E)}(i_{(O,E)}), Ħ_{(O,E)}(j_{(O,E)})\}.$

$Ħ_{(O,E)}(i_{(O,E)} + j_{(O,E)}) \geq S\{Ħ_{(O,E)}(i_{(O,E)}), Ħ_{(O,E)}(j_{(O,E)})\},$ On behalf of entirely $i_{(O,E)}$ and $j_{(O,E)}$ in R_2.

Also, $Ħ_{(O,E)}(i_{(O,E)} j_{(O,E)}) = S\{ Ħ_{(O,E)}(i_{(O,E)} j_{(O,E)}), Ħ_{(A,M)}(e_{(A,M)} e_{(A,M)})\}$

$= S\{ Ħ_{(A,M)}(e_{(A,M)} e_{(A,M)}), Ħ_{(O,E)}(i_{(O,E)} j_{(O,E)})\}$

$= Ħ_{(A,M)\times(O,E)}((e_{(A,M)\times(O,E)} e_{(A,M)\times(O,E)}), (i_{(A,M)\times(O,E)} j_{(A,M)\times(O,E)}))$

$= Ħ_{(A,M)\times(O,E)}[(e_{(A,M)\times(O,E)}, i_{(A,M)\times(O,E)})(e_{(A,M)\times(O,E)}, j_{(A,M)\times(O,E)})]$

$\geq S\{Ħ_{(A,M)\times(O,E)}(e_{(A,M)}, i_{(O,E)}), Ħ_{(A,M)\times(O,E)}(e_{(A,M)}, j_{(O,E)})\}$

$= S\{S\{Ħ_{(A,M)}(e_{(A,M)}, Ħ_{(O,E)}(i_{(O,E)})\}, S Ħ_{(A,M)}(e_{(A,M)}, Ħ_{(O,E)}(j_{(O,E)})\}\}$

$= S\{ Ħ_{(O,E)}(i_{(O,E)}), Ħ_{(O,E)}(j_{(O,E)})\}.$

$Ħ_{(O,E)}(i_{(O,E)} j_{(O,E)}) \geq S\{ Ħ_{(O,E)}(i_{(O,E)}), Ħ_{(O,E)}(j_{(O,E)})\},$

On behalf of entirely $i_{(O,E)}$ and $j_{(O,E)}$ in R_2.

For that reason (O,E) is an S-fuzzy soft ideal R_2. Thus (ii) is proved (iii) is clear.

3.6 Theorem:
Let (A,M) be an S-fuzzy soft subset of a hemiring R as well as (X,Y) be the strongest S-fuzzy soft ideal relation of R. Then (A,M) is an S-fuzzy soft ideal of R if and only if (X,Y) is an S-fuzzy soft ideal of R x R.

Proof:

Assume that (A,M) is an S-fuzzy soft ideal of a hemiring R.

Then for any $i_{(A,M)} = (i_{(A,M)1}, i_{(A,M)2})$ and $j_{(A,M)} = (j_{(A,M)1}, j_{(A,M)2})$ are in $R \times R$.

We have, $Ħ_{(X,Y)}(i_{(X,Y)} + j_{(X,Y)}) = Ħ_{(X,Y)}[(i_{(X,Y)1}, i_{(X,Y)2}) + (j_{(X,Y)1}, j_{(X,Y)2})]$

$= S[Ħ_{(X,Y)}(i_{(X,Y)1} + j_{(X,Y)1}), Ħ_{(X,Y)}(i_{(X,Y)2} + j_{(X,Y)2})]$

$\geq S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)}(j_{(A,M)1})\}, S\{Ħ_{(A,M)}(i_{(A,M)2}), Ħ_{(A,M)}(j_{(A,M)2})\}\}$ $= S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)}(j_{(A,M)2})\}, S\{Ħ_{(A,M)}(j_{(A,M)1}), Ħ_{(A,M)}(j_{(A,M)2})\}\}$

$= S\{Ħ_{(X,Y)}(i_{(X,Y)1}, j_{(X,Y)2}), Ħ_{(X,Y)}(j_{(X,Y)1}, j_{(X,Y)2})\}$

$= S\{Ħ_{(X,Y)}(i_{(X,Y)}), Ħ_{(X,Y)}(j_{(X,Y)})\}.$

$Ħ_{(X,Y)}(i_{(X,Y)} + j_{(X,Y)}) \geq S\{Ħ_{(X,Y)}(i_{(X,Y)}), Ħ_{(X,Y)}(j_{(X,Y)})\}.$

On behalf of entirely $i_{(X,Y)}$ and $j_{(X,Y)}$ in $R \times R$ .And,

$Ħ_{(X,Y)} (i_{(X,Y)} j_{(X,Y)}) = Ħ_{(X,Y)} [(i_{(X,Y)1}, i_{(X,Y)2}) (j_{(X,Y)1}, j_{(X,Y)2})]$

$= Ħ_{(X,Y)} (i_{(X,Y)1} j_{(X,Y)1}, i_{(X,Y)2} j_{(X,Y)2})$

$= S\{ Ħ_{(A,M)} (i_{(A,M)1} j_{(A,M)1}, i_{(A,M)2} j_{(A,M)2}) \}$

$\geq S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)}(j_{(A,M)1})\}, S\{Ħ_{(A,M)}(i_{(A,M)2}), Ħ_{(A,M)}(j_{(A,M)2})\}\}$

$= S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)}(i_{(A,M)2})\}, S\{Ħ_{(A,M)}(j_{(A,M)1}), Ħ_{(A,M)}(j_{(A,M)2})\}\}$

$= S\{ Ħ_{(X,Y)} (i_{(X,Y)1}, i_{(X,Y)2}), Ħ_{(X,Y)} (j_{(X,Y)1}, j_{(X,Y)2}) \}$

$= S\{ Ħ_{(X,Y)} (i_{(X,Y)}), Ħ_{(X,Y)} (j_{(X,Y)}) \}$.

$Ħ_{(X,Y)} (i_{(X,Y)} j_{(X,Y)}) \geq S\{ Ħ_{(X,Y)} (i_{(X,Y)}), Ħ_{(X,Y)} (j_{(X,Y)}) \}$

On behalf of entirely $i_{(X,Y)}$ and $j_{(X,Y)}$ in $R \times R$.

(i.e) (X,Y) is an S-fuzzy soft ideal of $R \times R$.

Suppose that (A,M) is an S-fuzzy soft ideal of $R \times R$, then

$i = (i_{(X,Y)1}, i_{(X,Y)2})$ and

$j = (j_{(X,Y)1}, j_{(X,Y)2})$ are in $R \times R$,

$S\{ Ħ_{(A,M)} (i_{(A,M)1} + j_{(A,M)1}), Ħ_{(A,M)} (i_{(A,M)2} + j_{(A,M)2}) \}$

$= Ħ_{(X,Y)} (i_{(X,Y)1} + j_{(X,Y)1}, i_{(X,Y)2} + j_{(X,Y))2})$

$= Ħ_{(X,Y)} [(i_{(X,Y)1}, i_{(X,Y)2}) + (j_{(X,Y)1}, j_{(X,Y)2})]$

$= Ħ_{(X,Y)} (i_{(X,Y)} + j_{(X,Y)})$

$\geq S\{ Ħ_{(X,Y)} (i_{(X,Y)}), Ħ_{(X,Y)} (j_{(X,Y)}) \}$

$= S\{ Ħ_{(X,Y)} (i_{(X,Y)1}, i_{(X,Y)2}), Ħ_{(X,Y)} (j_{(X,Y)1}, j_{(X,Y)2})\}$

$= S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)} (i_{(A,M)}\}, S\{Ħ_{(A,M)}(j_{(A,M)1}) Ħ_{(A,M)} (j_{(A,M)2})\}\}$.

If we put $i_{(A,M)2} = j_{(A,M)2} = 0$, we get,

$Ħ_{(A,M)} (i_{(A,M)1} + j_{(A,M)1}) \geq S\{ Ħ_{(A,M)} (i_{(A,M)1}), (j_{(A,M)1}) \}$,

On behalf of entirely $i_{(A,M)1}$ and $j_{(A,M)1}$ in R.

And, $S \{ Ħ_{(X,Y)} (i_{(X,Y)1} j_{(X,Y)1}), Ħ_{(X,Y)} (i_{(X,Y)2} j_{(X,Y)2}) \}$

$= Ħ_{(X,Y)} (i_{(X,Y)1} j_{(X,Y)1}, Ħ_{(X,Y)} (i_{(X,Y)2} j_{(X,Y)2})$

$= Ħ_{(X,Y)} [(i_{(X,Y)1}, i_{(X,Y)2}) (j_{(X,Y)1}, j_{(X,Y)2})]$

$= Ħ_{(X,Y)} (i_{(X,Y)} j_{(X,Y)})$

$\geq S\{ Ħ_{(X,Y)} (i_{(X,Y)}), Ħ_{(X,Y)} (j_{(X,Y)})\}$

$= S\{ Ħ_{(X,Y)} (i_{(X,Y)1}, i_{(X,Y)2}), Ħ_{(X,Y)} (j_{(X,Y)1}, j_{(X,Y)2})\}$

$= S\{S\{Ħ_{(A,M)}(i_{(A,M)1}), Ħ_{(A,M)}(i_{(A,M)2})\}, S\{Ħ_{(A,M)} j_{(A,M)1}), Ħ_{(A,M)}(j_{(A,M)2})\}\}$

If we put $i_{(A,M)2} = j_{(A,M)2} = 0$,

we get $Ħ_{(A,M)} (i_{(A,M)1} j_{(A,M)1}) \geq S\{ Ħ_{(A,M)} (i_{(A,M)1}), Ħ_{(A,M)} (j_{(A,M)1}) \}$,

On behalf of each $i_{(A,M)1}$ and $j_{(A,M)1}$ in R . hence (A,M) is an S-fuzzy soft ideal of R .

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A REVIEW ON MAHILAA AROGYA SETU MOBILE APP - MACHINE LEARNING APPROACH TO PREDICT RISKS OF EARLY STAGES OF OVARIAN AND CERVICAL CANCER ALGORITHM.

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ABSTRACT

Most of the women life in the present world is ending at the middle age between 45-60 years due to ovarian and cervical cancer. The early diagnosis and prognosis of a cancer type have become a necessity in cancer research, as it can facilitate the subsequent clinical management of patients. The proposed mobile application system will help to predict the risk of ovarian and cervical cancer at the figure tips in the early stages. Here we are using machine learning classifiers for prediction. The dataset used to train machine learning classifier model is referred from archive.ics.uci.edu machine learning repository. Here we are planned to use Random Forest, Naïve Bayes, Decision Tree (J4.8), Logistic Regression, Logistic Model Trees (LMT), and Support Vector Machines (SVM) classifiers for predicting risk of Ovarian and Cervical Cancer in the early stages address Medical and Societal Issue

Keywords: Naïve Bayes, Decision Tree(J48), Multi-Layer Perceptron, Logistic Model Tree(LMT), Support Vector Machine(SVM).

I. INTRODUCTION

In the present world the women health care is playing one of the vital roles in medical field. Now a day most of the women's life is ending at the middle age between 45 to 60 years due to the cancer related issues. There are many types of cancer diseases related to woman healthcare majorly:

1. Ovarian cancer

2. Cervical cancer

3. Breast cancer

4. Uterine cancer

5. Endometrial cancer

6. Vaginal Cancer

In this work we have designed and developed a mobile application to predict the risk of ovarian and cervical cancer at the finger tips in the early stages, so that the application will address this issue related to medical and societal problems in women healthcare domain. The global statistics of occurrence of cancer is as follows, 17 million cases of different types of cancer were estimated in 2018 survey. In which 9.8 million of people got died due to cancer worldwide.

Ovarian cancer: Ovarian cancer is a type of cancer that begins in the ovaries. The female reproductive system contains two ovaries, one on each side of the uterus. The ovaries each about the size of an almond produce eggs (ova) as well as the hormones estrogen and progesterone. Ovarian cancer often goes undetected until it has spread within the pelvis and abdomen. At this late stage, ovarian cancer is more difficult to treat. Early-stage ovarian cancer, in which the disease is confined to the ovary, is more likely to be treated successfully. Surgery and chemotherapy are generally used to treat ovarian cancer.

Causes: It's not clear what causes ovarian cancer, though doctors have identified factors that can increase the risk of the disease. In general, cancer begins when a cell develops errors (mutations) in its DNA. The mutations tell the cell to grow and multiply quickly, creating a mass (tumor) of abnormal cells. The abnormal cells continue living when healthy cells would die. They can invade nearby tissues and break off from an initial tumor to spread elsewhere in the body (metastasize).

Cervical cancer: Cervical cancer is a type of cancer that occurs in the cells of the cervix the lower part of the uterus that connects to the vagina. Various strains of the human papillomavirus (HPV), a sexually transmitted infection, play a role in causing most cervical cancer

II. LITERATURE SURVEY

[1] Assisted reproductive technology and risk of ovarian cancer and borderline tumours in women: a population-based cohort studyby Frida E. Lundberg, Anna L. V. Johansson, Kenny Rodriguez-Wallberg, Kristina Gemzell-Danielsson & Anastasia N. Iliadou**. The study aimed to investigate if assisted reproductive technology (ART) treatment or a diagnosis of infertility were associated with the risk of ovarian cancer or borderline ovarian tumours (BOT) in parous women.

[2] Ovarian Cancer: Prevention, Detection and Treatment of the Disease and Its Recurrence. Molecular Mechanisms and Personalized Medicine Meeting Report by Francesmary Modugno, Robert P. Edwards Despite aggressive surgery and chemotherapy, the prognosis for these women is poor, with a 5-year survival rate of less than 30%. This poor outcome is due in part to the lack of effective prevention and early detection strategies

III. METHODOLOGY
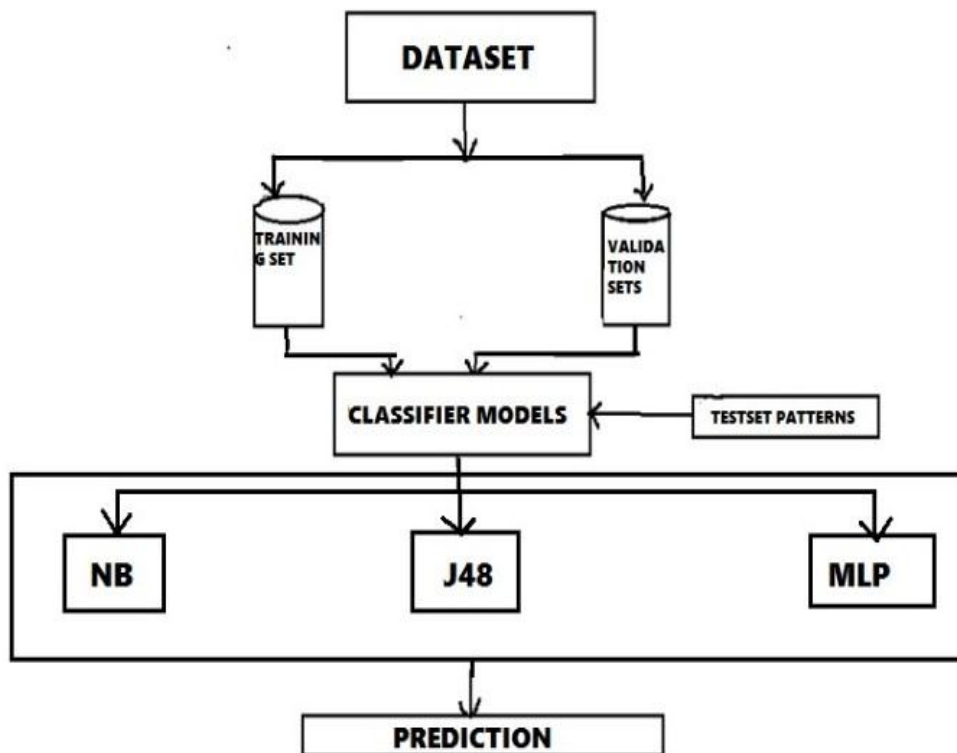
Figure.1 Architecture

The Figure. 1 shows architecture of the implemented system. There are three modules in the project.

Dataset

Machine Learning Classifier Models

Prediction

In the first step we chose dataset from assets folder of the project and train the classifier models chosen datasets are divided into two types Training set and Validation set. The test set patterns are feed to the classifier models for prediction.

The Machine Learning classifier models chosen are:

Naive bayes - NB

Decisiontree - J48

Multi Layer Perceptron – MLP

The proposed prediction system is implemented in Java language. To implement this system we have used Window builder with Spring Tool Suite for Graphical User Interface (GUI) development and weka core API JAR libraries for classifiers. In Graphical User Interface (GUI) there is an option to choose the dataset file, select classifiers Naïve Bayes, C4.5 (J48) Decision Tree and Multilayer Perceptron.
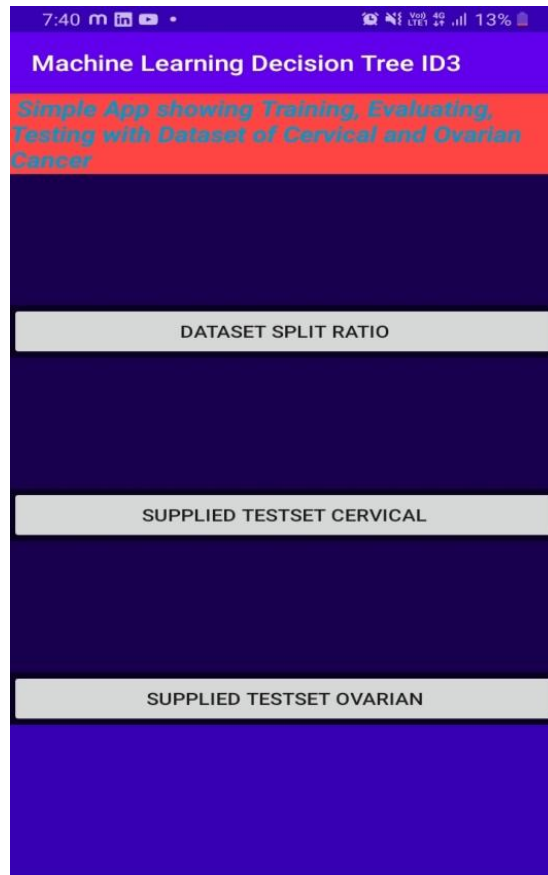
Figure.2 GUI of the Application

Figure.3 GUI for the specifying Split Ratio.

The system also has feature for Training, Evaluation, Testing and Analyses options to carryout experiment with the classifiers. There are options to display measured parameters TP Rate, FP Rate, Precision, Recall, predictions about Testing Set can be printed in Text Area and results can be analyzed by plotting Bar Graph
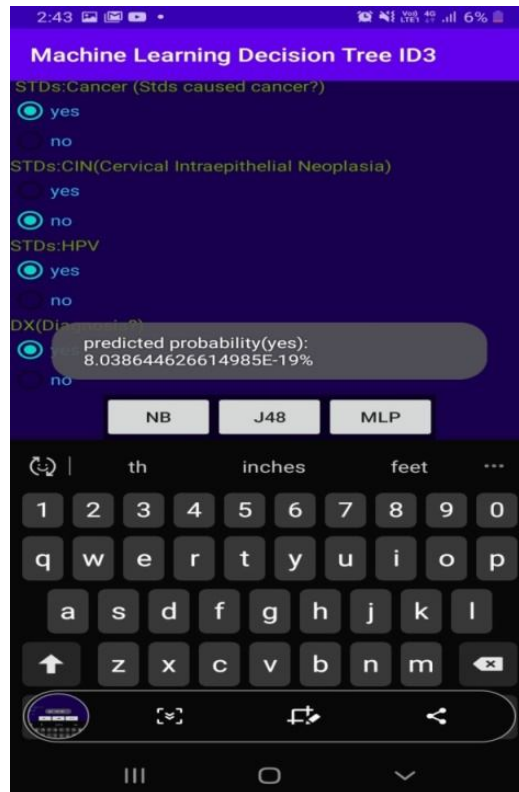
Figure.4 GUI showing results for (J48) Decision Tree classifier.

Figure.5 GUI showing results for Multilayer Perceptron classifier.

IV. RESULTS AND ANALYSIS

The parameters Accuracy, Correctly Classified Instances, Incorrectly Classified Instances against Total Number of Instances is measured the results shows that Accuracy of C4.5 (J48) Decision Tree is 95.7588% better than Naïve Bayes 78.4235%, and Multilayer Perceptron classifiers 81.28%. Figure.6 shows performance measure for MLP classifier, Table.1 shows the results obtained for Accuracy. Figure.7 shows Correct and Incorrect classification results obtained.
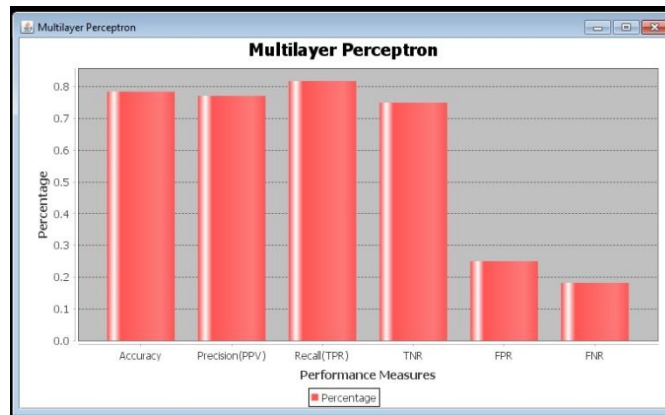
Figure.6 Performance measure for MLP classifier.

Table.1 Results obtained for Accuracy

	NB Classifier	MLP Classifier	J48 Classifier
Correctly Classified Instances	7193	7455	8783
Incorrectly Classified Instances	1979	1717	389
Total Number of Instances	9172	9172	9172
Accuracy	78.4235%	81.28%	95.7588%
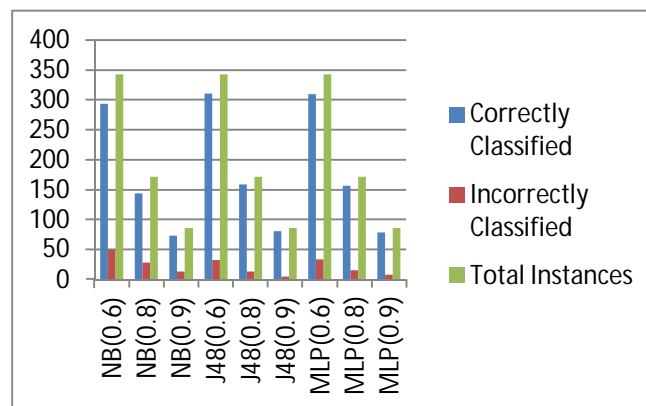
Figure.7 Correct and Incorrect classification results

V. CONCLUSION

The proposed mobile application system plays important role in the medical and societal domain. It helps doctors and common women at the finger tips bin predicting the ovarian and cervical cancer in the early stages, to take decision about the diagnosis. Various Machine Learning algorithms will be considered for prediction of risk and prediction accuracy will be measured.

Medical field: This application helps doctors and medical specialists to predict the chances of cancer easily at the figure tips in early stages by using this application very easily.

Societal application: A common woman can come to know whether they are having a cancer or not at the figure tips in its early stages by using this application very easily.

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A STUDY ON ATTRIBUTING HOWARD SHETH MODEL FOR CAPITAL GOODS PURCHASE BEHAVIOR

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ABSTRACT

Most scholars agree that the study of consumer behavior was advanced and given an impetus by Howard Sheth Model. The major advantage and strength of the model lied in the precision with which a large number of variables have been linked in the working relationships to cover most aspects of the purchase decision and the effective utilization of contribution from the behavioral sciences. John Howard and Jagadish Sheth put forward the Howard Sheth model of consumer behaviour in 1969, in their publication entitled, 'The Theory of buyer Behaviour'.

The Howard Sheth Model is a sophisticated integration of the various social, psychological, and marketing influences on consumer choice into a coherent sequence of information processing. It aims not only to explain consumer behaviour in terms of cognitive functioning but to provide an empirically testable depiction of such behaviour and its outcomes.

The current paper study the Howard Sheth model attributing to capital goods in current business scenario where the challenges and competitiveness are coexisting. Capital goods include buildings, machinery, equipment, vehicles, and tools. Capital goods are not finished goods instead part of a system, but they are used to make finished goods or process systems. These are physical assets that a company uses in the different processes to produce products and provide services that consumers will later use.

The model interpretation with the real time case of buying and selling capital goods with a reputed paint industry buyer been studied in this paper.

Key words: Consumer behavior, Capital goods, Howard Sheth model, Behavioral sciences

PREFACE

Buying behavior in an organization refers to the process of how companies or organizations buy goods and services. Few series of steps are involved in addressing:

Need analysis with description and budgeting.

Product specifications and conformity to system requirements

Value analysis and proposition to the proposed products

Identifying the Suppliers and references towards suitability of organizational buying process.

Proposal solicitation and supplier selections

Decision process involving risk, warrantees, bonds.

Performance review from buying perspective whether it fits to needs or not.

Problem Definition:

A real time case of buying and selling capital goods with a reputed paint industry buyer been studied in this paper. Various parameters those either influenced or integrated in the decision making of buying, been detailed in a comprehensive manner. This case has few historical basis also as few systems been supplied and performing satisfactory to the buyer.

Objectives of Research:

1. To identify underlying factors which play lead role in selection and buying decision of buyer by applying Howard Sheth Model of Consumer Behaviour.

2. To assess and analyze the buying parameters influences.

3. What-If analysis and insights that can drawn to the marketers so that the journey could be more effective

Scope of Research:

The system in discussion was a pneumatic conveying system comprises various silos, electrical items, mechanical structures, pipes associated with high quality surface finish, various levels of inspections etc. This system was unique for paint industry application as the process demands free flow of material, lesser intervention for any maintenance or process choking, higher availability.

Current scope of work covers detailing various parameters been either influenced or integrated in the decision making of buying such described system attributing with established Howard Sheth model.

Theoretical Framework:

Howard Sheth model has four sets of constructs. They are,

1. Input

2. Perceptual and learning construct (Hypothetical construct)

3. Output

4. Exogenous Variables.

Input:

The input variable is the stimulus from the buyer's environment. These include product variables-physical brand characteristics (meaningful stimuli) and verbal or visual product characteristics (symbolic stimuli)-such as quality, price, uniqueness, availability and service, and the symbolic meaning of these variables.

The proposed system was unique in such a sense that there are five different materials have unique characteristics been mixed and to transported from one area to other destination via pneumatic conveying system. Buyer has only this input requirement.

Perceptual Construct:

The first of the two sets of hypothetical constructs in the Howard Sheth model are those related to perception. These concepts are related to how individuals handle information from various sources.

Perceptual constructs variables are – Attention, Stimulus ambiguity, Perceptual Bias and Overt search. Consumers accept the stimulus and explain it. Two factors that may affect his interpretation are stimulus ambiguity and perception bias. Stimulus ambiguity occurs when a person is unsure of the meaning of the stimulus he receives and how it may affect his response. When he distorts the information, he receives to suit his established needs or experience, a perception bias occurs.

The user department ie plant team here, been given impetus of various document details with analysis for preparing need to buy.

Learning Construct, this is the second set of Hypothetical constructs and is more complicated. From the actual purchase, the observable behaviour is related to the individual's intentions, and Howard and Sheth call it the buyer's prediction of when, where and how to buy the product.

The variables under the learning construct are – Motives, Brand Comprehension, Choice criteria, Attitude, Intention, Confidence and Satisfaction. What is most closely related to the buyer's intention is his attitude to the product or brand (which can be clearly seen from the model), which affects and is influenced by many other variables, as well as their own complexity. The way consumers explain the stimuli brings him to the brand comprehension stage. This refers to consumers' understanding and overall evaluation of the brand. If the consumer's evaluation is very high, it makes him full of confidence and finally make a purchase decision.

The buyer hasn't figured in mind at this input stage who can be the potential suppliers but evaluated on various parameters and analyzed various available options. Like breaking the packages into multiple sub-packages and integrate at plant side, complete outsource to a single package and get things work from one source to plant etc.

Output:
The purchase decision is considered as Output.

The variables under output are – Attention, Brand Comprehension, Intention and Purchase. Output variables are the possible responses to input incentives mediated by individual internal influences. Output variables are the possible responses to input stimuli mediated by personal internal influences. Same was inherited in this case that plant team was satisfied with the services and past projects with the Plant. The services are influenced a lot and enhanced the After using the product, if the consumer is satisfied, it will enhance his positive attitude and improve its brand understanding. If consumers are dissatisfied with the product, it will lead to a negative attitude, low attention to product stimulus, poor brand comprehension and decreased willingness to buy.

Exogenous Variables:

These are not proposed in the Howard and Sheth models, nor are they a direct part of the decision-making process, but they have a significant impact on consumers' decisions and are used as subdivision criteria in marketing activities. These variables include: the purchase value of the buyer, the personality characteristics of the consumer, the members of the social group, the financial status of the consumer, and the pressure of time.
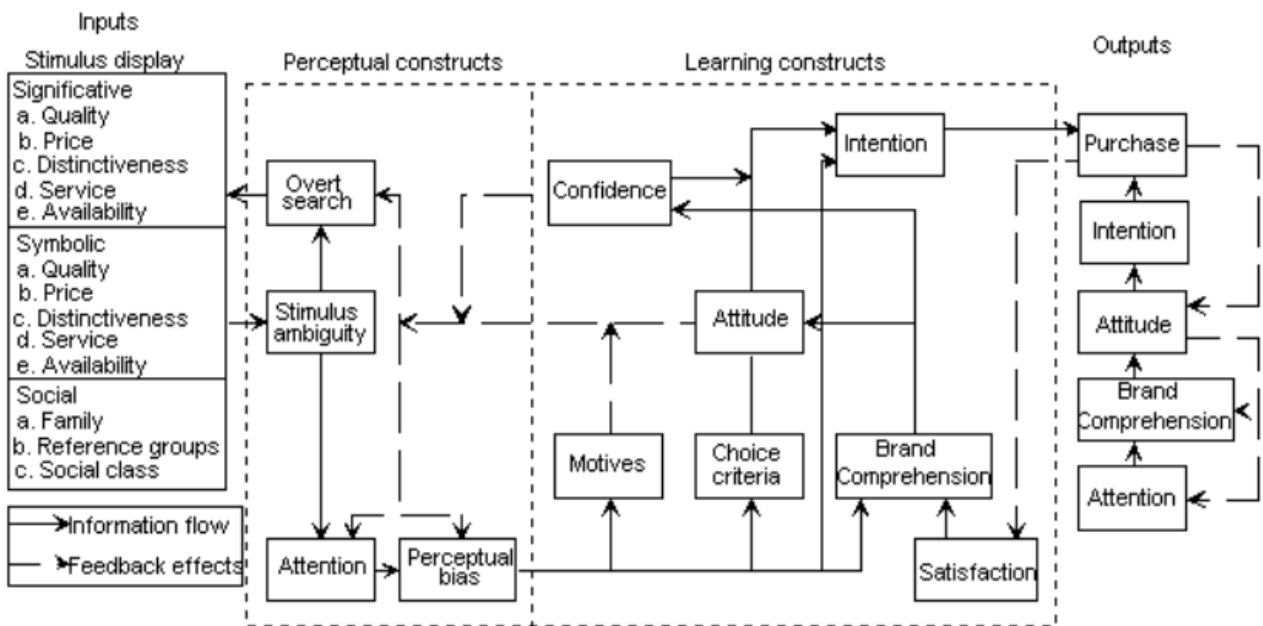
CONCLUSION

From the above detailed explanation and the model it the process was well established, and the process is well defined. Each and every buyer has their own behavioral approach towards the purchasing process, however all of them are influenced by certain factors. Those influences may be environmental, social, personal, or psychological influences. Besides the society has different impacts on one's behavior depending on different groups to which it belongs. Those factors affect the consumer buying behavior so they should be considered. The consumers themselves are the decision makers and so are the most important factors in the consumer market. The dynamic nature of the paint industry and demand for improvements or expansions are crucial for increase in business partners.

The real time cases worth of buying transaction values appx 4 cr and executed over a period of 6 months. This case provides the detailed analysis on Howard Sheth model attributing to capital goods in current business scenario.

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A STUDY ON CREDIT CARD FRAUD DETECTION

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ABSTRACT

Fraud detection is becoming a challenging task in financial transactions, especially in credit cards. The use of credit cards for online and daily transactions is growing exponentially. There is a depletion of billions of currencies per year because of credit card theft since this exists only primitive levels of security mechanism to authenticate the transactions. In order to overcome these fraudulent transactions, additional security techniques need to be developed by analyzing various factors. The objective of this investigation is to describe the critical attributes of fraud detection. Further, this article explores the techniques and methods employed for fraud detection based on the critical attributes discussed. A comparative analysis is carried on the existing techniques, and the various vital challenges are reported.

Keywords— credit card, fraud detection, transaction, security, algorithms.

I. INTRODUCTION

A. CREDIT CARD FRAUD

Credit card theft may be a big problem for financial services. There is a depletion of billions of currencies per year because of credit card theft. Credit card fraud may be a large-ranging term for robbery and theft attempted using a bank card as a fraud source of funds in a transaction. Credit card theft's main aim is to use those cards to get consumer products or goods without paying their price or getting unauthorized funds. Credit card theft is an exception to crime. Although credit card theft incidences are restricted to only 0.1 percent of all payment purchases, they need to result in significant financial consequences since the fraudulent purchases are high-value transactions. Credit card fraud may be divided into offline and online modes.

Today's fraud prevention mechanisms are built to block one-twelfth of 1 percent of all completed purchases, which also translates into billions of currencies in the loss. There is a significant growth in credit card purchases resulting in a considerable rise in illegal activities. Today Fraudsters are always a group that is uniquely creative and intelligent. Typically, the mathematical approaches and many software for data analysis algorithms will not solve this detection system. Many fraud identification systems are driven by artificial intelligence, Meta-learning, and matching patterns.

B. FRAUD DETECTION

In several organizations, especially those in banking, finance, accounting, retail, and e-commerce, fraud prevention is one of the critical problems. This went against saying that any crime has a detrimental effect on the bottom line of an organization, its credibility, and discourage potential opportunities, and existing client to interact with it. Most frequently than not, the organization ends up paying for the losses for any fraud. It also takes away great customers while attracting more fraudsters.

Credit card fraud identification aims to determine if, based on past evidence, a purchase is a fraud. The choice is highly challenging due to shifts in customer purchases, for example, over holiday seasons and in the strategies of the fraudsters. Particularly those that they use to respond to fraud detection methods. Machine learning techniques are now known to offer an efficient approach to tackling problems like these. A credit card theft happens anytime one party uses another person's card for personal use without the permission of his or her holders. If fraudsters execute such an excellent scenario, it is used before the maximum usable capacity has been exhausted. Therefore, we would like an answer that minimizes the maximum usable credit card amount, which is more famous for theft.

C. CURRENT CHALLENGES IN FRAUD DETECTION

The challenges in credit card fraud are often (i) Thieves also obtain stolen card numbers on the dark Web, which is only reachable through special software as part of the Internet. Credit card numbers are essential to criminals who are not scared to enter unauthorized dark network sites and allow them to do so. (ii) Your payment card number are often hacked for no mistake of your own. Your credit card number can be leaked in the data theft and hurts one of your favorite retailers. Thieves will also use these details combined with the credit card account

numbers to run up online charges. (iii) Although online shopping may be easier than submitting your credit card number via the mail, you do need to take care when it arises to electronic purchases.

Fig.1 Data-driven approach for credit card fraud detection.
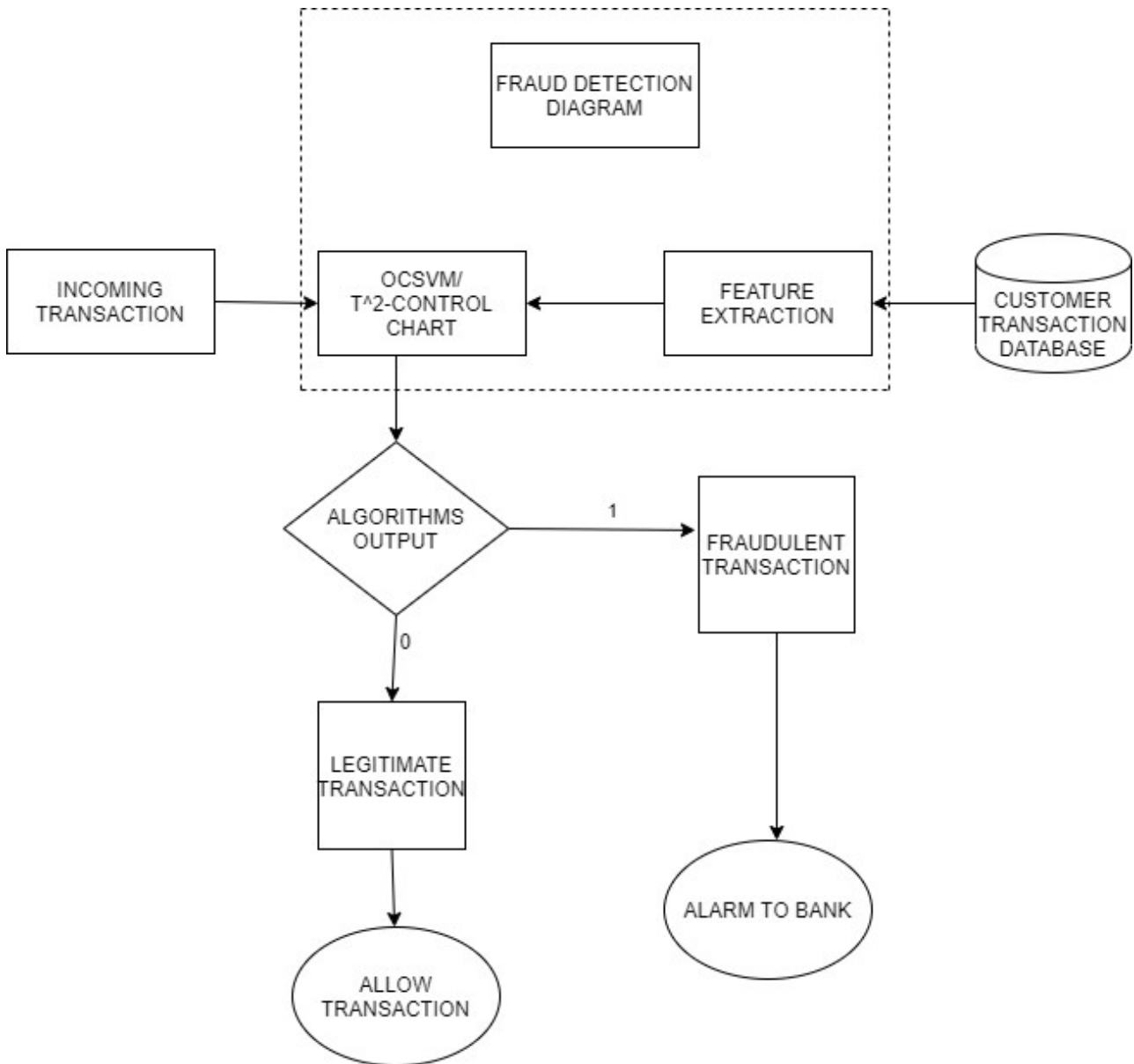
II. REVIEW

The study aims to describe the numerous approaches involved in identifying credit card fraud. The payment card fraud detection highlights and threads are often to be addressed in numerous studies works.

A. ATTRIBUTES

Card data are held in a variety of formats. Card numbers – traditionally the first Account Number (PAN) – are imprinted on the card, and the data in a machine-readable format is contained in a stripe at the end. Fields can differ, but the most general are:

- Cardholder name

- Card number

- Date of expiration

- Verification code

- Phone number

- Cardholder's address

Therefore, the mail and Web are extensive routes for theft against retailers selling and delivering goods and impacting legal postal orders and Web retailers. When the card is not visibly available (called CNP, card not current), the retailer will trust that the issuer (or anyone who purports to be so) will implicitly deliver the information, whether by fax, mobile, or Internet. The holders of credit cards are also monitored by mail or phone. Although there is already protection, it is often more dangerous than face-to-face delivery, so the card issuers prefer to charge a higher transaction fee for CNP due to the increased risk.

A retailer has trouble checking whether the individual cardholder does approve the transaction. Shipping firms may promise distribution to a venue, but they are not allowed to provide documentation and usually are not interested in handling retail payments. A typically recent safeguard for merchants is to enable shipping only to a cardholder-approved address, and merchant banking systems provide easy methods to verify the details. Second, check that the paper size is precisely the correct example for you.

B. IMPACTS ON CREDIT CARD DEFECTS
Identity theft can be categorized into two specific categories: application theft and account taking.

1) Application Fraud
Application fraud occurs when an individual uses stolen or forged documents to open an account in the name of another person. Criminals can steal documents like bank statements to produce valuable information about themselves. They can build fake documents as an alternative. With this information, they can open a credit card or loan account in the victim's name, then draw it ultimately.

2) Account Takeover
If offenders behave as legitimate users, an account theft happens, taking ownership over an account and performing illegal purchases. Fraud is performed at the intention where money is lost, according to action fraud. An account acquisition denotes the act by which fraudsters plan to take control of a customer's account from a wide array of service providers such as credit cards, email, banks, and more. Account-level regulation produces more significant long-term gains for fraudsters but is also incredibly detrimental to legitimate account holders. In Forrester's opinion, risk-based authentication (RBA) plays a crucial role in identity and access control management (IAM) and risk prevention of account theft attacks that result in annual losses of up to $7bn. The prototype is used to format the file, and the text is beautiful. All borders, column widths, line spaces, and text fonts are prescribed, do not change them. You could notice peculiarities. For example, the top margin proportionately very throughout this prototype measure is customary. This calculation et al. is systematic, utilizing parameters that foresee a part of the entire process along with the text, rather than as an individual document. Also, do not update any of the current designations.

C. ALGORITHMS USED IN CREDIT CARD FRAUD
There is already a range of methods and algorithms in use for identifying these frauds. Machine learning aids in this work too. The data sets are obtained from many international survey agencies in Neural Network, and trained ANN algorithms are used for data research. In case of fraud, the decision trees and SVM algorithms are used to address the problem. Classification methods for preventing credit card theft are

- **Naive Bayes Algorithm:** All the characteristics are grouped into sections in this method. This derived functionality is categorized in a way that no other cluster learns about the other functions. Further, the characteristics are categorized for the person as true or false fraud activity.

- **Decision Tree Algorithm:** The decision tree method minimizes misclassification costs while choosing the splitting features for each non-terminal's node and the output of the contrast with the well-known standard classification models for a real-world credit card data collection. The cost-sensitive decision tree algorithm performs the best-known techniques on the specified problem like correct and optimistic rate and a newly developed cost-sensitive metric unique to the fraud detection domain. By incorporating this method in fraud identification schemes, the financial losses related to fraudulent purchases will be further common.

- **K-Nearest Neighbors Algorithm:** KNN algorithm is a simple occasion-based equation that maps all planning instances and orders unlabeled cases dependent on their closest neighbors. For example-based instances of students themselves are used to talk to the paradigm, not at all like the equations of the tree of choice that use cases to create a tree, and that tree talks to the model. Be it as it can, all learning estimates are contended to be occurrence-based because they also utilize the training resources available to construct templates.

- **Support Vector Machine (SVM):** SVM is used to classify and predict the data for fraud detection. In

SVM implementation, the issue of overfitting is tiny. Help vector machine may be a tool used for the identification and classification of patterns. Predicting or classifying trends into two groups is a classifier; fraudulent or non-fraudulent. The cost-based vector support machine with a practical kernel function is used to detect fraud with lower error rates.

- **Logistic Regression:** This methodology does not need a particular meaning or criterion for identifying the crime. It follows a primary method in which the flow is calculated regularly or not.

- **Artificial Neural Network:** Utilizing qualified data or data set obtained by several organizations, this methodology works. This data conducts activities and helps diagnose the occurrence of fraud.

- **Cryptography:** Cryptography prevents users by offering data protection capabilities and other device authentication features—cryptographic algorithms used for encryption and decryption of messages between computer systems for safe communication. A cipher suite uses one encryption algorithm, another message authentication algorithm, and another critical exchange for fraud detection. Cryptography is most generally concerned with decoding plaintext (ordinary text, often referred to as clear text) into ciphertext (a method called encryption), then back again (known as decryption).

- **Cued Click Points:** Cued Click Points (CCP) was developed to lower trends and reduce hacker hotspots' utility. Instead of 3 click points on a single image, Cued Click Points uses three dissimilar images [1,2,3] in a single press. It offers cued-recall and introduces visual indications that warn the valid users if they have made a mistake when entering their latest click-point.

III. RESEARCH WORK
The recent research work has been comprised in the following section. This section illustrates an elaborate research work of an individual author and the success and failure of their work in fraud detection.

Trivedi & Monika (2016) suggested a genetic code for Fraud Detection that involves techniques for determining the optimal solution to the issue and indirectly extracting the outcome of the fraudulent transaction. This approach proves successful in pointing out illegal purchases and reducing the volume of false warnings. Genetic Algorithm is suitable in areas of such equal use. Using this method in the fraud detection program can allow the fraud to be identified or expected within a minimal period after the purchases have been made. That would potentially eliminate significant damages for banks and consumers, and thus rising risks.

The research work addressed by Nuno Carneiro et al. (2017), using Decision Support Systems, uses data mining supported algorithms to detect fraud in e-tail. Their commitment to developing their manual revision cycle with an automated program and feedback to the fraud analysts culminated in a superior overall result. Researchers are finding a sophisticated path to detect fraud with the help of machine learning algorithms, but there are rare reports of practical implementations. They describe how fraud is detected in a developed system and deployed at a very popular e-tail merchant.

Using the Bayesian Network Classifier (BNC) algorithm, AlexG.C.deSá et al. (2018) proposed a customized classification algorithm for credit card fraud detection. Hyper-Heuristic Evolutionary Algorithm (HHEA) created the Fraud-algorithm, which generates a personalized solution to the classification datasets. The Fraud-BNC was tested on a PagSeguro dataset. This Algorithm is, therefore, common enough to solve many literature classification problems. The results obtained were compared with seven previous algorithms and evaluated by considering the issue by data classification and hence the strategic economic performance. Fraud-BNC introduced itself because it was the proper method to have a fair trade-off between the two views, increasing the economic performance of the present business by up to 72.64%.

Towards automatic credit card fraud identification function architecture utilizing multi-perspective HMMs (Hidden Markov Model) suggested by Lucas et al. (2020). We construct a series of credit card purchases from three different perspectives:

(i) The series includes or involves no fraud (ii) The sequence is achieved by choosing the cardholder or the payment terminal (iii) That is a list of amounts paid or the period between the new transactions and the prior ones. Combinations of the three conditional viewpoints produce eight collections of transaction sequences from the (training) collection. Every one of those sequences has HMMs (Hidden Markov Model). Considering the series of prior transactions, each HMM assigns a probability to a transaction. Such percentages are used for additional tools to fraud identification during Random Forest classification. It increases the sorting process performance and allows for improved identification of fraudulent transactions.

Eunji Kim et al. (2019) suggested a Champion-challenger analysis for identifying credit card fraud utilizing hybrid ensemble and deep learning. They performed an in-depth comparative analysis on vast real-world transaction data between deep learning and hybrid ensemble, with various functional assessment criteria to evaluate the models work better than the other. The creation and evaluation of the two frameworks incorporate the champion-challenger system. In all o□-line and post-launch checks, the competitor outperformed the winner. After o□-line and post-launch testing, they opted to run the FDS for the deep learning-based model, which demonstrated +3.8% transaction-level recall progress, +2.1% card-level recall progress, and +5.5% cost-reduction rate improvement compared with Hybrid Ensemble model is comparable post-launch warning levels.

Deshen Wang et al. (2019), using Omega, proposed a credit card fraud detection strategy with consumer incentives. They produce consumer incentive methods for merchants to adopt accurate techniques to detect (prevent) fraud, such as secondary authorizations. They further refine the technique by adding secondary tests only to the transactions for values over those thresholds. They define the circumstances under which the approach is appealing to retailers and explain that it will contribute to a 'win-win-win for consumers, vendors, and card issuers when the consumer's tolerance of false declines is small or/, and the amount of incentive is within a specified range. They also show that concerted decisions by the retailer and the card issuer of the card will produce additional benefits.

YueWu et al. (2019) establish four feature sets focused on industry specialist market information, fraudster suggestions, related media coverage, and the relevant literature to identify illegal cash out reliably. They also build features using a functional data analysis algorithm to capture the cardholder's time-dependent behavioral patterns. They also create a comparison feature collection focused on Whitrow's conventional technique methodology. We equate these feature sets with a particular dataset composed of actual 25,000 credit card purchases with three types of machine learning: Severe gradient boosting, random forest, and support vector machine. The findings indicate that both cardholder's overview and complex behavioral trends produce considerably better efficiency than Whitrow's approach. With magnitudes of 0.081, 0.049, 0.046, and 0.053, respectively, the precisions at the top 5%, 10%, 15% and 20% are increased.

TABLE 1. SUMMARY OF CREDIT CARD FRAUD DETECTION FRAMEWORKS

SL.NO	AUTHOR	FRAMEWORK & TECHNIQUES	HIGHLIGHTS	LIMITATIONS
1	Trivedi & Monika (2016)	Genetic algorithm-Techniques for finding the optimal solution	1. This approach is effective in pointing out the purchases illegitimate and reducing the number of false warnings. 2. Detecting or predicting the theft probably during a minimum period after the purchases	1. Not in a generalized sort, the limitation obtained can be used directly in the global fraud detection problem. 2. Another issue about this field is data overlapping
2	Carneiro (2017)	Data mining- E-tail, Decision Support Systems	1. This work tackled the issue of fraud detection for online retailers doing business. 2. It lets researchers and professionals de-sign and enforces programs focused on data mining. 3. It addresses practical implementation issues.	1. The platform should be revised, as well as alignment of current programs and facilities from retailers. 2. We could not train a logistic regression on a higher-order representation of the features because of memory limitations.
3	de Sa et al. (2018)	BNC (Bayesian Network Classifier) algorithm- A customized classification	1. A modified BNC (Bayesian Network Classifier) is used to address a question in the identification of real-world credit card fraud.	1. The conclusion obtained here by classification algorithms is that the financial risk of ignoring a scam is paramount.

		Algorithm	2. This section discusses works that pursue an approach to classification to give solutions.	2. Class disparity and the possibility that theft that has been miss-classified has an expense equal to that of miss-classifying legal transactions.
4	Lucas et al. (2020)	Multi-perspective HMMs (Hidden Markov Model)-Automated Feature Engineering	1. It gives the choice of integrating a broad spectrum of sequential knowledge. 2. Support to Personal identification and e-commerce purchases.	1. For this, the transaction history is not large enough that we cannot calculate the HMM features. 2. The framework had suffered from a limitation of the low structural value.
5	Kim et al. (2019)	Hybrid ensemble and Deep learning - Champion challenger analysis & Expert Systems with Applications	1. A comprehensive comparison of the ensemble method which is the industry standard so far. 2. The analysis was based on realistic environments. 3. Following deployment, we contrasted the post-results.	1. The number of researchers who test the data-driven goals scored models for transactions at high risk is negligible. 2. There are different costs to both types of underpayments, false alarms, and missed frauds.
6	Wang et al. (2019)	Omega - Consumer incentive strategy for merchants	1. Uses secondary authentication only for high-value transactions.	1. Detecting expensive abuse for high-value transformations. 2. No prevention of theft concerning low-value purchases.
7	Wu et al. (2019)	Decision Support Systems- Functional data analysis algorithm and Whitrow's strategy	1. It calls both card-holders snapshot and complex activity trends. 2. Uses SVM algorithm to solve both nonlinear and high-dimensional issues.	1. The aggregation approach tends to understand the cardholder action dynamics. 2. The conduct of fraud will differ in the region, so the apps' predictive value differs by nation.

IV. DISCUSSION

Almost all implemented algorithms, it could be observed, do not work in real-time. As shown, the detection of credit card fraud uses many ML techniques, especially those of artificial intelligence, and blends them with optimization techniques such as aggregation; for the detection of financial statements frauds, it focuses primarily on text processing techniques.

Nowadays, various online transactions are made, and we do not tell the user how to use the online payment. We only grab the IP address for verification. So, cybercrime assistance is needed to investigate the fraud. The review says that:

- Evolutionary algorithms are unique; much of the existing methodology involves a period after the transactions are made.

- Expenditure incurred in fraud detection is more excellent in most of the existing techniques.

- Attributes and data science used to identify fraudulent transactions are not sufficient.

- Specific research work describes that fraud detection is specified only for high-value transactions. These demand to propose a cost-effective technique to address both low and high-value transactions.

- No standardization has been done in fraudulent transaction attributes; it may vary from one financial institution to others and also vary from country to country.

- Existing techniques perform more effectively only when the data science is in linear form.

- The review shows that the accuracy rate arrived through the existing techniques need to be improved; evolutionary algorithms are exceptional.

V. CONCLUSION

This article discusses the numerous efforts to prosecute credit card theft, which describes their essential outcomes. The overview of contributions from various researchers highlights the different algorithms, techniques, and other features treated for detecting credit card fraud. We would begin analyzing credit card fraud in our future work to improve the current algorithms with improved accuracy.

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A STUDY ON CUSTOMER ENGAGEMENT THROUGH DIGITAL MEDIA ONRESTAURANT BUSINESSES

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ABSTRACT

This study explores how effectively restaurants are using digital media and studies theeffectiveness of different digital customer engagement programs that the industry is focusing on. Digital media is emerging as a communication tool in any business. Emails, social media, SMS services, food ordering sites, restaurant websites are the five digital media channels included in this research. For this study primary and secondary source of data is used, the sample size included in this study extends to 50 respondents, which included managers of restaurants and technical team of restaurants. Digital media has a greater degree of customer engagement than the other channels. Understanding customer behavior helps the restaurants to identify the tastes and preferences of the customers. The results of this research are restaurants are effectively using digital media platforms and spending more amount and time on online food ordering sites and social media. The majority of restaurants employ an executive to look after their digital media channels. The findings of this study are conducting customer engagement programs increases restaurant's growth and helps in understanding customer behavior. Hence, it has been recommended that restaurants should focus on customer engagement programs for restaurant growth.

Keywords: Digital media, Customer Engagement, Restaurants, Social Media

INTRODUCTION

Customer engagement is the emotional connection between a customer and a brand. Highly engaged customers buy more, promote more, and demonstrate more loyalty. Consumers choose something with which they feel they have an emotional connection. According to a survey which was done in 2013 by Gartner, "Customers are transitioning to communicating and buying through digital channels." This has led to the concept of increased use in customer engagement.

Customer engagement or lead nurturing is one of the most important parts of marketing strategy. And unlike other aspects of marketing, this one never ends, as long as the business has a product or service to offer.

Different channels that engage customers and products/service/brand digitally they are:

- Search engines that help the customers to get information about products/brands/services.

- Branded websites that help to impart information about a product/service/brand.

- Websites that give reviews about product/service/brand.

- Emails which are useful to keep the customers updated about the latest updates of the company.

- Banners type of advertising on various websites other than the ones belonging to the company.

- Using online videos for promotional purposes and for informational purposes.

- Social networking sites, blogs, etc.

LITERATURE REVIEW

*Amit Jain et.al: (2017)*states in his study that the majority of the hotels are using social media, but they are not using all the benefitsof it properly. Majority of the hotels failed to use all the options to engage guests effectively.*Manoj timilsina (2017)* states that Social media works as an important tool to find out potentialas well as new customers towards any kind of business.*Anurag Tiruwa et.al: (2014)*suggested that a lot of improvisations need to come, to reachmore people digitally and to show the power of digital media as a primary channel to engagecustomers in FMCG sector, mostly digital media is useful for promoting a brand and to engagecustomers.*C.M. Sashi (2012), in his study "Customer engagement, buyer-seller relationships, andsocial media,"*revealed how the advancement in the internet lead to an explosion of interestin customer engagement. *Paul hariggan et.al: (2017)*mentioned that proper use ofsocial media by Managers of tourism brands increases customer engagement in tourism, andthe managers can easily understand the nature of customer engagement towards social mediabrands in tourism.*SenikaDewnarain et.al: (2019)*stated that service experience in thehotel industry increases the electronic word of mouth, so the marketing expenses decreases notonly this Ewom increases the confidence level and builds trust in customers.

OBJECTIVES OF THE STUDY:

- To study how effectively restaurants are using digital media

- To study the effectiveness of different digital customer engagement programs that the

- industry is focusing on

- To analyze the impact of customer engagement in restaurant businesses through digital

- media

SCOPE OF THE STUDY:

This study helps us to understand customer engagement through digital media in restaurant businesses. The study is being carried out for a period of 60 days. The scope of the study is limited to a sample size of 50. This study helps restaurants to know how effectively they are using digital media platforms and to know the effectiveness of different digital customer engagement programs that the industry is focusing on. The outcome of the study helps restaurants to understand the advantages of various digital platforms.

METHODOLOGY:

Sample Size:

The sample size included in the study extends to 50 respondents, which included managers of restaurants and technical team of restaurants.

Sampling Plan:

The sampling method used is convenience sampling the technique to obtain the responses from target audience such as, restaurant managers and digital marketing personnel of restaurants of

Hyderabad.

LIMITATIONS:

- The study is confined only in Hyderabad because of time constraints.

- Sample size used for the study is small hence the results cannot be taken as universal.

- The limitation of the convenience sampling technique is applicable to the study.

- Most of the respondents do not answer correctly due to time constraints.

DATA ANALYSIS:

Correlation between how often restaurants use digital customer engagement programs and business growth.

		usage	Does digital customer engagement programs help in growing business
	Pearson Correlation	1	.633[**]
Usage	Sig. (2-tailed)		.000
	N	50	50
Does digital customer engagement programs help in growing business	Pearson Correlation	.633[**]	1
	Sig. (2-tailed)	.000	
	N	50	50
**. Correlation is significant at the 0.01 level (2-tailed).			

FINDINGS:

- The data collected from premium restaurants, shows that 84% of the restaurant's revenueper month exceeds above 10 lakhs, 16% of the fall under the category of 5-10 lakhs.

- Almost every restaurant uses online food ordering sites as their primary source to reachcustomers and also have their presence on social media.

- It is found that restaurants give more importance to food ordering sites in terms ofmoney spent by them.

- It was observed that 64% of the restaurants are getting 25%-50% of their revenue fromonline food ordering sites.

- It was observed that importance given to food ordering sites and time allocation fordigital media per day are highly correlated (0.934) compared to other variables.

- Majority of the restaurants are spending more time on food ordering sites and they aregiving next preference to social media in allocating time per day.

- Emails and SMS services were given less preference and these two variables have weakcorrelation (0.270) between allocation of time per day and level of importance given tothese factors.

- It was observed that majority (66%) of restaurants have executive to look after theirdigital platforms.

- It was observed that 36% of the restaurants conduct customer engagement programsrarely, 34% of the restaurants conduct customer engagement programs occasionally.

- Conducting customer engagement programs helps in understanding customer needs andwants, to discover factors that encourage customer involvement, and increases revenueof the restaurants.

- The correlation 0.633 shows that there is a strong correlation between usage ofcustomer engagement programs and business growth. These programs help inenhancing the customer experience and to understand the preferences and interests ofcustomers. These programs help the restaurants to analyse the overall performance andto build strategies for business growth.

- It was observed that 90% of the restaurant managers agreed that digital media as aplatform help the restaurants in understanding customer behaviour.

- With the help of digital media channels restaurants can better understand the customerbehaviour. Understanding customer behaviour help the restaurants to identify the tastesand preferences of the customers.

CONCLUSION:

This study is a step towards understanding role of digital media as a channel for customerengagement. To study how effectively restaurants are using digital media with the objective ofdigitally engaging the customer with different customer engagement programs. Commondigital media platforms with respect to restaurant businesses that are being widely used areEMAILS, SMS services, Social Media, Restaurant website, Online food ordering sites. Amongthese platforms' online food ordering sites and social media were given more preference,Restaurants are spending more time and resources on these two platforms to engage customers.Compared to other channels social media is cost effective in engaging customers. Frequentlyconducting the Customer engagement programs help in business growth. Customer datagenerated by social media and by other platforms gives an opportunity for restaurants tounderstand the customer behavior and to engage the customers more.

SUGGESTIONS:

- It is observed that most of customers are using social media and food ordering sites to engagewith restaurants hence, restaurants should mainly focus on these two factors to increase thenumber of customers and brand equity.

- Focusing more up on the customer engagement programs increases the profits and reputationof the restaurants.

- Restaurants should appoint digital marketing executive to increase the revenue throughdigital platforms

- Restaurants should conduct digital contests to engage customers more

- The online food ordering apps have to improve their restaurants sites and menus to satisfythe consumer in a better way.

- The high price is one of the reasons for consumer to ordering food through online. So, foodapps can consider this and reduce their delivery charges.

- Restaurant should concentrate on bulk SMS to increase the brand awareness to some extent.

- Restaurants should focus on digital customer engagement programs like Digital loyaltyprograms, Digital gift cards, Digital coupons.

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A STUDY ON EFFICACY OF FARADIC FOOT BATH WITH MC CONELL TAPING IN PLANTAR FASCITIS AMONG HOUSEWIVES

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ABSTRACT

BACKGROUND: Housewives with plantar fasciitis can experience pain in the heel. As the foot arch start to collapse the plantar fascia band, which runs from the heel and fans out each of the toes, Millions of people undergo any number of the following on a daily basis, a pain in their heel the moment their foot hits the ground in the morning; pain in the heel or arch area after taking the first few steps following a long period of sitting and Many housewives prolonged standing in kitchen.

AIM: To determine to prove the effectiveness of Faradic foot bath with Mc conell taping in plantar fasciitis among housewives.

OBJECTIVE: To find the effectiveness of Faradic foot bath with Mc conell taping in plantar fasciitis among housewives.

METHODOLOGY: 30 individuals with plantar fasciitis will be selected based on inclusion and exclusion criteria. Detailed procedure will be explained in patient's words and informed consent will be obtained from all the participants. The subjects were then allocated into two groups group A and group B.

Group A received Faradic footbath with Mc conell taping and Group B received the treatment of conventional physiotherapy alone. Both groups are assessed by outcome measures pre and post interventions.

OUTCOME MEASURES:
1. *Visual analogue scale (VAS)*
2. *Foot and ankle disability index (FADI)*

STATISTICAL ANALYSIS:
The collected data will be tabulated and analyzed using descriptive & inferential statistics. To all parameters mean and standard deviation (SD) will be used. Paired t-test will be used to analyze significant changes between pre-test & post-test measurements.

RESULTS:
The two-tailed P value is less than 0.0001 By conventional criteria, this difference is considered to be extremely statistically significant. The mean of Group One minus Group Two equals 20.0000 , 95% confidence interval of this difference form the both groups.

CONCLUSION: The plantar fascitis affecting a mididdle aged women with history of high heel use for pronlonged standing in the day to activities. This study prove the effectiveness of faradic footbath with mc conell taping to relieve pain among housewives.

INTRODUCTION

Plantar fasciitis (PF) is the most common cause of heel pain and accounts for 15% of all foot disorders, Plantar fasciitis is a condition caused by drastic or sudden increases in mileage, poor foot structure, and inappropriate running shoes, which can overload the plantar fascia, the connective tissue that runs from the heel to the base of the toes, resulting in heel pain.

The plantar fascia may look like a series of fat rubber bands, but it's made of collagen, a rigid protein that's not very stretchy. The stress of overuse, over pronation, or overused shoes can rip tiny tears in it, causing heel pain and inflammation, a.k.a. plantar fasciitis.

Plantar fasciitis sufferers feel a sharp stab or deep ache in the middle of the heel or along the arch of the foot. Another sign of the condition is the morning hobble from the foot trying to heal itself in a contracted position overnight. Taking that first step causes sudden strain on the bottom of the foot, resulting in heel pain or pain in the arch. The pain can recur after long spells of sitting, but it tends to fade during a run, once the area is warmed up.

Plantar fasciitis-related heel pain tends to strike those who over train, neglect to stretch their calf muscles, or overdo hill work and speed work. The condition of plantar fasciitis can also be caused by biomechanical flaws,

including flat, feet with high arches and a tight Achilles tendon; excessive pronation; sudden increases in training mileage; beginning speed work; wearing worn running shoes; running on hard surfaces, like asphalt or concrete; or a woman wearing high heels all day before switching into flat running shoes Plantar fasciitis affects active and sedentary adults of all ages and more likely to occur in persons who spend most of the day on their feet or who have limited ankle flexion. It is estimated to effect 10% of the population at some time in their life. Plantar heel pain is a common clinical condition treated by physical therapists.6A wide verity of conservative treatments had been recommended for the treatment of plantar heel pain. This study most concentrate to treat the physiotherapy approach like faradic foot bath with mc conell taping in plantar facitis among housewives.

OBJECTIVE:

To determine the effectiveness of Faradic footbath with Mc Conell taping on pain and disability in plantar fasciitis among Housewives.

HYPOTHESIS:
NULL HYPOTHESIS

There will be no beneficial effect of Faradic footbath with Mc Conell taping on pain and disability in plantar fasciitis among Housewives.

ALTERNATIVE HYPOTHESIS:-

There will be beneficial effect of Faradic footbath with Mc Connell taping on pain and disability in plantar fasciitis among Housewives.

METHODOLOGY

Study design: Quasi Experimental Study

Study Setting: Manimalathy physiotherapy clinic, Subramaniapuram, Trichirappalli.

Sampling method: Convenient sampling – Odd Even method

Sample size: According to prevalence rate required sample size is30 participants .Each group 15 participants.

Group A-n=15

Group B-n=15

Inclusion criteria:

- Patient diagnosed as chronic plantar fasciitis.

- Age ranging from 18-60 years[6]

- FADI score of less than 65.[6]

Exclusion criteria:

- If patient exhibit any red flags to manual therapy intervention (ie, tumor, fracture, RA, OA, prolonged steroid use, etc)6

- Patient had prior surgery to distal tibia, fibula, ankle joint or rear foot region.6

- History of planter fasciitis in the past months.11

- Foot abnormalities including, diabetes, gout, nerve impingement, autoimmune disease, pitting edema, etc.

- Pregnant women

- Persons with rheumatoid arthritis

- Malignancy

- Fractures or dislocation

- Recent undergone surgery

- Acute inflammatory condition

- Infections

MATERIAL REQUIRED:

- Mc Conell Tape

- Ultrasound therapy.

- Faradic muscle stimulator

PROCEDURE:

30 individuals with plantar fasciitis will be selected based on inclusion and exclusion criteria. Detailed procedure will be explained in patient's words and informed consent will be obtained from all the participants. Subjects will be assessed for presence of plantar fasciitis.

Pain will be measured in VISUAL ANALOUGE SCALE (VAS) and FOOT AND ANKLE DISABILITY INDEX (FADI) score. the subjects were then allocated into two groups group A and group B

FLOW CHART
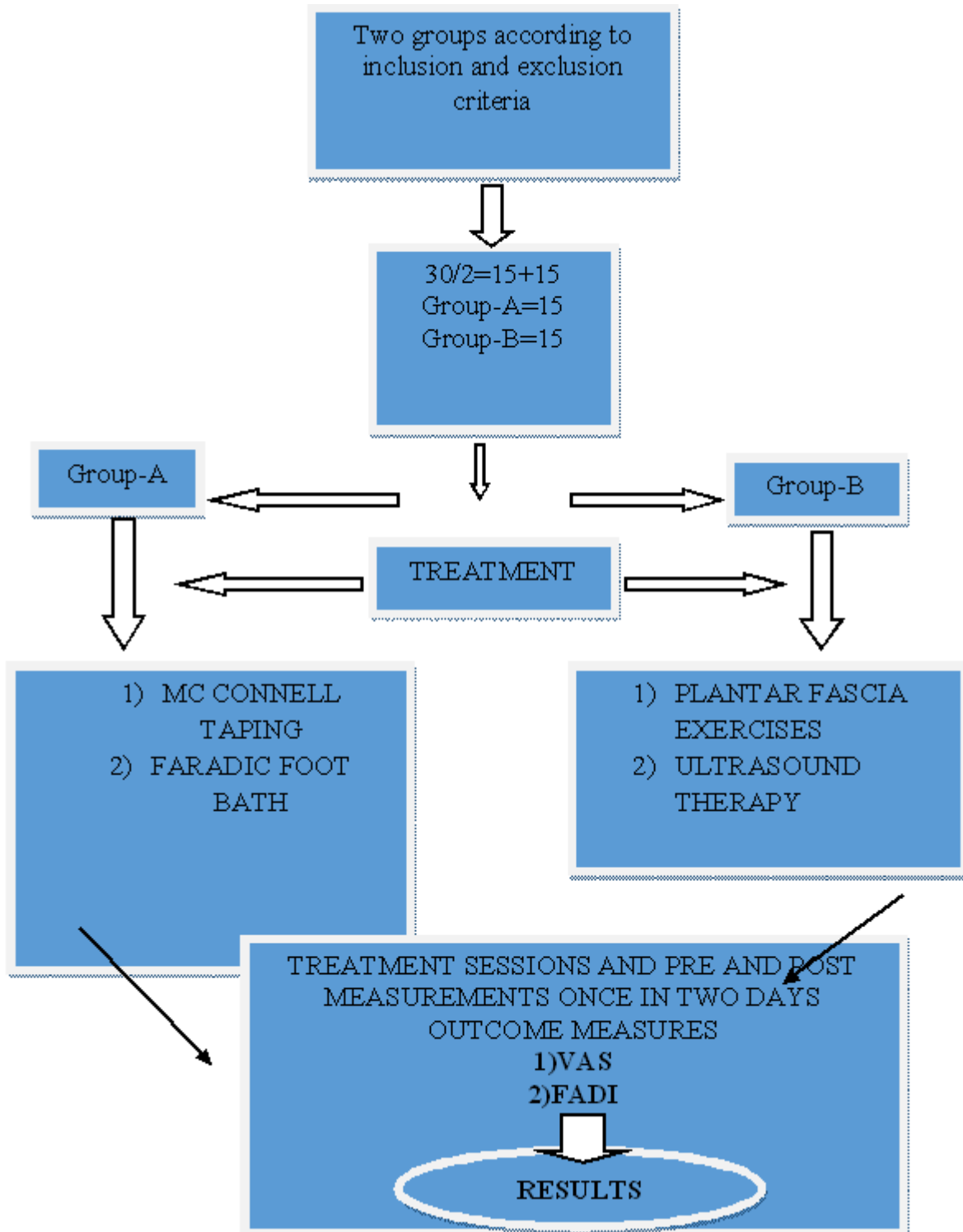
Fig. : 1 Procedure for Data collection method

Group A: (n=15):

Mc conell Taping: For 1 week continues until next visit. All the patient from group A is selected for taping. Start by taping around the ball of the foot (metatarsal) area. Next, wrap another piece of tape around the heel and attach it to the tape around ball of the foot. Place a strip of tape around the metatarsal region and then cross the mid-foot diagonally before wrapping it around the and crossing the mid foot again .this is going to make an X shape across the mid –foot. Finish the tape by applying tape horizontally across the foot to cover the previous strips.

Faradic Foot bath:
Patient was comfortable seated with high sitting position and back well supported. Position the feet on a stool covered with a plastic sheet, place the foot in a bath containing enough warm water to cover the toes. One electrode under the heel and another electrode under the tarsus and meta tarsus. surged duration 1 sec, interval 3sec, treatment time 15 minutes.

Group B : Conventional therapy.:
All patients in this group will be treated with 5 minutes of Plantar fascia foot exercises given.

Ultrasound therapy was given for Duration: 10 mins with the frequency:3MHz, Intensity:1.0W cm^2

Treatment Protocol (Both A & B Group)

Sessions	: 1 session/day once
Frequency	: 7 days/week
Duration	: 2 weeks

RESULTS:
- The collected data will be tabulated and analyzed using inferential statistics. To all parameters mean and standard deviation (SD) will be used.

- Paired t-test will be used to analyze significant changes between pre-test & post-test measurements.

- Unpaired t-test will be used to analyze significant changes between two groups.

Table –1. Pre test –Post test values of group –A

Group A	Pre- Value		Post- value	
	Mean	SD	Mean	SD
FADI	60.8	4.86	96	2.55
VAS	8.2	0.94	1.4	2.69

Table -2 Pre test –Post test values of group –B

Group B	Pre- Value		Post- value	
	Mean	SD	Mean	SD
FADI	60.8	4.86	76	3.96
VAS	8.2	0.77	6.26	0.96

Fig 2. pre and post values of VAS
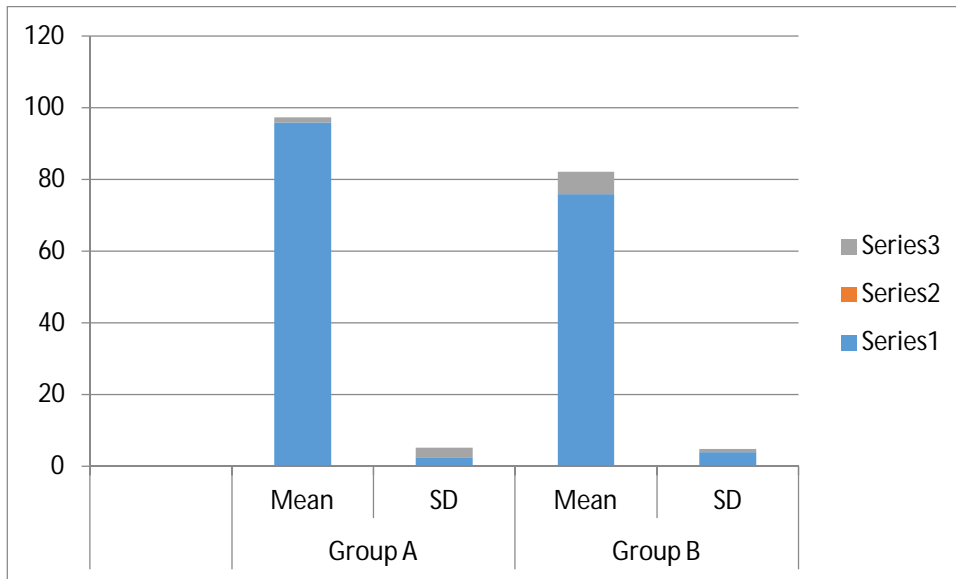
Fig 3.Pre and post values of FADI
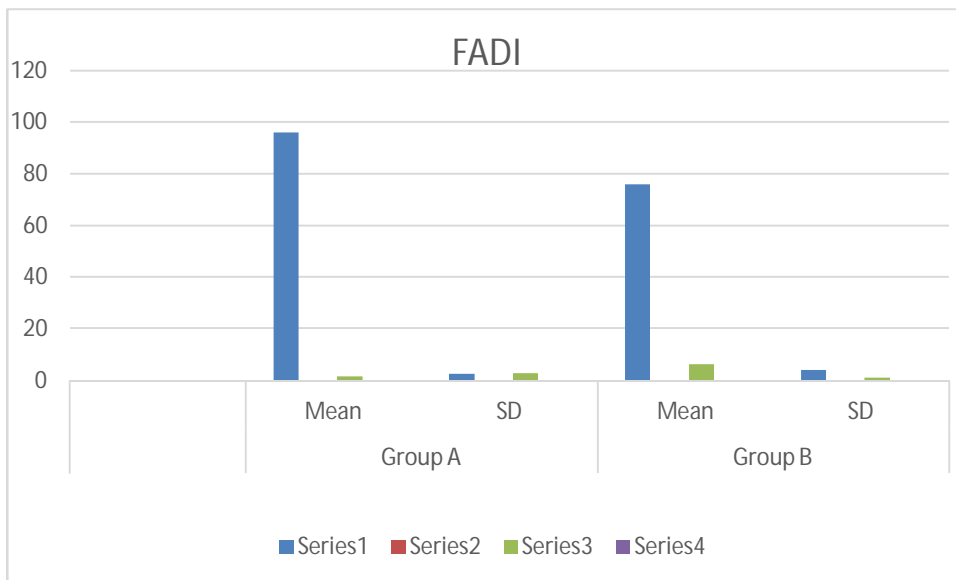
Fig.4 Pre and post values of FADI
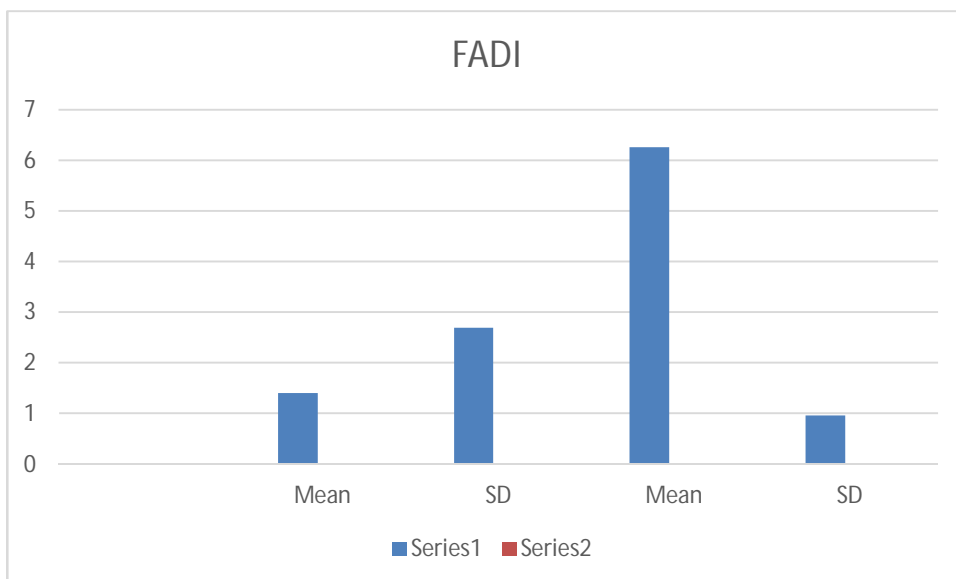
Fig. 5 Pre and post values of VAS
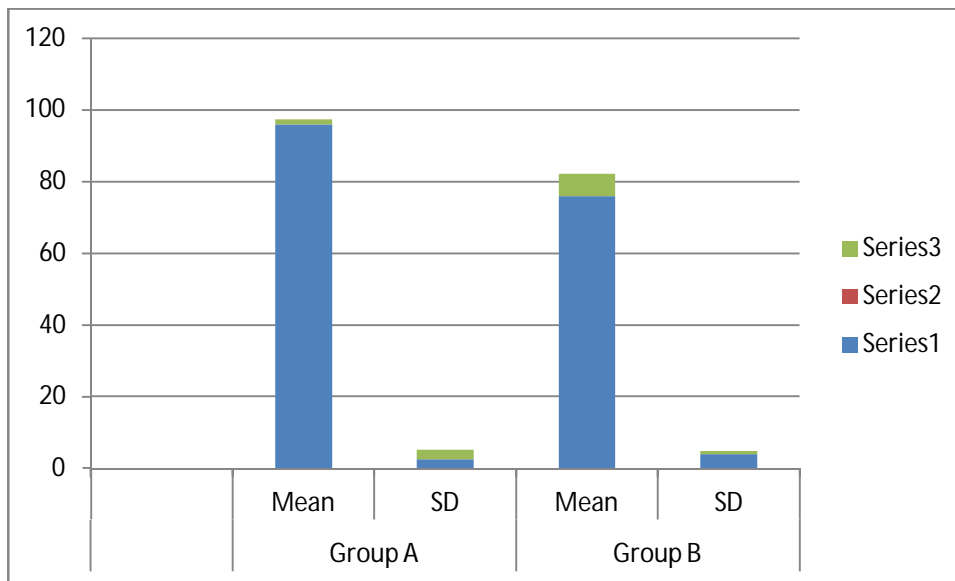
Table – 3   Comparison between the post test values group A and group B.

	Group A		Group B		P-Value	T –Value
	Mean	SD	Mean	SD		
FADI	96	2.55	76	3.96	≥ 0.0001	16.44
VAS	1.4	2.69	6.26	0.96	≥ 0.0001	6.50

Fig. 6 Comparison between the both groups
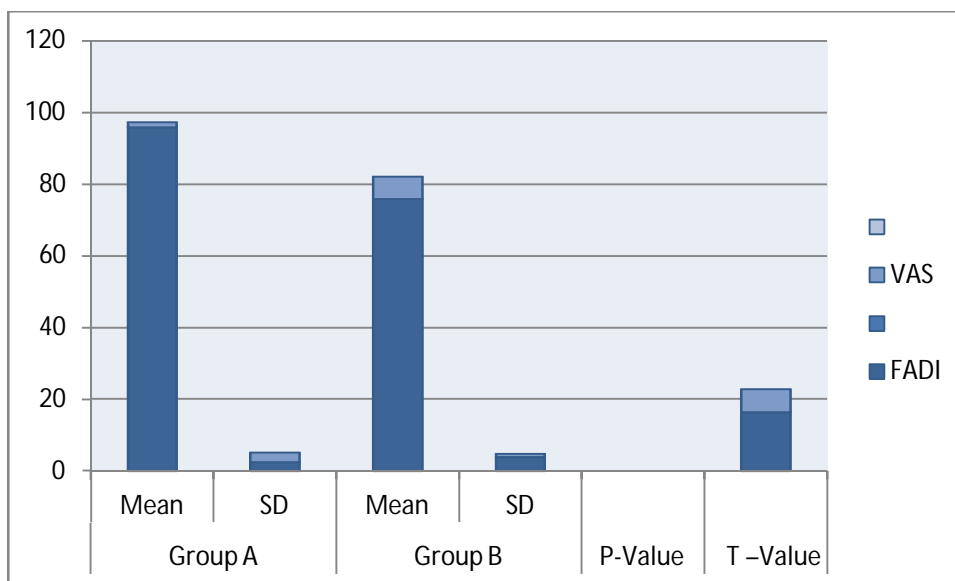
DISCUSSION:

Plantar fasciitis taping is often used as a method of treatment to alleviate stress on plantar fascia can relieve some pain and inflammation in plantar fasciitis, to maximize the amount of relief that can be achieved through plantar fasciitis Mc conell taping. For those who may currently suffering from plantar fasciitis, taping would be most effective when used in combination with other treatment devices like ultrasound therapy and calcaneal glide mobilization, and it will be more effective in repairing the condition. but compare the both groups were received the treatment results significant changes for the post intervention.

In the comparison of pre and post values of SPADI scale the two-tailed P value is less than 0.0001, by conventional criteria, this difference is considered to be extremely statistically significant. The Confidence interval of The mean of Group One minus Group Two equals 20.0000, 95% confidence interval of this difference: From 17.5089 to 22.4911 and the value of t = 16.4458, df = 28, standard error of difference = 1.216.

The compare the both groups of VAS results of the two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant. The Confidence interval of the mean of Group One minus Group Two equals -4.8000, 95% confidence interval of this difference: From -6.3106 to -3.2894 and the value of t = 6.5088, df = 28, standard error of difference = 0.737.

In the housewives are working or standing prolonged more in the house, their plantar fascia will be stressed more, Mc conell taping prevents the stress and giving support to the plantar fascia to prevent worsening of the condition and helps to heal the condition. The results states that significant improvement Group A Faradic foot bath with Mc conell taping to relieve pain in plantar fascitis among Housewives.

LIMITATIONS AND FUTURE RECOMMENDATIONS:

- Small sample size

- The duration of the treatment.

- A study with large sample size is recommended.

- Further studies can be done with more duration of treatment session.

- A study with different outcome measures.

- Various other techniques with taping can also be used.

CONCLUSION:

In a plantar fasciitis there will be pain in their heel the moment their foot hits the ground in the morning; tenderness in the heel and arch area; pain in the heel or arch area after taking the first few steps following a long period of sitting; discomfort and throbbing in the heel and arch area after long periods of standing. Many housewives prolonged standing in kitchen. This study emphasizes to discuss this condition from the perspective of the female gender, providing useful information on prospective causes, and modalities of Faradic foot bath technique with McConnell taping helps to maintain the fascia in its normal alignment, it reduces the workload of the plantar fascia even in standing, taping method keeping the plantar fasciitis under control.

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A STUDY ON HUMAN RIGHTS IN PATIENT'S CARE WITH SPECIAL REFERENCETO INDIA

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ABSTRACT:
A patient face numbers of obstacles or hindrances seeking treatment in a Hospital or in a healthcare institute, such as, a person with mental disabilities is latched up in a mental health care institute, medicated by force and control in unsanitary conditions, sometimes hospitalworkers overtly disclose HIV status of a patient, throughout a medical operation denial of anesthesia by a drug user, a sex worker is denied to be treated by a health care providers etc. which are common to all countries transgresses their basic human dignity and also jeopardize health outcomes. This paper will discuss about the safeguards provides for the protection of human rights of the patients under the framework of the Constitution of India as well as under International perspective.

Key Words: Human Rights, Patient, Indian Constitution, Judiciary, dual loyalty

INTRODUCTION:
While observing and analyzing the abuses of patient"s care in health care institutions, the idea of human rights in patient"s care has full grown throughout the world and at the same time in some cases holding government and other parties responsible. In some countries like Latin America and South Africa, the States are bound by the judiciary to show respect and protect human rights of HIV/ AIDS patients as well as to serve them appropriate medical aid.

The patients are facing various challenges while seeking treatment in a healthcare institute, such as, in a mental health care institute a mentally disabled person is locked up, medicated compulsorily, held in a germ-infested condition, no privacy maintain by the hospital staff about HIV status of a patient, the sex workers are denied to get treatment by the health care providers etc. These hindrances are common to all countries which infringe the basic human rights of the patients and also endanger health outcomes. The rights of a patient to get proper health care service as a consumer have much more importance than of the rights of any other consumer and because as a patient they have very little options in their treatment. Along with it, one important concept associated with the term patients" human rights is „dual loyalty" which denotes the concurrent commitment of the healthcare providers towards the patients as well as to the State. Incase of alignments of interests between the patient and the State, the doctors are often constrained to manipulate the rights of the patients. So there is an urgent need for the patients to have knowledge about their legal rights while seeking treatment in a healthcare institute.

Human Rights in Patient's Care under International Arena
I. **World Health Organization** authorized the World Health Assembly regulate somespecified areas such as to design procedure including sanitization and quarantine requirements in order to prevent spread of disease internationally, to prescribe standards for therapeutic procedure, as well as for maintain purity, safety, along with standards for advertising and labeling of pharmaceutical, biological and other similar products thoseare moving in international market.

II. **Universal Declaration of Human Rights**: **(UDHR)** sets forth the right to a "standard of living adequate for the health and well-being of himself and his family, including . . . medical care and . . . the right to security in the event of . . . sickness, disability . . . or other lack of livelihood in circumstances beyond his control." Although the components of right to health has not been defined under this declaration but it says much more about health which is about and beyond medical care.

III. **The International Covenant on Economic, Social and Cultural Rights (ICESCR)** denotes that for the full realization of right to health, Government should take some steps those are needed for "the reduction of the stillbirth-rate and of infant mortality and for the healthy development of the child"; "the improvement of all aspects of environmental and industrial hygiene"; "the prevention, treatment and control of epidemic, endemic, occupational and other diseases"; and "the creation of conditions which would assure to all medical service and medical attention in the event of sickness."

IV. **European Social Charter (ESC)** states that in order to protect the right to health of the people, the States shall "take effective actions so as to remove as far as possible thecauses of ill-health"; "to provide advisory and educational facilities for the promotion of health and the encouragement of individual responsibility in matters of health"; "to prevent as far as possible epidemic, endemic and other diseases".

V. **African Charter on Human and Peoples' Rights (ACHPR)** "reveals that every individual shall have the right to enjoy the best attainable state of physical and mental health". State shall adopt appropriate measures for the protection of health of their peopleand shall ensure proper medical attention to them.

VI. **Convention on the Rights of the Child (CRC)** says that States Parties shall ensure that there is no deprivation of the right of the children to access proper health care treatment and every child shall enjoy highest attainable standard of health.

VII. **Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights** expressed that every people shall have right to health. The States shall adopt some effective measures to provide them highest standardof as well as the right to physical, mental and social well-being, such as: "Primary health care, that is, essential health care made available to all individuals and families in the community", "extension of the benefits of health services to all individuals subject to the State's jurisdiction", "universal immunization against the principal infectious diseases", "prevention and treatment of endemic, occupational and other diseases", "education of the population on the prevention and treatment of health problems", and "satisfaction of the health needs of the highest risk groups and of those whose poverty makes them the most vulnerable".

VIII. **American Declaration of the Rights and Duties of Man (ADRDM)** states that States shall ensure to every person the right to proper sanitary measures as well as social measures relating to housing, food, clothing, health care services etc.

Patient's Right in India:
Under the perspective of International conventions, the Constitution of India also in its various provisions provides safeguards for the protection of human rights of the people. But in spite of all that rights, patients, as a human being deprived of their human rights while seeking treatment from the health providers.

I. **Right to life, liberty & security of Person:** The constitution of India ensures to its citizens the right to life and personal liberty under Article

21. Still the patients in India are denied of their life, freedom and security in situations where patients are confined in a medical clinic for failure to pay, patient's demise because of inaccessibility of ambulance service as expected. Again the expanding development of maternal death rate and newborn child death rate shows the image of poor regenerative wellbeing and pre-birth care accessible in India. "The maternal mortality proportion (number of ladies passing on per 100,000 live births) in India is higher than in 120 nations, including neighboring conditionsof Bangladesh, China, Nepal and Sri Lanka. In excess of 117,000 women and girls dying every year in India from generally preventable pregnancy-related causes. The North-East States has themost noteworthy maternal death rate (328 deaths for every one lakh conveyances) and the tea gardens are the significant supporters of it.

II. **Right to bodily Integrity:** One of the important aspects of doctor patient relationship is „informed concept". It arises when the patients receive information about all benefits and risk associated with the treatment procedure and they give permission for a medical procedure. But the health care providers fail to take informed consent in actual practice. The Supreme Court of India recently stated that in absence of informed consent of the patient, a treatment cannot be considered as legal although the treatment procedure was appropriate or correct. The Apex Court also revealed that if the patient is a competent adult, any other"s consent is not considerable except in life threatening situation.

III. **Right to Information:** Government of India neglects to give data on medical care administrations in India just as a doctor additionally neglects to furnish patients with data in regards to therapy alternatives and about likely dangers and advantages of every therapy methodology they give. Patients areregularly denied admittance to their clinical documents in Hospitals. The Apex Court uncovers that the patient has a privilege to his/her clinical record based on Article 19 and 21 of the Constitution of India, and the wellbeing supplier, regardless of whether public or private, have an obligation to give the equivalent under the Right to Information Act, 2005, the Consumer Protection Act, 1986, the Medical Council Act, 1956 and the World Medical Ethics read with Constitutional rights". The Court additionally uncovers that the public authority needs to build up a time period component of revelation of clinical records to patients or their family members to give protections to security and privacy. Under Section 2(f) of The Right to Information Act, 2005, the Information Commission can authorize the privilege to data of patients against both Government and Private Hospitals". The Supreme Court of India regarding critically ill individuals expressed that while 'Willful extermination' is a demonstration of any individual, including a specialist, of

purposefully executing an individual who is at death's door by giving medications, 'Assisted Suicide' is a demonstration of the patient who gets the help of a specialist in taking medication with the expectation of ending it all, are unlawful.

IV. **Right to Privacy and Confidentiality:** In different fields patients basic liberties for example right to protection and privacy are encroached by the health care providers in various situation, for example, patient's clinical data is available to all staff individuals or clinical assessment are happens out in the open conditions by and large. Alongside it patients are compelled to reveal their clinical conclusion to their employers to get leave from work. The Supreme Court of India expressed that in a contention between right to privacy and right to get information about any danger to her life/wellbeing, the later will prevail. Again the Court said that the obligation to keep up mystery in each Doctor-Patient relationship was likewise not outright and such obligation could be broken if public interest so requires.

CONCLUSION:

The rights of a patient to have proper health care as a consumer are most important than the rights of a general consumer because patient usually has very little choice in their treatment. Along with it human rights in patient care concept refers not just to entitlements for actual patients only, but also it is concerned with the health providers and the entire community. Under the perspective of International conventions, the Constitution of India also in its various provisions provides safeguards for the protection of human rights of the people. But in spite of all that rights, patients, as a human being deprived of their human rights while seeking treatment from the health providers. Along with the patients, the health providers are also facing human rights violations in course of their occupation. Under various International Laws such as ICESCR, ACHPR, ESC the right to have decent working conditions are promised. But in actual, they are not enjoying the same. For example, medical staff other than the Doctors are paid less than the national minimum wage, medical staff are exposed to dangerously high levels of radiations due to faulty equipment, nurses may infected with HIV due to due to improperly sterilized medical protection and sometime medical staff feel insecure because of some violent patients.

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A STUDY ON IMPACT OF ADVERTISEMENT ON CUSTOMER ATTRACTION IN THE BANKING SECTOR DURING THE PANDEMIC

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ABSTRACT

This paper seeks to analyze the Coronavirus Pandemic (2019) on How does Advertisements affects the Banking sector. The virus is currently a worldwide issue and has affected marketing, advertising, and various marketing strategies worldwide. Covid - 19 has impacted different companies, organizations, firms, international and regional markets through their marketing and expenditure operations. This will help the bank to improve their level of customer attraction and to provide effectiveness in the services offered by them. The main objective of this study is to identify the effectiveness of advertisement in Banks in India and to improve customer attraction and satisfaction. The research design adopted here was descriptive analysis, with positivism as research philosophy and inductive approach is employed. The research strategy adopted was a survey and therefore the sampling technique used was simple in the probabilistic sampling method.

Key Words: Advertisement, Customer, Effectiveness, and Satisfaction, descriptive analysis.

1. INTRODUCTION
Advertisement in banking supports for enlargement and leads the banks to have higher opportunities in process of extension in the banking sector. so, advertisement enables banks to attract more customers to deal with bank services. Advertising helps banks to provide more effectiveness to perform overall bank operations and to inform customers of bank offers and products. Banks are needed to efficient advertising for superior performance and growth. Advertising is essential for Banks and provides fundamental supports for banks.

1.1. Background of the Study
Displeased customers tell ten people, according to the stereotypical marketing sagacity. But now they have the power to tell 10 million people through social networking. They can share their experiences and opinions of a company in a matter of seconds, no matter where they are in the world. We no longer can live in isolation. Advertisement efficiency has constructed a new aspect in business clarity and commitment, making it more demanding and happening. To gain an edge over the competition, businesses pursue social networking as a cost-effective edge. also, they use different advertising tools to gain and maintain a strong footing in the industry. Advertisement has become a very important communication tool. The success and failure of many organizations depend on the quality of advertising activities (Mandan, Hossein, and Furuzandeh, 2013). The more effective advertising is, the more fruitful results will have appeared.

After that, the commencement of market strategy in the business sector the focal point remained product orientation. All the marketing tactics that the bank used were for the product. With time and with more evolution, it gradually changed to customer orientation and ways to retain customer loyalty for future gains. The selection of Promotion of products And Services always depends upon the target market, group, gender or age, they are targeting. Since conventional banks have branches across the country, they always make use of newspapers and television media to advertise. Some banks rent space in several exhibitions, while others make blogs to spread awareness like American Banks

1.2. Problem Statement
Different issues are involved in this study. A potential customer doesn't choose a bank based on their massive advertisement, which is not the determinant factor. The majority of people choose a banking institution, based on the conventional products and services offered by the banks. Advertisements are never the most effective or useful means to promote banking products and services. Its maybe possibility that bank bears high advertisement cost to advertise their products and services in the market but not receive a positive or expected response from potential customers, that Customers may not sync with the terms and conditions of the bank or competitor or they may not be satisfied with the products or services they are providing. If advertisements are deceptive or do not fulfill the goal of the bank, that can be removed by engaging with high reputed companies. , that can be removed by involving the high reputed personality in their ads. So, this study focuses on these above problems.

1.3 Objectives of Research
In this study, an attempt has been made to evaluate the relationship between

Product and service promotion and level of customer attraction   The objectives of the study are as follows:

- To identify the effectiveness of Advertisement in Bank during the pandemic in India.

- To study the ways to improve the customer attraction and satisfaction level.

- .To examine the effect of Advertisement on customers' perception in the banking sector.

1.4. Delimitations of the Study

The study is delimiting the Indian banking sector because; offered products are different in commercial banking and cooperative banking. cooperative advertise their products and services on a very small scale than the commercial banks. People are less aware of cooperative banking due to less marketing of their products and services. But even if do know about cooperative banking but still they are unwilling to do business with them to gain interest. Therefore, we delimited the cooperative sector from our study.

The study is conducted with a limited variable

Some independent t variables can also have an impact

Limited respondents

1.6. Significance of the Study

The significance of this study is to assess the relationship between bank advertisement and the satisfaction level of customers. If advertisements are more attractive then they can capture the minds of customers and create the need in the mind of the customer regarding the specific products and services. From advertisements, people can easily get information about the banking services and products and also know about their rating. This research helped us to determine that whether advertisement affects our decision in choosing the banking institutions or not.

2. LITERATURE REVIEW

. Richardson and Robinson (1986) examined that internal marketing gave the frame to motivate the clients. After collecting the data and analyzing it, completing an internal marketing plan confirms that it had an impact on the quality of the services provided, identifying the needs. the vital role of communication in informing and encouraging employees and developing optimistic dominances. Separately, all banks have minor differences with one another however all banks provide similar services and also charge similar rates.

The paper by Lackey, Seaton, and Nicholls (1992) investigated the alternative forms of bank advertising. An empirical evaluation of the effectiveness of these alternative forms of bank advertising revealed that verbal advertisements are less effective than visual advertising. Both male and female models are the effective alternative form of bank advertisement instead of a transformational advertisement. The paper by Lackey, Seaton, and Nicholls (1992) explored alternative forms of bank advertising.

An empirical analysis of the effectiveness of these alternative forms of bank advertising revealed that verbal advertisements are less effective than visual advertising. Many similarities and differences were seen between online customers and traditional customers. The four pillars of the marketing mix are the primary tools that influence the buying behavior of the traditional customer. Whereas in web customer, functionality and stability of web site is very important and so is trust and credibility of the online vendor.

This tool is also used by financial institutions to attract and communicate with customers. Advertising also uses to introduce new technology and methods of banking and create awareness among the people about the banking products and services. A proper measure needs to be taken of customers that use banking products because of advertisements. Al-Shayea (2013) analyzed that marketing has become an essential part of our working style. Banking companies also focus on adopting huge marketing to build goodwill and to attract customers. Now a day's marketing is considered as important for banking companies as blood to the human body. Many samples are tested in this respect to evaluating the results. Different methods are used to measure the consumer response after huge marketing campaigns. Khazaei and Ashtiany (2014) studied that in this Electronic copy available at competitive world organizations have to adopt different ways and methodologies to combat the increasing economic crisis and widening emerging media, which can only be gained through effective advertisement of products and services This research showed a positive correlation between customer's deposit (dependent variable) and advertising (independent variable).

Henderson (2014) explained that advertisements assist banks in gaining market share by attracting customers of other banks through advertising campaigns. Advertising had a significant role in supporting banks to expand in the banking sector and to ensure that customers were aware of all the bank's offers and products. In the banking

sector, advertising played a crucial role in supporting banks to expand and to ensure that customers were aware of all the products and services they had to offer. Advertisements enable banks to target specific segmentation of customers and to focus advertising efforts to make an exact segment of bank customers to be aware of bank offers. In the banking sector, advertising played a crucial role in supporting banks' expansion and in ensuring their customers were informed of all their products and services. Schuler (2015) argues that advertisements make customers more likely to get involved with a bank since advertising helps customers get vital information about their bank. operations and bank history to lead ore customers to decide to deal with the bank and to open their account in the bank. Advertisements provide banks with a strong brand name and remind customers about the bank's performance, as well as the range of services they provide to people in the banking sector. Advertisements support banks for long-term growth and enable them to attract more customers and to create strong relationships with current customers of banks.

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design
The framework of the study is simply research design. From different types of research designs, the descriptive research design was employed as the main research design for this study to the realization of the intended objective. The reason behind using descriptive research design is because the researcher is interested in describing the existing situation under study. The descriptive method of research is a technique for gathering information about the present existing condition. also, this research design is a fact-finding study with adequate and accurate interpretation of findings. The purpose of this Research Paper is to assess and gain a better understanding of advertising practice by considering the case of United Bank SC. Descriptive analysis is used based on summarized data to identify the significance of advertisement on the overall operation of the bank

3.2 Data Collection
The survey has been given to 100customer out of that 68 respond with duly filled responses t provide the empirical record for technical investigation based on descriptive statistics, correlation, and regression. the purpose of this study, questionnaires have been provided to collect information. At the initial stage, a questionnaire was delivered to check its reliability and whether it meets research needs. The distribution period of this questionnaire lasted five days and results led to changes within the original questionnaire by ruling out some questions that were considered irrelevant to the topic. the first page of the questionnaire was also added to this stage, along with the briefing about advertisement. which are further divided into subheadings. The sampling method is used for random sampling. Sixteen bank branches from all banking institutions were randomly and questionnaires were distributed to the purchasers of every bank. also distributed questionnaires in our university, to collect data. The questionnaire consisted of 17 questions; the first part was demographic data, which contained seven questions (Name of the respondent, Name, and sector of the bank, occupation, location, gender, age, qualification, marital status, residence, income, etc.). Other parts of the questionnaire were enlargement and extension in the banking sector (India), Promotion of product And Services, Enlargement and extension of a bank, advertisement effectiveness and Customer attraction, and Advertisement efficiency. Data processing was carried out by using excel.

3.3. Theoretical Framework
As we all know that theoretical framework is the foundation of hypotheticodeductive research. It is a conceptual model, which throws light on the relationship of variables. Advertisement efficiency is the social communication among people in which they create, exchange information and ideas in different communities and networks. Promotion of products And Services is a form of marketing communication, which is used to encourage, persuade, or manipulate their audience. Where advertisement effectiveness is an ability to produce the desired outcome. Enlargement and extension of a bank are generally describing the amount of time, effort, or cost which is used for the intended task or specific outcome. Customer attraction is measured by how products and services, supplied by a company meet customer expectations. Advertisement efficiency, Promotion of product And Services, advertisement effectiveness, and Enlargement and extension of a bank are independent variables, as they are not affected by any variable. Rather these variables put a strong impact on customer satisfaction.

3.4 Hypothesis
H1: Enlargement and extension of a bank has a significant influence on Customer attraction

H2: Advertising has a significant influence on a Customer attraction level

.H3: Promotion of products And Services has a significant influence on Customer attraction

4. RESULTS AND DISCUSSIONS

4.1. Descriptive Statistics

Parameters for analysis	Independent Variable			Dependent variable
	Enlargement and extension of a bank (EEA) 1	Advertisement effectiveness (AEFC) 2	Promotion of product And Services (PPS) 3	Customer Attraction (CA) IV
Sum	264	266	229	268
Count	68	68	68	68
Minimum	1	1	1	1
Maximum	5	5	5	5
Range	4	4	4	4
Mean	3.940298507	3.970149254	3.417910448	4
Median	4	4	3	4
Mode	4	4	3	4
Standard Deviation	0.928497374	0.913744947	1.053058853	0.946320447
Sample Variance	0.862107374	0.834929828	1.108932947	0.895522388

Interpretation

The mean value of Enlargement and extension of a bank (EEA) is 3.940 and the mean of Customer attraction (CT) is 4 and the average or mean value of advertisement effectiveness (AEFC) is 3.97 and the mean of Enlargement and extension of a bank (AEFI) is 4.17 and Promotion of product And Services (PPS) is 3.41. The standard deviation of Enlargement and extension of a bank (EEA) is 0.92, Customer attraction (CT) is 0.94, advertisement effectiveness (AEFC) is 0.91, Enlargement and extension of a bank (AEFI) is 0.79 and the standard deviation of Promotion of product And Services (PPS) is 1.05.

4.2. Correlation Analysis

Parameters for analysis	Enlargement and extension of bank	Advertisement effectiveness	Promotion of product And Services	Attraction toward customer
Enlargement and extension of bank	1			
Advertisement effectiveness	0.736770779	1		
Promotion of product And Services	0.25448972	0.199099979	1	
Attraction toward customer	0.73042352	0.586868639	0.164750604	1

The correlation between Enlargement and extension of a bank (EEA) and Customer attraction (CA) remains 0.730 which implies there is a positive relationship between these two variables and concludes that strong correlation. The correlation between Enlargement and extension of a bank (EEA) and advertisement effectiveness (AEFC) is 0.736 this is a strong positive relationship between these variables. The correlation between Enlargement and extension of a bank (EEA) and Promotion of product And Services (PPS) is (0.2544) which shows the negative relationship between these variables. There is no relationship between Enlargement and extension of a bank (EEA) and advertisement effectiveness (AEFC). The correlation between Customer attraction (CA) and advertisement effectiveness (AEFC) is positive 0.5869. which implies there is a positive relationship but less positive than the others variables. But on the contrary. There is a negative relationship between advertisement effectiveness (AEFC) and Promotion of product And Services (PPS) the value of correlation is 0.199. Correlation between Advertisement efficiency (AEFC) and Advertisement efficiency is equal to 1 and the only one correlation exists between Promotion of product And Services (PPS) and Customer attraction 0.164 which is negative

4.3 Z – Test
Since the data follows a normal distribution and the sample size is more than 30, the z test has been used. It is used to determine the variance between two population mean

Decision rule

1. Z Calculated value vs. Z Table value

- If the calculated value lies between these critical value limits, we will accept the null hypothesis otherwise reject the null hypothesis.

2. P-value approach

- Compare the p-value with α: if the p-value is less than or equal to alpha (i.e., 0.05) then we reject the null hypothesis
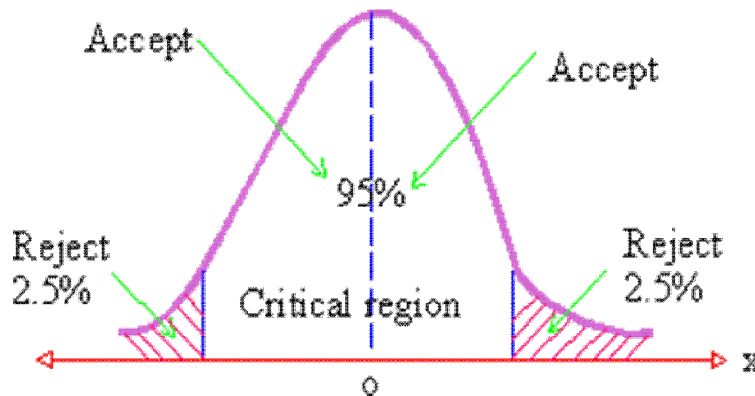
As Level of significant @5%

Z-Test: Two-Sample for Means

Z critical value for 2 tail tests @5% level of significance is

± 1.96

Parameters	Z-test	Z-critical (two-tailed)	p-value	Remarks
Enlargement of bank	-0.366	1.96	0.7144	(H1) Hypothesis Rejected
Advertisement effectiveness	-0.185	1.96	0.853	(H2) Hypothesis accepted
Promotion of product And Service	-3.35	1.96	0.0008	(H3) Hypothesis accepted

Hypothesis Result (Rejected)
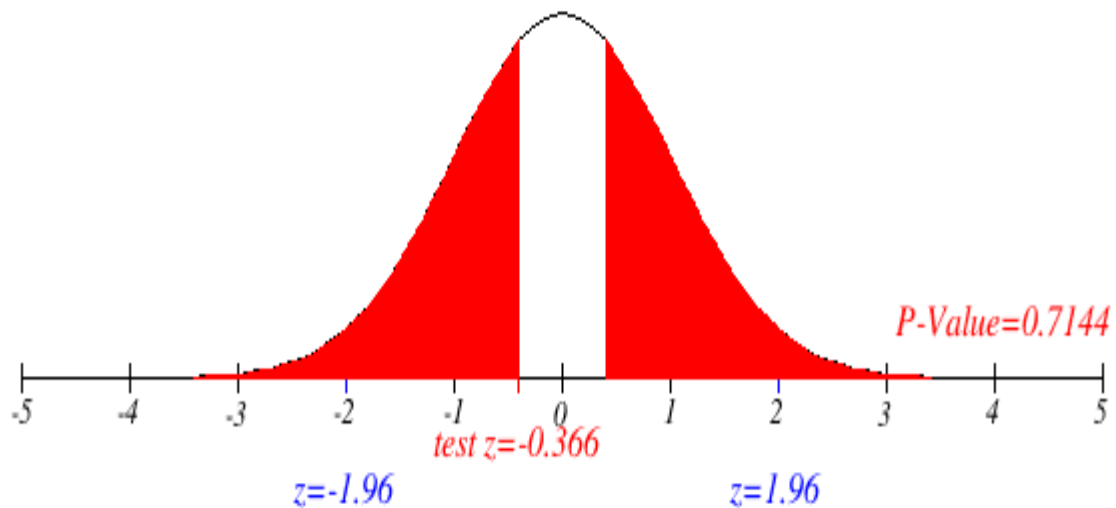
Enlargement of bank (Z Cal: - 0.366 Z critical: ± 1.96 P-value: 0.7144)
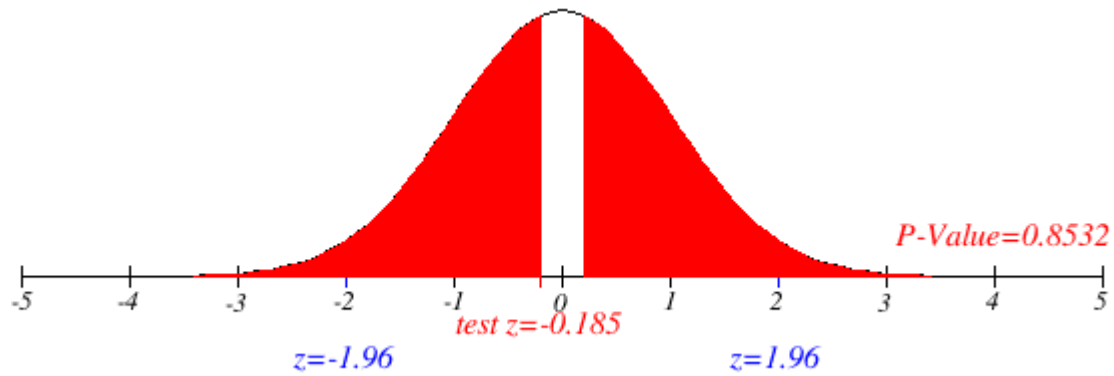
Advertisement effectiveness (Z Cal: - 0.185 Z critical: ± 1.96   P-value: 0.8532)

Hypothesis Result (Accepted)
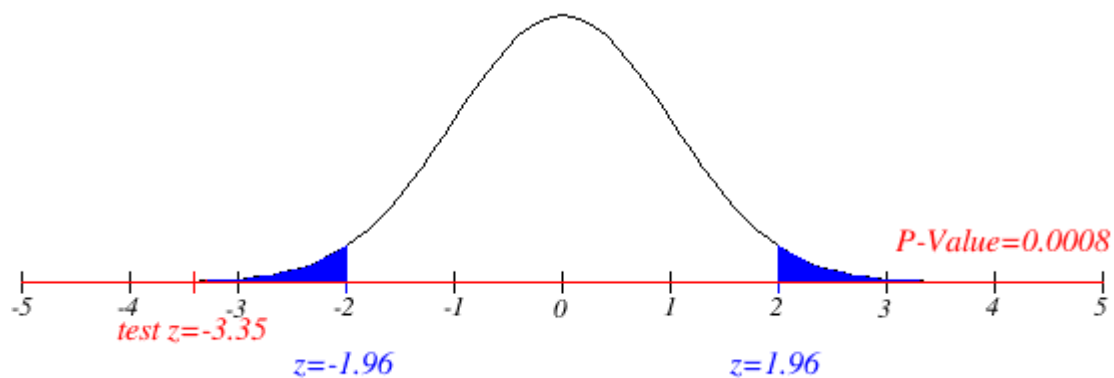
Promotion of product And Service (Z Cal: - 3.35 Z critical: ± 1.96   P-value: 0.0008)

the analysis of the z-test revealed that As. The Z critical is set to be 1.96, as we used prior alpha as 0.05. We used a two-tailed z-test because there are two region significant areas that have to be tested. From the Table, it can be seen that the value z-test for Enlargement of bank and Advertisement effectiveness was less than Z critical, which conclude that the result was not significant Thus, the null hypothesis is accepted but for Promotion of product And Service we can say that their id significant difference on customer attraction. These results yield the conclusion that there are no differences in customer attraction by Enlargement of bank and Advertisement effectiveness but Promotion of product And Service does.

5   CONCLUSION AND LIMITATION
5.1 CONCLUSION
This research was conducted to study How does advertisement on customer attraction in banking sector the banking sector in India during the pandemic. it contained three hypotheses about Four different variables which were Enlargement and extension of bank Advertisement effectiveness Promotion of product And Services Customer attraction. As the banking institutions start to use pamphlets, TV, and social media to advertise their services, it has been shown that advertisements have a very strong impact on customer satisfaction. and broachers which aren't the strongest means to draw in clients. Hence the clients are not greatly attracted toward banking products and services by advertisement. According to the results, advertisement and quality have a strong influence to capture the mind of the customers and the only advertisement is not an effective tool to attract the customers or clients, quality of product and services are also very important to attract the clients. If an advertisement is very attractive, effective and use different ways to advertise the products and services but the quality of services and products are not good and not standardize then no one willing to accept these products and services because people are becoming more literate and they are not willing to compromise on quality and standard, as it is a sign of prestige

5.2 LIMITATIONS OF THE STUDY
This study is carried out in the following limitations

- The major limitation was time, due to shortage of time an aggressively detailed study could not be conducted

- Lack of support by the individuals who are not willing to fill the questionnaires.

- Many other variables which were vital for this study had not been considered as a lot of variables affect the dependent variable and all those variables cannot be discussed at the same time.

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- Dr. P. Malyadri Principal, Government Degree College, Hyderabad International Journal of Advance and Innovative Research (Part – 1) Volume 7, Issue 1 (V) ISSN 2394 - 7780 January – March 2020

A STUDY ON LITERATURE REVIEW INVESTIGATING THE EFFECT OF OCCUPATIONAL STRESS AND EMOTIONAL INTELLIGENCE ON JOB PERFORMANCE

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ABSTRACT
Job stress is a big issue that affects people of all professions and occupational groupings in society. It is responsible for a great deal of mental and physical sickness. It is also costly to organisations and businesses due to poor employee performance, higher labour absenteeism, medical costs and worker disability, and money for new recruiting. Stressful experiences have an emotional, cognitive, and physiological impact on people. As a result, the individual must be equipped with specific information and abilities that will assist him in dealing with job stress. Through different studies conducted around the world, this study attempts to investigate the review based on Emotional Intelligence and occupational stress. It demonstrates that those with higher levels of emotional intelligence are better at coping with stress.

Keywords: Emotional Intelligence, Occupational Stress, Job Performance

INTRODUCTION
Working is necessary for every human person, and it occupies the majority of their daily life. Many researchers have looked at the working lives of humans. Worker provides a variety of basic human requirements, including mental and physical activity, social bonding, self-esteem, self-confidence, and feelings of competence or qualification, regardless of income.

The physical, mental, and biological responses of the human body to situations that cause feelings of fear, excitement, worry, danger, or wrath in the individual are referred to as stress. Job stress is a big issue that affects people of all professions and occupational groupings in society. It is responsible for a great deal of mental and physical sickness. It is also costly to organisations and businesses due to poor employee performance, higher labour absenteeism, medical costs and worker disability, and money for new recruiting.

Stress is a harmful physical, mental, and emotional reaction that occurs when there is a mismatch between job expectations and the competencies or resources available to people to deal with job pressure. The main root cause of stress in the workplace is when employees confront challenges and changes in their daily job routine, which results in stress, worry, concerns, worries, tension, and other negative emotions. The impact of EI competencies on stress has been studied in the context of organisational performance, and various research have found a positive association between EI and stress. The EI competencies help to develop an individual's ability to better control their emotions in the workplace.
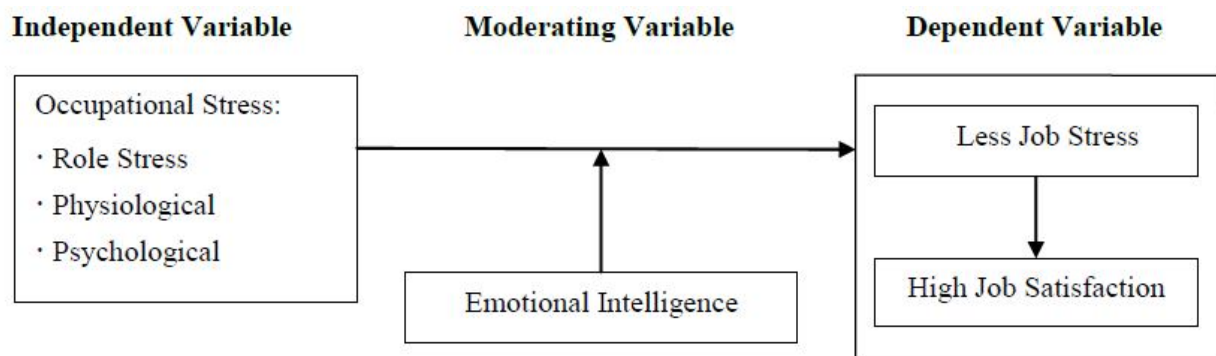
Job stress & EI model

REVIEW OF LITERATURE
According to Shahu and Gole (2008) Occupational stress is widely regarded as a serious problem for managers in private manufacturing firms. The researchers looked at the link between job stress, job satisfaction, and performance among 100 managers from private manufacturing companies. According to the findings, higher stress levels are associated with lower performance, whereas more job satisfaction is associated with higher performance.

The association between emotional intelligence and job stress, as well as health-related repercussions in human service employees, was investigated in a study. Employees with a greater level of emotional intelligence had less work stress and had fewer negative health implications, according to the findings. The study found that emotional intelligence is helpful in preventing unfavourable health outcomes in workers, particularly depression symptoms. (Ogińska-Bulik 2005)

Darolia and Darolia (2005) looked into the role of emotional intelligence in stress management and emotional control. It was clearly shown that emotionally intelligent people, who are able to comprehend and recognise their emotions, regulate themselves appropriately in stressful situations, keeping their impulsivity and anger under control.

Kaur (2003) identified role erosion, role overload, role isolation and personal inadequacy responsible for occupational role stress in her study of managers working in different branches of Punjab State Cooperative Bank Ltd.

The function of emotion in occupational stress was investigated by Spector and Goh (2001). In order to avoid the broadness of earlier definitions and focus on negative emotional responses, they used a restrictive definition of job stress as "any scenario or event that provokes a negative emotional response, such as anger, irritation, or anxiety, tension." Emotions, according to the authors, determine how the work environment is seen, i.e., whether or not a given condition is regarded as a workplace stressor. They went on to say that these assessing emotions could cause psychological and bodily stress. Continuously unfavourable emotional experiences can cause psychological strain, which can lead to lower job satisfaction and organisational commitment. The physiological components of experienced emotions can cause physical strains, which can be harmful to one's health. The ability of an individual to manage and control their emotions in the workplace was found to have an impact on the result of stress.

Sehgal (1997) investigated the impact of role stress on a person's level of job involvement, alienation, and the coping mechanisms employed to deal with stress. Role erosion, resource deficiency, and inter-role distance were determined to be the most significant drivers to role stress. Approach coping techniques were utilised more frequently than avoidance coping styles.

Dasgupta and Kumar (2009) investigated the sources of role stress in doctors as well as the stress levels of male and female doctors at the Indira Gandhi Medical College and Hospital in Shimla (India). Role stress is caused by a variety of factors, including role overload, self-role distance, role isolation, inter-role distance, role stagnation, role expectation conflict, role ambiguity, and role inadequacy, according to the study. It went on to say that there is no substantial difference in stress levels between male and female doctors, with the exception of inter-role distance and role inadequacy, which were shown to be more prevalent among male doctors.

In a study of 158 freshmen, Gohm, Corser, and Dalsky (2005) looked for a link between emotional intelligence (emotion-relevant abilities) and stress (feelings of inability to control life events), with personality (self-perception of the meta-emotional traits of clarity, intensity, and attention) as a moderating variable. The findings revealed that while emotional intelligence may be beneficial in lowering stress for some people, it is unnecessary or irrelevant for others. It could be because they have average emotional intelligence but don't seem to apply it, owing to a lack of confidence in their emotional abilities.

Duran and Extremera (2004) found a link between emotional intelligence and burnout syndrome, particularly personal accomplishment, in their research of professionals working in institutions for persons with intellectual impairments. The findings showed that emotional intelligence, as measured by the ability to understand, express, and control emotions, had an impact on perceived job stress and the repercussions of stress.

According to Slaski and Cartwright (2002) the association between a group of retail managers' emotional quotient, subjective stress, distress, general health, and morale, as well as their quality of work life and managerial performance. There were significant connections in the expected direction, demonstrating that managers with a higher emotional quotient experienced less subjective stress, had greater health and well-being, and performed better as managers.

In a study of 150 junior officers working in several banking institutions in Himachal Pradesh, Chand and Sethi (1997) looked at organisational characteristics as predictors of job-related stress. The greatest and most significant predictors of job-related strain were found to be role conflict, difficult working conditions, and role overload.

In a study published in 2009, Ismail, Suh-Suh, Ajis, and Dollah looked at the role of emotional intelligence in the link between occupational stress and job performance. The study's findings showed that the association between occupational stress and emotional intelligence was strongly linked to job performance. The addition of emotional intelligence in the analysis moderated the influence of occupational stress on job performance, according to the statistical findings.

According to Aziz (2004), organisational stress stems from the individual's experience of organisational demands. The concept of role, which is understood as the place a person occupies in a system, creates stress. The study looked into the level of organisational role stress experienced by women in the Indian private sector who work in information technology. The amount of role stress was investigated using an organisational role stress scale on a sample of 264 professionals. The most powerful role stressor was resource deficiency, followed by role overload and personal inadequacy. On various role stressors, the study discovered disparities in stress levels between married and unmarried employees. The amount of education, on the other hand, did not appear to be a significant determinant of stressors.

According to Abraham (2000), the social skills component of Emotional Intelligence is linked to positive interpersonal connections and improves job satisfaction while lowering occupational stress. She went on to say that these social skills promote social networks, which in turn increases an employee's dedication to the company.

Singh and Singh (2008) looked at the relationship between emotional intelligence and medical professionals' perceptions of role stress in their work environments. A total of 312 medical professionals were included in the survey, with 174 male and 138 female doctors working for privately owned professional hospital groups. The study's findings revealed no significant differences in emotional intelligence and perceived role stress between genders, but significantly negative emotional intelligence-organizational role stress connections for both genders and medical professionals as a whole.

According to Chabungban (2005), improving emotional intelligence can help people bridge the gap between stress and higher performance. If stress is not addressed in a timely manner, it can be costly to both the organisation and the employee. Regularly administering emotional intelligence abilities can help employees at work control impulses and persevere in the face of frustration and obstacles, prevent negative emotions from swamping the ability to think, feel motivated and confident, and accurately perceive emotions, empathise, and get along well with others, and prevent negative emotions from swamping the ability to think, feel motivated and confident.

CONCLUSION

Stressful experiences have an emotional, cognitive, and physiological impact on people. As a result, the individual must be equipped with specific information and abilities that will assist him in dealing with job stress. If an individual's stress level exceeds his tolerance threshold, his health may be jeopardised. Controlling unpleasant emotions is unquestionably the key to an individual's emotional health and well-being in society.

People with higher emotional intelligence are more successful in managing with stress, according to this and previous studies. Those with high emotional intelligence, according to Salovey et al, are better able to effectively grasp and analyse their emotional states, as well as know how and when to communicate their sentiments. They can also efficiently control their moods. According to studies, EI people have strong emotions and a good attitude toward difficult situations. Individuals with EI competencies have the ability to pick various courses of action to deal with stress without collapsing, to be positive in solving a problem, and to feel in control of the situation.

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A STUDY ON RURAL MARKETING PRACTICES OF FMCG PRODUCTS IN HARYANA

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ABSTRACT

"Go Rural" is the new slogan of the marketer's. Today's era is of competition. And to face the throat cut competition. To face throat cut competition the marketer's keep on looking for new strategies in the market. Rural Marketing is one of them in planned strategies. Also the saturated situation found in the urban market. So for increase sale, increase profit, increase market share, increase brand loyalty, the marketer's are focused on rural marketing. This is itself shows the importance of rural marketing. Because se of many reasons such as large and scattered population, higher purchasing capacity, development of infrastructure, less use of resources, more opportunities in rural areas etc, marketer's want to adopt rural marketing strategy. Some of the organized retail model working in rural India as " Hariyali Kissan Bazaar", ITC Chopal Sager. In this paper, the researcher try to find out the consumer satisfaction towards FMCG products. This is a descriptive research. A questionnaire is designed to find out the rural consumer opinion. And in last section suggestions are given to the marketer's how and why they should be serious towards rural marketing. Primary data are used. Three ways of marketing processes are also defined.

Keywords: Rural, Marketing, Rural Marketing, FMCG, Three ways of marketing process.

INTRODUCTION:

Mahatma Gandhi always said that India lives in village. So if we want to growth of the economy of the country we have to develop the villages. And for the development of villages rural marketing can play a vital role. Around 68.84% people of India lives in villages. And there are 664,369 villages in 2019 in India. And around 61.5% (1300 million) people depending upon farming activities. Rural marketing helps to develop the standard of living people in villages through satisfying their wants and needs. Goods and services can easily available to the villagers due to rural marketing. They also can live a better life. They can earn their livelihood in their area due to growth of marketing activities. They have no need to move to urban. It will be the need of time that rural marketing is applied by the companies. There can be many benefits of rural marketing as generating employment opportunities, improve standard of living, rapid economic growth, development of agro based industries, optimum utilization of rural resources, easy marketability of agricultural produces, price stability etc. So it will be necessary first of all to understand the meaning of rural marketing.

Rural:

The word rural marketing is simply made up of two words. One is rural and the other is Marketing. There are many definitions of rural. According to National Agriculture Library defined rural as "Any population, housing, or territory NOT in urban area". It defines two types of urban areas:

- "Urbanized Areas"- populational of 50,000or more "Urban Clusters"-population of at least 2,500 and less than 50,000

- "Nonmetro" does not mean rural The Census of India 2001 defines rural as that what is not urban. And urban is:

- All locations with in a municipality/corporations, cantonment board or a nodified town area committee.

- All other locations satisfying all of the following criteria:

1. Minimum population of 5,000.

2. At least 75% of male workforce engaged in non agriculture activities, and

3. A population density of over 400 persons per sq km.

So there are many definitions explaining rural. But in simple words it can be said that rural have low density, low level of income, low education, almost more people engaged in agricultural activities, low infrastructure, less use of technology, low living standard.

Marketing:

Different persons understand the different meaning of marketing. Consumers considered it as shopping, farmers considered it as co-operating marketing manufacturer understood it product designing, advertising, retailing and for sellers/retailers treat it as selling.

Harry W. Hepner says in his book "Marketing Management":

" Marketing includes every activity that has to do with the movement of goods from the point where they are produced to the point where they are consumed. It includes product planning, pricing, advertising and analysis of market in terms of its present and potential customers".

William J. Standon says in his book "Fundamentals of Marketing":

"Marketing is a total system of interacting business activities designed to plan, price, promote and distribute want satisfying products and services to present and potential customers".

All these definitions it can be conclude marketing is not an activity but a group of activities done for the satisfaction of the consumers. It includes research and development of a new product, buying and assembling, packaging, branding, selling, transportation, storage and warehousing, standardization and grading, pricing, financing, advertising and after sale services.

Rural Marketing:

Rural marketing means a process of development, pricing, promoting and distributing rural specific goods and services leading to desired exchange with rural customers to satisfied their needs and wants and also to achieve organizational goals.

FMCG:

It means "Fast Moving Consumer Goods". Those products which sell quickly at relatively low cost are called Fast Moving Consumer Goods". For example soft drinks, dairy products, baked goods ,fruits, milk, toilet paper, over-the counter drug like aspirin etc. FNCG's products have very low profit margin. FMCG'S have a short life because of high demand and high consumption rate. The companies of FMCG'S products have found high turnover. In a way perfect market conditions are found.

Literature Reviews:

According to Vidya Iyer's article, there are obstacles and opportunities when it comes to investigating rural markets, and the concept of rural markets is evolving and is not growing at a constant rate. To comprehend the rural we must recognize that consumers' purchasing decisions are influenced by a variety of factors. Consumer behavior differs from that of a city dweller. These consumers' products should have maximum utilization. So, in order to communicate with them, the marketing strategy utilized in urban regions will not be effective unless it is modified to include rural areas. It is something that consumers can relate to customer values in Rural India (Iyer, 2010). The 4As model of rural marketing has been a more consumer-oriented approach to understanding the rural consumer. The 4As of Rural Marketing are an acronym that stands for "Availability, Affordability, Acceptability, Awareness. This concept is part of a larger attempt to preserve rural market places. Rural markets are more suitable and successful. For acceptance the products must be of good quality and have a long shelf life. In a rural setting, value and utility are paramount. Acceptability means introducing distribution techniques whose acceptability is based on the rural viewpoint and awareness means introducing distribution methods whose acceptability is based on the rural perspective and implemented with the assistance of rural customers be successful benefits both the consumers and the company (Naidu, 2017). Because of the varying demographics, understanding consumer behavior in rural marketing is complex and varied. The rural and small-town purchasing procedure because of a variety of factors, urban consumers differ from those in rural areas and it's critical to comprehend these so that the launch goes smoothly. So it is very necessary to understand all the factors affecting the rural consumer ((Pradhan & Misra, 2012).

Three Ways of Rural Marketing:
1. **Urban to Rural:** Urban marketers selling pesticides, fertilizers, FMCG products, tractors, bicycles, consumer durables, and other goods and services in rural regions make up a large component of rural marketing.
2. **Rural to Urban:** In Agricultural marketing a rural producer wants to sell his production in the city, such as seeds, spices, fruits and vegetables, forest produce, milk, and other related items.
3. **Rural to Rural:** Agricultural implements, handicrafts, bullock carts, dress materials, and other activities that take place between two villages in close proximity to each other are included.

Objectives:
- To know the consumer awareness of rural marketing practices.

- To identifying the consumer opinion about the rural marketing practicing.

- To analyze the factors influencing the consumer satisfaction with respect to rural marketing practices.

- To give suggestions for enhancing the rural marketing practices in Haryana.

- To study the rural marketing practice of FMCG products.

METHODOLOGY:

Methodology is telling a way of doing research. It tells the way how to solve the given problem. In this paper the descriptive research is used. Descriptive research is used for the study to describe a population, situation or a phenomenon for solving a problem. For data point of view primary data are used. In this paper non-probability convenient sampling is used. Sample sizes are 350 respondents. For data collection on-line mode is used. For data analysation some statistical tools are used as percentage, pie chart. For check the consistency Cronback Alpha is used.

Table 1

Male	100
Female	250
Total	350

Table2

Age	Below 18	18 to 35	35 to 50	Above 50
No of family members	-----	-------------	--------------------	------------------
Educational level	Upto 5th	10th	UG	Higher education
Family income (monthly)	Below 5,000	5,000 to 10,000	10,000 to 20,000	Above 20,000
Who take the purchase decision?	Father	Mother	Son	Daughter
How do you know about Brand	TV	Newspaper	Social Media	Friends and Relatives
Whether do you prefer Branded products?	Street Store	Local Market	Directly from Company	On-line
Satisfaction with product return quality of company	yes	No	May be	--------------------
Do you find any price difference in between rural and urban areas	Yes	No	May be	--------------------
If your brand product is not available what will you do?	Drop purchase	Go to another retail outlet	Try another Brand	

Factors for rating	**Total**	Excellent%	Good%	Moderate%	Bad%	Very Bad%	**Total**
ADVERTISEMENT	**350**	29%	48%	19%	2%	1%	**100%**
BRAND	**350**	26%	57%	15%	1%	1%	**100%**
QUALITY	**350**	42%	45%	12%	1%	1%	**100%**
PRICE	**350**	16%	51%	29%	2%	2%	**100%**
OFFER – DISCOUNT	**350**	27%	35%	30%	6%	2%	**100%**
CULTURE	**350**	23%	53%	21%	2%	1%	**100%**

Table 3

FINDINGS:

From table 1 total respondents are 350 from villages of Haryana. 250 females and 100 males. Out of them from table 2, 76% are belong to age group of 18 to 35. 17.4% of them are of age below 18. 4.9% of them are belong to 35 to 50 and rest 1.7% are above 50. From education point of view 58.6% of them are under graduates, 22.6%

are 12th passed, 9.7% are higher educated, 3.7% are upto 5th standard and 5.4% are 10th passed. It shows that the education level is not so good and not so bad. From income point of view 32% of them are earn below 5,000. 24.9% earns between 5,000 to 10,000. 19.4% are of them earns between 10,000 to 20,000. And last 23.7% earns above 20,000. Here salary means monthly salary. This shows that income level is not so good in village. The family members in a family are mostly 4 or 5. This shows that the joint family are broken into a single family. And their purchasing decisions are taken by mostly father(66.9%), then mother(21.1%), by son (3.1%), and by daughter 1.4% and by others it will be 7.4%. So this shows that the decisions in villages mostly taken by the head of the family means father. Most of the people purchase goods from local market(61.4%), and then 20% from street store. Only 10.6% of them would like to prefer on-line mode. And very few are purchase directly from the company. Most of the rural people (66.3%) would like to prefer branded products and other 33.7% would not like branded products. About 35.4% of them knew about brand from TV, 32.3% of them from social media and 13.4% of them knew from friends and relatives. 47.1% people says the product return quality is good. And 44.9% says may be and remaining 8% people says no they are not satisfied with the product return quality. 65.1% people says that they find the price difference in rural and urban products. 23.7% of them says may be and remaining 11.2% says no they are not found any price differentiation in rural and urban area's products. If a particular brand is not available 53% of them sys that they would like to try another brand. Only 11.7% of them are loyal to a particular brand. And 35.3% of them would like to go to another retail outlet. From table 3 majority of the people (77%) says that they purchase any products by influencing advertisements. So there is a great effects of advertisement on purchasing. 83% of them are agree with influencing brand , 87% people are agree with quality, 67% people are influenced to purchase by price. It means that people are more influenced by advertisement, brand, quality than price. 62% people influenced by offers flash discount. 76% of them are influenced to purchase by culture. Most effectively factor is quality of a product. Cronback alpha value is 0.771001 which is greater than 0.7, so the validity is satisfied.

CONCLUSION AND SUGGESTIONS:

So we can see here that due to up of income, educational level, single family etc. people would like to prefer branded products. But brand loyalty is not constant. So here is the need of create brand loyalty to face the competitors. If the company get success in improve product quality instead of the lower the prices the company can make their customers being loyal and increase sale. And achieve their targets of customer's satisfaction. Only after satisfaction it can large it's market share, can increase profits and face competition. Advertisement is the best for creating demand. To face the competition it is the demand of time to go to rural. And because of rural marketing, both the villagers as well as the manufacturer are benefited. On one side there is development of village and on the other hand the demand for the product increases and also the market share increases. That's why the slogan 'Go Rural' has been given.

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A STUDY ON SAVINGS AND INVESTMENT PATTERN OF SALARIED EMPLOYEES WITH SPECIAL PREFERENCE TO HYDERABAD CITY

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INTRODUCTION

Salaried class people are those who earn certain amount as salary in return for the work done. Salaried individual invests their income in various investment avenues such as stock market, bank, real estate, life insurance, gold and silver and so on where they can earn some returns. In the salaried class, investment is a kind of self-restriction from spending the entire income for genuine and self-protective reasons to stabilize the regular financial flow in the form of salary even during some inevitable brief time hindrances.

Investment may be defined as deployment of funds made with an anticipation of earning some returns. Returns just in case of the investment is variable in nature and this variability of comeback known as danger. It is essential for investors to identify the risk and manage the same accordingly. The main motive of every investor is maximizing returns and minimizing risk. The choice of investment depends on degree of risk and unexpected rate of return. Normally high returns involve high risk and low returns involves low risk. Every individual plan their investment based on future goals.

REVIEW OF LITERATURE

The review of literature is divided into two parts. Firstly, to review the financial literacy and secondly, to review perception of investors on capital markets.

FINANCIAL LITERACY

Ali Medabesh and Asif Jeelani Khan (2020) in a article stated that **"Financial Assets and the preference of salaried class assesses"** based in Jammu and Kashmir found that most of the important role in financial planning of an individual is the habit of investment in financial assets. **Puneet Bhushan (2014)** stated that financial literacy is important for every individual to make effective use of financial products and services. **Thulasipriya (2015)** has conducted that India investors even if they are well educated, independent, salaried and are of high income prefer to play safe. **M. Sathanapriya and Dr.K.Brindha (2019)** concluded that investors are very well aware about investment avenues that are available in Chennai but still are preferring to invest in their money in bank deposit and real estate. Further, **Sandoop Sivaraman (2019)** conducted that investors are aware of various investment avenues they still prefer to invest in bank deposit, insurance, PPF and NSC. Similar studies were done by **Nishi Bhardwaj and Shivani Chouhan** (2019). **Navjot Kaur and R. Bhaskaran (2015)** highlights that that the policymakers should focus on financial awareness rather than focusing only on financial literacy.

PERCEPTION OF INVESTORS

T.M. Hemalatha and Pavithra.S (2018) stated that different expectations from their investment as their needs are different and investors outlines safety of funds as their priority for choosing an investment. **Shanthi and R. Murugesan (2016)** pointed that the women investors are most likely to invest in financial products providing risk free returns. **Geethu Gopi, D. Priyanka and R. Preetha (2018)** examined "An Insight into the savings and investment pattern of salaried employees working in private sector of shipping industries at Ernakulam District". The study found that the main purpose of investing in capital markets is to generate returns and reduce taxable income In addition to this, savings of the employees are directed towards their personal expenses such as child's education, marriage plans and retirement plans. **Jhatiya Vijay Naranbhai and Vyakhyata Sahayak (2018)** concluded that working women select saving in post office as one of the safest investment instrument and commodity as less safe investment option. On contrary, **George Antony and Shaju Aishwarya (2020)** have argued that "How does salaried class invest? – Demographical Impact on Investment Behavior with special reference to Kerala"

Objective of the Study

- To examine the attitude of investors on various investment avenues.

RESEARCH METHODOLOGY

Research methodology is a systematic way to solve research problem by applying logical steps. It aims to describe and analyze methods, throw light on their limitations and resources. Random sampling technique was used to collect data from 100 employees.

Data Analysis and Interpretation

The study describes the demographic variables such as age, Marital status, Family structure, Work Experience, Annual income and Years of experience in investments.

Table 1: Demographics of Respondents

Parameter		Frequency	(%)	Parameter		Frequency	(%)
	24-30	28	28		11-15 years	28	28
	31-40	41	41		16-20 years	3	3
	40-50	27	27		> 20 years	16	16
	>50	4	4	**Work Experience**	Total	100	100
Age	Total	100	100		<200000	16	16
	Male	60	60		200001-300000	30	30
	Female	40	40		300001-500000	44	44
Gender	Total	100	100		>500000	10	10
	Married	75	75	**Annual Income**	Total	100	100
	Single	25	25		Less than 3 years	18	18
Marital Status	Total	100	100		3 to 5 years	16	16
	Nuclear	53	53		6 to 10 years	30	30
	Joint	47	47		Above 10 years	36	36
	Total	100	100	**Years of experience**	Total	100	100
	0-5 years	18	18				
Family Structure	6-10 years	35	35				

The Table 1 shows that, 28% of the sample investors belong to the age group of 24-30, 41% of the sample investors are of the age group 31-40, while 27% of the sample investors are of the age group 40-50 and a mere 4% of them are above 50 years of age. The major investment decisions take place in the age group of 24-50. Further majority of the respondents are male respondents and 75% of the sample investors are married respondents and 25% of them are unmarried respondents. About 53% of the sample investors live in nuclear family and 47% of them live in a joint family. Majority of the sample investors are nuclear family respondents. Investment decisions are quite critical in case of nuclear family, since, the family heavily depends on the one or two earning members. Hence, there is a better scope and push for investment planning. However, in case of joint family, there could be more earning members, which provides better social security and as such, motivation towards investment planning is comparatively less. Also, in case of joint family, there could be more dependents and hence the savings/investments could get hampered. It is also found that, majority of the sample investors have a Work experience of 6-10 years followed by respondents having an experience of 11-15 years and Majority of the respondents earn between 3,00,000 – 5,00,000, followed by respondents earning between 2,00,000 – 3,00,000.

Investment Source of Respondents'

The Table 2 shows that 61% of respondents invest from their salary, 24% of respondents invest from their existing savings, 10% of the respondents invest from the inherited amount and only 5% of respondents invest out of their personal borrowings.

Table 2: Investment Source of Respondents'

Investment Source	No. of respondents	Percentage (%)
Salary	61	61
Existing Savings	24	24
Inherited Amount	10	10
Personal Borrowing	5	5
Total	**100**	**100**

Opinion about investment in capital market

The Table 3 shows opinion of investors investing in capital markets in terms of risk, return, liquidity, safety and awareness. Majority of the respondents agreed that investment in capital market are not safe and 75% of respondents strongly agreed investment in capital market has stability of the return is uncertain. Further, the respondents also find it difficult to predict in the capital market. Majority of the respondents i.e. 60% respondents find it difficult to earn profits due to low of awareness level in terms of capital markets and its

products, its prospects and risk. Further, the respondents also equally difficult to sell of their securities with ease.

Table 3: Opinion of Investors in Capital Market Investments

	Strongly Agree	Agree	Moderate	Disagree	Strongly Disagree
I don't feel the safety of the principal	55	28	6	7	4
The stability of the return is uncertain	75	16	5	2	2
It is very difficult to predict in market	84	16	0	0	0
It is difficult to get profits	88	12	0	0	0
The liquidity of investments is low	16	50	20	7	7

CONCLUSIONS

The overall aim of the study is to evaluate the investing pattern of investors, emphasis was given to those aspects that help in the attainment of the specific objectives framed. Therefore, a study based on other sections of the community namely businessmen, self-employed and pensioners may be carried out. Like the present study, the suggested studies may also go a long way in throwing light on the functioning of finance market in India. Further, studies from the point of view of sub-classes of exclusive salaried group such as employees of banks, educational institutions, manufacturing concerns etc. would also be of purposeful. Research on the above lines is considered to be meaningful under the present Indian conditions.

An in-depth analysis is finished to spot the level of awareness, attitude, factors which influence the investors to save and invest, average savings of investors, pattern of savings, conversion of savings into investments and investment preferences etc. It is hoped that the saving public (particularly salaried class) can analyse in their savings and investment practices to move towards greater savings and more investments. Organisations and government departments working to improve investment practices will also be benefited by these findings.

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A STUDY ON WEARABLE GLOVE MOUSE DEVICE WITH GLIDING EXERCISES IN CARPEL TUNNEL SYNDROME AMONG SOFTWARE WOMEN PROFESSIONALS

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ABSTRACT

Carpal Tunnel Syndrome results in considerable discomfort and pain, limitation of activities of daily living, loss of sleep and work disability Carpal tunnel Syndrome is more frequent in pregnancy because the systemic process increases the extra capsular fluid retention by the hormone Prolactin and produce soft tissue swelling in the later stages (third trimester) of their pregnancies. However software women Professionals especially pregnant ladies while working with their computers by the repetitive movement of the fingers experience a severe pain, swelling and numbness because of carpal tunnel syndrome. The symptoms get very worst during night. If not treated properly this will lead to severe pain, stiffness, restriction of movement, stress and depression. Many therapies have been advocated for treating the carpal tunnel syndrome including Mobilizations, nerve gliding, tendon gliding, Ultrasound, icing, Massaging, Elevating the arm or flicking, Neural mobilization, wrist splints and invasive treatments like injecting corticosteroids in the carpal tunnel and eventually releasing the median nerve by surgery.etc. Women experience pregnancy several times, and if they acquire CTS, invasive treatments cannot be used, and pregnancy increases the probability of reoccurrence of CTS in the next pregnancy with higher intensity. The disease is becoming very common nowadays as most of the population is engaged in computer work by some means especially the software sector ladies who always use the conventional mouse for their work with the PC. Using the wearable device (wearable glove mouse device) along with the tendon and nerve gliding exercises prescribed by the physiotherapists improves the condition and relieves the pain and symptoms of Carpal Tunnel syndrome.. The occurrence of CTS is diagnosed by positive Tinel's sign and positive Phalens test. This work tries to give possible non invasive solution for the CTS during pregnancy for software sector women professionals and the relief of symptoms is measured with the help of VAS Scale, Functional Status Scale.

KEYWORDS: Software professionals, carpal tunnel syndrome, wearable glove mouse device, Gliding exercises.

AIM: To determine to prove the effectiveness of Tendon and nerve gliding exercises with Wearable glove Mouse Device to reduce the pain and symptoms of carpal Tunnel syndrome among pregnant software women professionals.

OBJECTIVE: To find the effectiveness of Tendon and nerve gliding exercises with Wearable glove Mouse Device to reduce the pain and symptoms of carpal Tunnel syndrome among pregnant software women professionals.

METHODOLOGY: 10 individuals with carpal tunnel syndrome during pregnancy will be selected based on inclusion and exclusion criteria. Detailed procedure will be explained in patient's words and informed consent will be obtained from all the participants.The subjects were then allocated into two groups group A (Experimental) and group B (Control).

Group A received Tendon and nerve gliding exercises with the Wearable glove mouse and Group B received the treatment of Ultrasound therapy and simple wrist exercises alone. Both groups are assessed by outcome measures pre and post interventions.

OUTCOME MEASURES:
3. Visual analogue scale (VAS)

4. Functional Status Scale

STATISTICAL ANALYSIS:
The collected data will be tabulated and analyzed using descriptive & inferential statistics. To all the parameters mean and standard deviation (SD) will be used. Paired t-test will be used to analyze significant changes between pre-test & post-test measurements.

RESULTS:

The two-tailed P value is less than 0.0001 By conventional criteria, this difference is considered to be extremely statistically significant and 95% confidence interval of this difference form the both groups.

CONCLUSION: The aim of the study was to determine the effect of wearable glove mouse device along with tendon and nerve gliding exercises in reducing the pain and improving the functional ability of hand in patient with carpal tunnel syndrome during pregnancy among software women professionals.

INTRODUCTION

Carpal tunnel syndrome is a common condition that causes pain, numbness, and tingling in the hand and arm. CTS is a common complication of pregnancy. It is a syndrome of compression neuropathy of median nerve at the wrist. Carpal Tunnel Syndrome results in considerable discomfort and pain, limitation of activities of daily living, loss of sleep and work disability. Twenty percent of symptomatic subjects with symptoms of pain, numbness, nocturnal parasthesia and tingling sensation in the hand would be expected to have Carpal tunnel syndrome based on the clinical examination and electro physiologic testing.

The occurrence of pregnancy related Carpal Tunnel Syndrome (PRCTS) is mainly due to redistribution of fluids because of hormonal imbalance during pregnancy. The Signs And Symptoms includes: Pain that shoots from the hand up the arm as far as the shoulder, tingling in the hands during the day or the night that disrupts sleep and limits the ability to grasp objects with the hands, Weak feeling in the hands, and the inability to pick up small objects, the feeling that the hands are swollen, even if they do not appear to be so, burning numbness and tingling sensation in the thumb and first three fingers, weakness in the muscle at the base of the thumb, near the palm.

Pregnant women with CTS working with computers are more sensitive than men regarding reporting their symptoms. If untreated it leads to further more complications. There is a lot of non invasive approach for the treatment of CTS of pregnant women working in software sectors. One of the non invasive methods is using the wearable glove mouse device. In this we are going to use the wearable glove mouse device along with the tendon and nerve gliding exercises prescribed by the physiotherapists which improves the condition.

.OBJECTIVE:

To determine the effectiveness of Tendon and nerve gliding exercises with Wearable glove Mouse Device to reduce the symptoms of carpal Tunnel syndrome among the pregnant software women professionals.

HYPOTHESIS:
NULL HYPOTHESIS

There will be no beneficial effect of Tendon and nerve gliding exercises with Wearable glove Mouse Device to reduce the symptoms of carpal Tunnel syndrome among pregnant software women professionals.

ALTERNATIVE HYPOTHESIS:-

There will be beneficial effect of Tendon and nerve gliding exercises with Wearable glove Mouse Device to reduce the symptoms of carpal Tunnel syndrome among pregnant software women professionals.

METHODOLOGY

Study design: Quasi Experimental Study

Study Setting : Department of Physical Medicine and Rehabilitation,

Annamalai University, Annamalainagar, Tamilnadu, India

Sampling method : Convenient sampling – Odd Even method

Sample size: According to prevalence rate required sample size is 10 participants. Each group there are 5 participants.

Group A: n=5

Group B: n=5

Inclusion criteria:

- Pregnant women who are diagnosed of having carpal tunnel syndrome with positive Tinel's sign and positive Phalen's test.

- Age ranging from 18-35 years

- Primiparous women of software professionals.

Exclusion criteria:

- Age above 35 years

- Multiparous women

- Any other Wrist abnormalities including, diabetes, gout, autoimmune disease

- Pregnant women who are not working in software sectors

- Persons with rheumatoid arthritis

- Malignancy at wrist

- Fractures or dislocation at wrist

- Recent undergone surgery

- Acute inflammatory condition

- Infections

MATERIAL REQUIRED:

- Wearable Glove Mouse of different sizes

- Ultrasound machine

PROCEDURE:
A total of 10 subjects with symptomatic carpal tunnel syndrome during pregnancy working in software sector were selected randomly with due consideration to inclusion and exclusion criteria. Detailed procedure will be explained in patient's words and informed consent will be obtained from all the participants. A brief demonstration will be given about tendon and nerve gliding techniques for both the experimental and control group. The subjects were given nerve and tendon gliding exercises. The experimental group was alone given the wearable glove mouse to use while work. The control group was given with simple wrist exercises followed by ultrasound therapy. The Pre test data and post test data was collected with VAS and FSS Scale. The results were recorded. The results of post test of the same parameter was recorded and compared.

Pain will be measured in VISUAL ANALOUGE SCALE (VAS). The VAS Scale is the valid and reliable measurement tool for pain. It is used to measure the pain response that the patient experience before and after nerve and tendon gliding exercises of median nerve.VAS Scale consists of 10 cm horizontal line with two ends labeled as no pain(0) and severe pain(10), the patient will mark a point on the line, which corresponds to the intensity of pain what they experience

Patient's functional ability is measured in FUNCTIONAL STATUS SCALE. FSS was used to measure the functional disability of hand. It consists of six items of questionnaire (writing, buttoning of clothes, holding a book while reading, household, carrying grocery bags, bathing and dressing).Scoring : 06-12 –No difficulty, 13-18 –Mild difficulty, 19-24 –Moderate difficulty, 25-29 –cannot do at all due to hand or wrist symptoms. The subjects were then allocated into two groups group A and group B

FLOW CHART
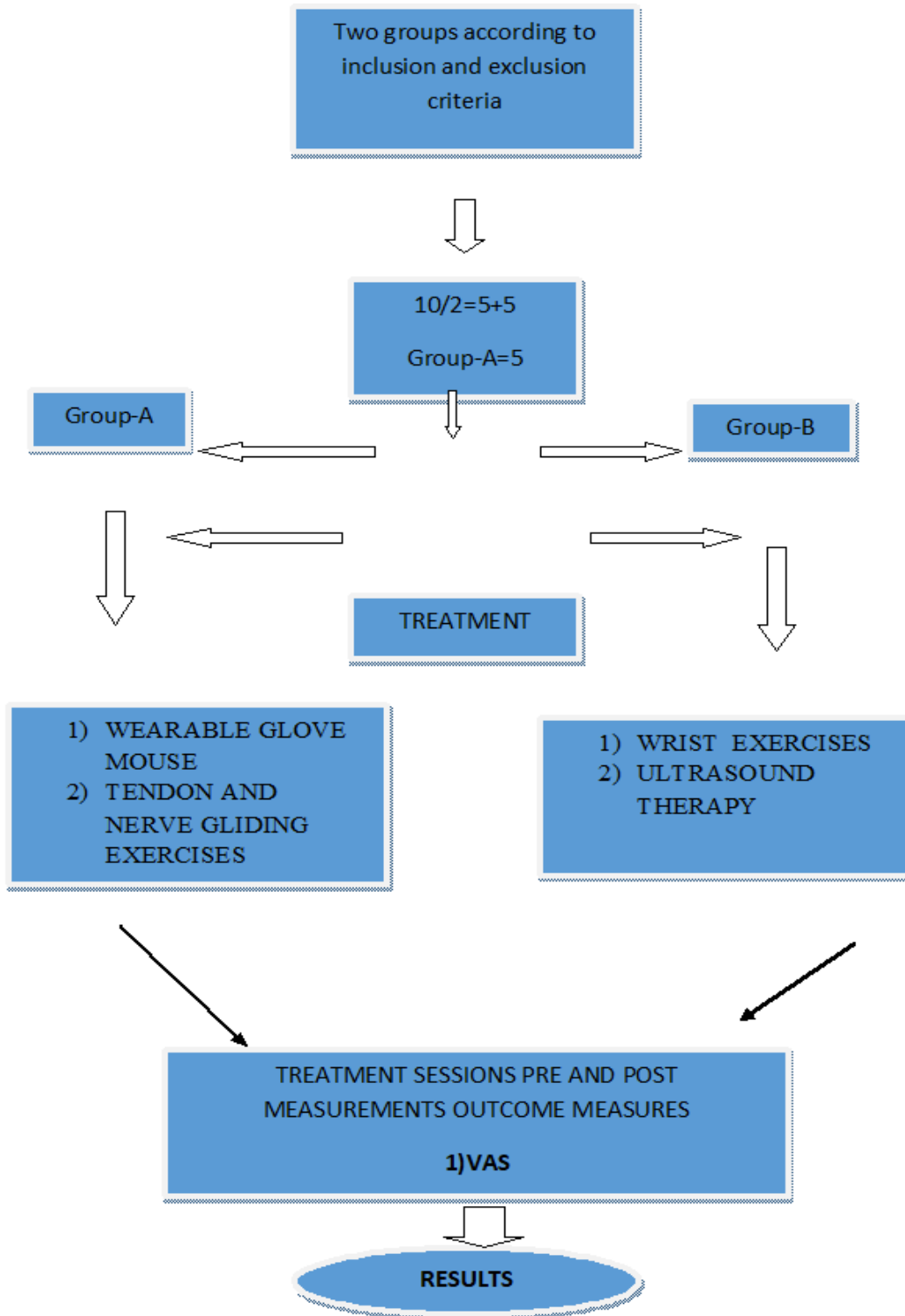
Fig. :1 Procedure for Data collection method

Group A: (n=5):

Wearable Glove Mouse Device : For four weeks continues until next visit all the patient from group A is selected for wearable glove Mouse device. Wearable computer mouse can be used with any computer. Wearable glove mouse will work as an alternative to conventional mouse. It focuses more on the step taken to prevent carpal tunnel syndrome. Wearable unit will comprise of flex sensors mounted on glove and centre finger for clicks drag and drop, axis detecting device accelerometer over the glove for detecting the movement and getting the heading of movement. Afterwards the microcontroller will convert movements that is analogue signals to digital signals Flex sensors are utilized for empowering and handicapping the mouse.

Fig: 3

Tendon and nerve Gliding exercises:
Tendon Gliding Exercises / Fist Flexion Exercises: These exercises are thought to relieve pressure on the median nerve and stretch the carpal ligaments, which also helps decrease pressure. They are also thought to help blood flow out of the carpal tunnel, which can help decrease fluid pressure. We have to move our fingers through five positions while our wrist stays in a neutral position(meaning it is not bend). To perform this exercise, we have to do the following:

Patient was comfortable seated with high sitting position and back well supported.

1. Start with your fingers straight.

2. Make a hook fist and then return to a straight hand.

3. Make a straight fist and then return to a straight hand.

4. Make a full fist andthen return to a straight hand.

Hold each positions for seven seconds and do 10 repetitions. Repeat three times to five times a day.

Median Nerve Gliding Exercises: For median nerve gliding exercises we must move our thumb through 6 positions while our wrist stays a neutral position. To perform this exercise, we have do the following:

1. Begin by making a fist with your wrist in the neutral position.

2. Straigthen your fingers and thumb.

3. Bend your wrist back and move your thumb away from your palm

4. Turn your wrist palm up

5. Use your other hand to gently pull out thumb farther away from your palm.

Hold each position for seven seconds, and do five repetitions. Repeat 3 to 5 times a day.

Group B : Conventional therapy.:
All patients in this group will be treated with 5 minutes of Wrist exercises given.

Ultrasound therapy was given for Duration: 10 minutes with the frequency of 3MHz, Intensity:1.0W cm^2

Treatment Protocol (Both A & B Group)

Sessions   : 1 session/day once
Frequency   : 7 days/week
Duration   : 4 weeks

RESULTS:
- The collected data will be tabulated and analyzed using inferential statistics. To all parameters mean and standard deviation (SD) will be used.

- Paired t-test will be used to analyze significant changes between pre-test & post-test measurements.

- Unpaired t-test will be used to analyze significant changes between two groups.

Table –1. Pre test –Post test values of group –A

Group A	Pre- Value		Post- value	
	Mean	SD	Mean	SD
VAS	7.8	0.74	1.0	0.1
FSS	25	1.41	12.6	1.01

Table -2 Pre test –Post test values of group –B

Group B	Pre- Value		Post- value	
	Mean	SD	Mean	SD
VAS	8.2	0.77	6.26	.96
FSS	25	1.41	20.6	1.8

Fig 4.GROUP A:
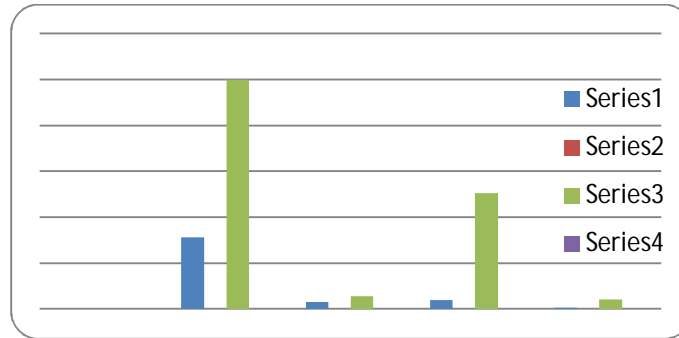
Fig 5. GROUP B
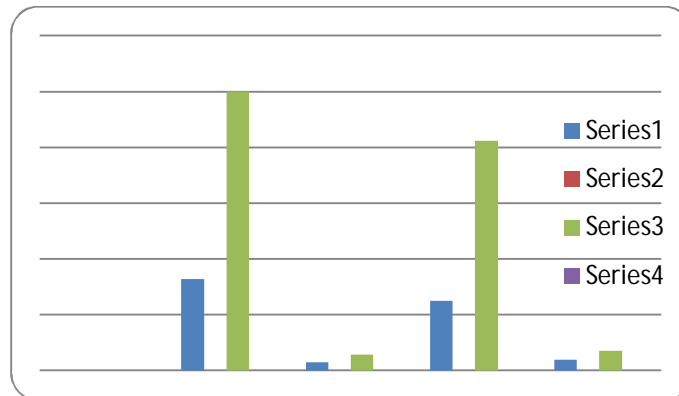
Fig 6.Pre and post values of VAS
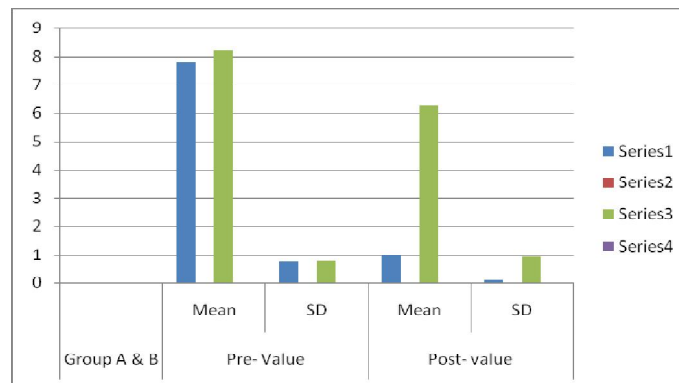
Fig 7.Pre and post values of FSS
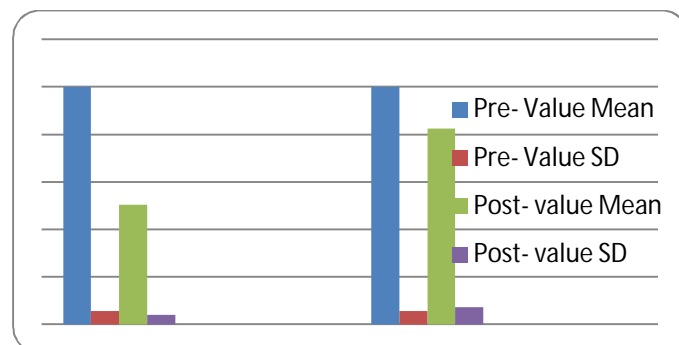
Table – 3 Comparison between the post test values group A and group B.

	Group A		Group B		P-Value	T –Value
	Mean	SD	Mean	SD		
VAS	1.0	0.1	6.26	0.96	< 0.0001	- 12.186
FSS	12.6	1.01	20.6	1.8	< 0.0001	8.667

Fig 8. Comparison between the post test values group A and group B.
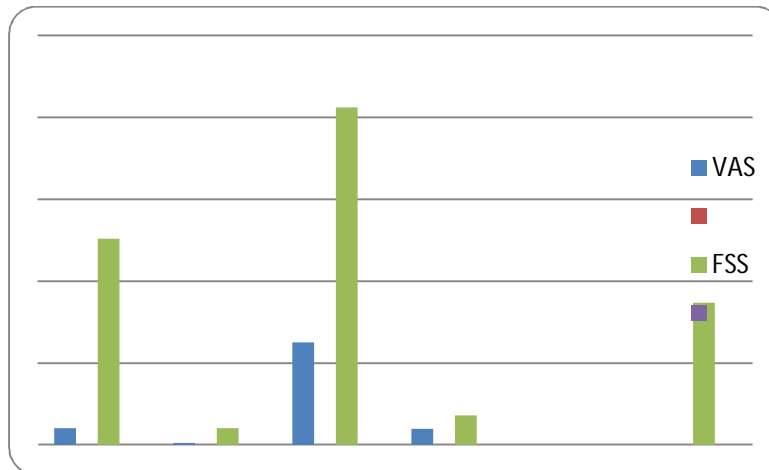
DISCUSSION

Carpal tunnel syndrome is a common condition among people who do repetitive work all day like punching keys on computer or cash register or even pressing on the strings of a violin. Pregnant women are also susceptible to carpal tunnel syndrome even if they do not type or play music all day. The studies have shown that one out of four pregnant women complains of the syndrome usually in the second or third trimester of pregnancy when fluid retention in the arms and hands is more likely to put pressure on the nerve that leads to the hands and fingers. The VAS Scale for pain response and the FSS scale for functional ability which are shown in table 1and table 2 and in the figure 1 and 2 respectively shows the effectiveness of the wearable glove mouse device given along with the tendon and nerve gliding exercises are measured in two groups the experimental group and control group. The former using wearable glove mouse device with exercises gives good responses than the later group given with simple wrist exercises and ultrasound therapy.

In the comparison of pre and post values the two-tailed P value is less than 0.0001 , by conventional criteria, this difference is considered to be extremely statistically significant. A significance value of P value and the Confidence interval of the mean of Group One minus Group Two equals -5.260 , 95% confidence interval of this difference is from -6.2554 to – 4.2646 and the value of t = - 12.186, df = 8, standard error of difference = 0.432. On comparing both the groups of FSS results of the two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant. The Confidence interval of the mean of Group One minus Group Two equals -8.000, 95% confidence interval of this difference: From 5.8714 to 10.1286 and the value of t = 8.667, df = 8, standard error of difference = 0.923. In the software workers who are pregnant the carpal tunnel syndrome during their pregnancy gives more stress and complications. So the results states that use of wearable glove mouse device along with the nerve and tendon gliding exercise reduces the pain and discomfort and improve their functional ability.

LIMITATIONS AND FUTURE RECOMMENDATIONS

• Small sample size

• The duration of the treatment is less.

• A study with large sample size is recommended.

• Further studies can be done with increasing the duration of treatment session.

• A study can be done with different outcome measures.

CONCLUSION

The aim of the study was to find the effectiveness of Tendon and nerve gliding exercises with Wearable glove Mouse Device to reduce the pain and symptoms of carpal Tunnel syndrome among pregnant software women professionals. The treatment of tendon Gliding Exercise normalize the pressure gradient around the nervous

system and releases the tendon thus reducing pain improving functional ability. It is found that the static keyboard and mouse are having many limitations so the wearable glove device can be used for the same purpose without any limitations. The degree of freedom of glove is more than mouse resulting better inputs in the world of virtualization. So this reduces the pain and difficulties of the carpal tunnel syndrome of the software sector ladies who are performing the exercises along with the wearable glove mouse device. If the pregnant ladies working with computers started to use the wearable glove mouse along with the home exercises of the tendon and nerve gliding then there will be a considerable reduce in the reoccurrence of the CTS in her post partum period.

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AGRICULTURAL WOMEN SELF HELP GROUPS MEMBERS MICRO CREDIT ANALYSIS IN TRICHY DISTRICT

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ABSTRACT

The study found the Agricultural women SHGs performing well in availing and repaying microcredit which had contributed to their socio – economic empowerment and to better livelihood conditions. And the study found that the interest rate of Microcredit should be reduced, installment term for Loan repayment should be increased, Loan repayment should be flexible based on their varying levels of income and savings, should provide subsidy loan for Agriculture Women Self Help Group for innovative projects, should provide self employment loan for individual Self Help Group members, should provide marketing facilities to the Self Help Group products (Proper marketing channel could be arranged by the Government (or) Non Governmental Organization (or) private institutions) and should provide self employment training to the rural people. Primary data required for the study were collected from 200 of Agricultural women retail Self Help Group members representing 10 Self Help Groups from Trichy district villages. Percentage analysis, Tabular analysis and Class interval techniques was used to find the constraints imposed by the nature of data, Socio-economic condition, Women empowerment and Microcredit lending, Utilization, Repayment, Economic activities and to analysis the age, income, savings and food expenditure.

INTRODUCTION

The present study attempted to assess the Agricultural women Self Help Groups (SHGs) Performance in Trichy district, TamilNadu. Primary data required for the study were collected from 200 of Agricultural women retail SHG members representing 10 SHGs from Trichy villages.The study found the Agricultural women SHGs performing well in availing and repaying microcredit which had contributed to their socio – economic empowerment and to better livelihood conditions.

SOCIO – ECONOMIC PROFILE:

The average membership of the SHGs is about 17. About 78 % of the Agricultural women belonged to the age group 21 to 50 years which is the most productive period. About 76 % of the Agricultural women were married .Women headed households constituted 20 % of the total married members of the sample SHGs. About 86 %, were Hindus (BC) and remaining SC/ST. About 46 % of the respondents had primary education and 42 % had high education. The house hold-size of the Agricultural women families showed that more than half of the Agricultural women families (52.68 %) had five or more members. The study observed an average earner – dependency ratio of 1.

The study found that 76 % of the SHG members participated in banking activities for micro credit utilisation and 65 % of them are equal partners in decision making in their families. SHG member's monthly savings ranged from Rs20 to Rs120 per member. About 58 % of them made weekly savings and 42 % had monthly savings.

The banks charged an interest rate of 9 % to 12 % for micro credit extended to the SHGs. The interest rate charged by the SHG members for internal circulation of loan amount was 24 % per annum and its goes to SHG's savings. The interest savings is provided as dividend to members later. The SHGs are known for prompt repayment, often 100 %, of the micro credit availed by them from the banks. In this study, all the SHGs reported 100 % repayment. About 10 % each of the loan money was used for old debt repayment and house alteration and construction, about 10 % on education, 5 % on economic activity and about 2 % in gold jewellery.

The World Micro credit Summit envisaged providing micro credit to 25 million poor families in India by year 2019. NABARD, the nodal agency for micro credit in India, set a target of credit linking 1 million SHGs in a decade's time that is by the year 2007 which has already been achieved, three years ahead of the schedule, indicating that there is still a long way to go. Majority of the groups would be forming part of the SHG philosophy while some could come through alternate mechanisms comprising application of Grameen model, credit unions and other emerging approaches. According to NABARD, 14.7 million people accessed micro

credit during 2010-20.As per Tamil Nadu corporation development of women limited, total SHG in Trichy district is 10415 and 166640 Women formed in SHG and their investment.

REVIEW OF EARLIER RESEARCH WORK IN MICROCREDIT

Nagayya (2000) found that the formal lending network has expanded massively over the past three decades and that there is an acceptable funding gap for the really poor, especially in remote rural areas. The role and performance of SHGs by female fishermen in India. She found that fisher women 's SHGs did well in using microloans, used them and paid back on time. The microcredit program implemented by SHGs contributed to the socio-economic well-being and empowerment of women fishermen. on the eradication of usury and illegal alcohol.

Sabyasachi Das (2003) reported on the activities of self-help groups and microcredits that encompassed the social, economic, political and spiritual development of the poorest social classes. to raise awareness, entrepreneurship and skills training, and to assist with organizing offers and marketing, introduced internal savings and credit, helped with account management and connected them to banks for credit requests. Deepti Agarwal (2001) reported that women's status is low and their socio-economic conditions are much worse than men's.

Jeyesh Talati and Venkatakrishnan.(2001) discussed the empowerment of women in Jhabua District, Madhyapradesh. The female "leaders" selected by the group members were responsible for keeping the group records and leading the group. These women's groups laid the foundation for the empowerment of women.

Radhakrishna Rao (2002) says that Kerala's remarkable achievements in education and health were greatly facilitated by its social and physical terrain. From a social point of view, community-based social reform movements competed with one another for social advancement.

Charat Dogra (2002) reported that 15-20 women formed such groups with monthly savings of 10 rupees or 20 rupees each. Initially, men in many villages made fun of these groups with their small savings, and also observed that as those savings grew and women could borrow for various urgent needs, men too would set up support groups with monthly savings of 50 rupees each or more.

Uwe Tietze and Villared (2003) reported on the regional procedures of the workshop to support responsible agriculture and marine fisheries in Asia.

Shankar chatterjee (2003) reported on networking Swarnajayanti Gram Swarozgar Yojana (SGSY), banks and ATMs initiatives in Utter Pradesh.

Suman Krishna Kant (2001) reported on the empowerment of women and mutual cooperation in the family.

Jeyasudha (2004) reported that eradicating poverty and inducing rapid socio-economic progress is the goal with which development programs are implemented through a multi-pronged strategy. It reached the most disadvantaged social classes and put the concept of rural development high on the national political agendas of developing countries in Asia, Africa and Latin America. Developed countries have also recognized this need and directed their efforts to meet the basic needs of the poorest people in developing countries. He said support groups are playing an important role in transforming the rural economy. Microcredit helps the rural poor improve their standard of living and meet their credit needs.The advanced international locations have additionally identified this want and feature directed their efforts toward assembly the simple desires of the poorest humans in growing international locations.

Meenambigai (2004) said that self-assist companies play a chief position in reworking rural economy. Micro credit score enables the agricultural negative to enhance their general of dwelling and fulfills their credit score desires. Micro credit score encourages savings, promotes profits producing sports and advantages girls.

Sheik Mohammed (2004) mentioned that Self-Help Groups labored for the achievement of girls entrepreneurs. Senthil Vadivoo and Sekar (2004) said that the self assist companies are a motion for girls empowerment; it protected girls together suffering towards direct and oblique limitations to their self improvement and their social, political and monetary participation. Women's empowerment may be regarded as a non-stop technique of numerous inter-associated and jointly reinforcing components. Empowerment is a technique of attention and potential building, main to extra participation, extra decision – making electricity and manage the transformative motion to conquer the restrictions on this technique.

OBJECTIVE OF THE STUDY

This study has the overall objective of analyzing the performance of the Agricultural women SHGs in Trichy district as no such study has not yet been undertaken. The specific objectives of the study are:

1. To collect socio-economic structure and activities of the Agricultural women SHGs.

2. To collect comprehensive information on the microcredit extended so far to Agricultural women through SHGs in Trichy.

3. To evaluate the financial performance of the SHGs.

4. To identify the reasons for the success, the constraints and suggestions on how micro finance could be delivered in future.

SCOPE OF THE STUDY

The study is important for applied research as well as basic research in the field of rural development. The study would provide a framework for drawing suitable programmes for the upliftment of traditional business with particular focus on Agricultural women. The opportunities for the creation of supplementary sources of income would also be explored. In short, the study would be highly useful to researchers, planners and policy makers in overcoming the problems of Agricultural women and in formulating strategies for the socio- economic development and empowerment of Agriculture through microcredit in Tamilnadu in general and in particularly in Trichy district

LIMITATION OF THE STUDY

The study was confined to Trichy of Tamilnadu state covering only four villages Lalgudi, Srirangam, Manachanallur, and Thuraiyur. The researcher personally contacted the Agricultural women individually and it was a Herculean task to make them willing to answer the questions listed in the interview schedule. The Agricultural women hesitated to answer several questions. However, with great difficulty their responses were obtained by paying sincere and thoughtful attention in bringing out several distinct features of saving and credit programmes. The data collected were cross- checked with available records such as registers, Bank Savings Account pass-books and records of banks concerned to ensure accuracy of the data collected.

DESIGN OF THE STUDY

The choice of research method does have an influence on the inferences drawn from the analysis of data. This chapter describes the choice of the study area, selection of respondents, method of data collection and analysis of data and interpretation of results for drawing inferences.

SELECTION OF THE RESPONDENTS

The study makes use of both primary and secondary data. Primary information referring to the socioeconomic background, microcredit lending, utilization and repayment, constraints and diverse different factors referring to social empowerment of the Agricultural ladies had been accumulated thru pre-designed questionnaire from two hundred Agricultural ladies representing 10 SHGs from the chosen ten villages. Average club of the respondents within side the observe vicinity turned into approximately 20 members. The club sample of the Agricultural ladies SHGs turned into good.

Secondary data connecting to the savings, loans, revolving fund received from banks and repayment undertaken were drawn out from the relevant records of the SHGs and from the animators/leaders concerned. Information on microcredit and Agricultural women at the state and district levels was obtained from many sources including Governmental and Non- Governmental Organizations.

DATA COLLECTION TOOLS

Interview questionnaire were designed to obtained general information on the SHG concerned from its office bearers. And also some questions are used to collect specific information from each member of the 10 Agricultural women SHGs.

TOOLS OF ANALYSIS

Percentage analysis, Tabular analysis and Class interval techniques was used to find the constraints imposed by the nature of data, Socio-economic condition, Women empowerment and Microcredit lending, Utilization, Repayment, Economic activities and to analysis the age, income, savings and food expenditure.

INSTITUTIONAL FRAMEWORK FOR MICRO CREDIT

Micro credit refers to provision of small amounts of credit to the poorest of poor who were not served by the formal financial institutions for many reasons and remain un reached. Frequent requirement of small amounts of

credit, a large number of clientele and consequently high transaction cost and low net worth of the clientele are some of the reasons which excluded the poorest village people from availing the credit facilities of formal financial institution such as banks. Hence, they were dependent on loan sharks who provided timely and adequate credit at door steps but at spurious interest rates, up to 500 % p.a. The term microfinance may look new but the concept and process existed in many Asian countries long ago in various names. Informal and small-scale lending preparations have lengthy existed in lots of components of the world, mainly withinside the rural areas, and that they nevertheless survive. Good examples are schemes in Ghana, Kenya, Malawi and Nigeria ("merry-go-rounds", "esusus" etc.). In Asia too they existed, mainly in India, Vietnam, Thailand, etc.

MICROCREDIT IN INDIA

The Self Help Groups (SHGs) emerged as a issue of the Indian economic gadget after 1996. They are small, casual and homogenous organizations of now no longer greater than 20 individuals each. The length of 20 has been made obligatory due to the fact any institution large than this must be registered below the Indian Societies Registration Act. Also, the reimbursement charge has a tendency to be decrease in huge organizations because the importance of the loose rider trouble and the propensities to default are excessive in heterogeneous organizations.

CONCLUSION

For poverty reduction and empowerment Micro credit is an accepted tool. However, it did not reduce poverty significantly in earlier days because of its limited outreach lack of mechanism to sustain the positive impact on the small number of client's beyond the project period, poor infrastructure and slow agricultural growth and Limited markets could slow down or impair the sustainability of the micro credit programme. Consequence no perceptible improvement on the socio-economic livelihood conditions of the poor could be observed.

SUGGESTIONS

Micro credit renter needs to be successfully carried out in Tamilnadu. The concept of SHG is not fully covered in all small villages, towns and cities (Panchayat, Municipalities and Corporations). This concept is utilized especially for the poor section of the community belonging to the lower income group. Women SHGs could escort in marvelous changes in the society, in the economic, social and political levels. The utilization of microcredit concept provides a new scenario of the poor society. The NGOs promote the SHG in all localities like up-liftment of the poor, their standard of living, income, education, health, sanitation and other basic amenities, water and transportation. The Government developed institutions NGOs and private institutions need to conduct awareness programmes to promote the SHG concept to cover the " Unreached" section of the society.

The sustainability of the SHGs on long term basis could be assured with following strategies:

1. Interest rate of Microcredit should be reduced. .

2. Installment term for Loan repayment should be increased.

3. Loan repayment should be flexible based on their varying levels of income and savings.

4. Should provide subsidy loan for Agriculture Women SHGs for innovative projects.

5. Should provide self employment loan for individual SHG members.

6. Should provide marketing facilities to the SHG products (Proper marketing channel could be arranged by the Government (or) NGO (or) private institutions).

7. Should provide self employment training to the rural people.

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AN EMPERICAL STUDY ON BEHAVIORAL DIMENSIONS OF E-COMMERCE CUSTOMER

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ABSTRACT

Behavior pattern /traits of customers are taken as specific segmentation variables. These are taken into consideration to understand the behavioral dimensions of e-customer. The objective was to compare the purchase behavioral dimension between male and female respondents and to find the influence on being of impulsive trait / Sentimental trait / Reasoning trait / detailed researching trait on the frequency of buying through e-marketing. The sample taken was a 114 of post graduate management students. The method was a survey method using a questionnaire The questionnaire consisted of items measuring attitude towards e-marketing, the behavior with internet, the intention of purchase if not actual purchase, frequency of internet use, and actual purchase, the consumers behavior patterns when shopping. It is observed that of the female the male respondents are frequently impulsive as a total of 18 of 46 that is 46% compare to 10 of 68 female have frequently been impulsive shopper.

The maximum number of female respondents have a negative notion of being sentimental, shows the psychological impact of sentimental is negative. Therefore we can infer that e- shoppers are not sentimental. The observation has highest number of count in being a frequent planned purchaser rather both the male and female show major similarity.it is observed that maximum number of respondents have researched before buying online.

It is understood that the trust factor in online is not yet grounded so any online customer studies the purchase plans and researcher before making a purchase. There seems to be an equal balance of the impulsive buyers in both online and offline shopping as 27 option less frequently and 28 more frequently. The maximum stayed undecided or unrevealed. A phenomena which was observed all through the analysis of the study is that many of the respondents chose to be indecisive either they had less knowledge about their own perceptions of either being an impulsive shopper, a planned one, or a researcher one. Or they have chosen to hide this fact from the researcher. Either way it makes a noted observation that the e customer is shy one, and other means of collecting data is to be applied

Keywords: - Behavior pattern /traits; common and specific segmentation variables; frequency of internet use; and online purchase.

INTRODUCTION

For companies to utilize new opportunities, it is mandatory to understand the consumer behavior and to apply modern marketing strategy. The Influence of consumer behavior in E-markets and E-marketing strategy provide us with identification of consumer behavior paradigm in internet driven markets (E-markets) and related marketing strategies (Mohamed, shams 2013)

Need of the study- Online experience is a more complicated issue than the physical shopping experience: Considering that an online customer is not simply a shopper but also an information technology user (Cho and Park, 2001) The Web experience can be defined as the consumer's total impression about the online company (Watchfire Whitepaper Series, 2000) .It is a result from his/her exposure to a combination of virtual marketing tools ". , likely to influence the buying behavior of the online consumer" (Constantin ides, 2002, p. 60).The Web experience embraces elements like searching, browsing, finding, selecting, comparing and evaluating information as well as interacting and transacting with the online firm. The total impression of the virtual experience is effected by factors like design events emotions atmosphere experiances during the online interaction. These elements induce goodwill and effect the final consumer. (II george , tom 2006).There are three key building blocks (intention, adoption, and continuance) so as to analyze the online consumer behavior in a systematic way..(Christy, lei, timothy 2003).This paper proposes to study the different behavior dimensions of select management students .

Three behavioral patterns of consumers in are:1) Sentimental Consumers: This group of consumers in their purchasing decisions primarily act based on emotional analysis and specific consuming values.2) Reasonable Consumers: This group of consumers in their purchasing decisions primarily act based on rational analysis and rational values.3) Intelligent Consumers: This group of consumers in their purchasing decisions act very complicated and In addition to considering the emotional and rational values, they also have their own specific characteristics(Mohammad Yazdi Mehrizi ,Shams Al-sadat Zahedi 2013)

The common segmentation variables are opportunity to use, user category, frequency of use, purchase intention, loyalty rating2.specific segmentation variable online-method of access, time of access, frequency of internet access, user category, visits to competitor website, shopping behavior, level of interactivity, pattern of info search (sen et al 1998)

Review of literature – Zia Ul Haq said. If online retailers know the factors affecting Indian consumers' buying behavior, and the associations between these factors and type of online buyers, then they can further develop their marketing strategies to convert potential customers into active ones.

Vaggelis Saprikis, Adamantia Chouliara and Maro Vlachopoulou (2010) examined the perceptions of Greek university students' adopters and non-adopters of online shopping in terms of demographic profile, expectations of online stores, advantages and problems related to online purchases. , the reasons for using or avoiding online shopping, as well as, the types of preferred products were studied. .

Liudmila Bagdoniene, Jurgita Zemblyte said as the number of Internet users is growing, only small part of them buys products/services online. They tried to understand what motivates consumersto shop online.

Shefali (2000) investigated the consumers' the intention towards Internet shopping. Alam (2008) stated young consumers are playing an important role in online shopping.. If online retailers know the factors affecting young consumers' buying behavior, and the associations between these factors and type of online buyers, to work on their marketing strategies

Javedi (2012) analyzed the factors affecting on online shopping behavior of consumers that might be one of the most important issues of e-commerce and marketing field. I have tried to understand the behavioral dimensions of this sample group with respect to its behavior towards e-marketing. The behavior dimensions are –the impulsive, sentimental or emotional, reasoned or planned, and the detailed researcher. The entire customer as an individual possesses all these behavioral traits towards shopping. The degree for each behavior may differ from person to person. An effort has been made to identify these traits in each of the samples and the relationship of the sample as an e-marketing customer. The attitude towards e-marketing whether, enthusiastic, positive, indifferent, negative or hostile.

Methodology-The sample taken was a 114 of post graduate management students. The method was a survey method using a questionnaire The questionnaire consisted of items measuring attitude towards e-marketing, the behavior with internet, the intention of purchase if not actual purchase, frequency of internet use, and actual purchase, the consumers behavior patterns when shopping.

Objectives-
1. To compare the purchase behavioral dimension between male and female respondents
2. The find the influence on being of impulsive trait / Sentimental trait / Reasoning trait / Detailed researching trait on the frequency of buying through e-marketing

In this paper the above variables that is behavior pattern /traits of customers and common and specific segmentation variables are taken into consideration to understand the behavioral dimensions of e-customer. Fishbein's attitudinal model has been widely used in the marketing context (Lilien et al1992) and this paradigm provides researchers with a useful lens for examining the factors explaining consumer purchasing intention and adoption.

Various researchers have understood the consumer's behavior to influence the same for a successful marketing experience. An effort is been made in this paper to further these intentions

To understand the e-customers in a better way this study can help to identify the stimuli which might influence the different traits in a customer.

BEHAVIORS AND BEHAVIORAL INTENTIONS
Behaviors-everything that consumers do related to acquiring, using, and disposing of products behavioral intentions-the intentions of consumers to behave in a way with regard to the acquisition, use, and disposition of products Note: behavioral intentions are presumed to precede behaviors. We therefore assume that measures of behavioral intentions are suggestive of future consumer actions (behaviors).

This paper tries to assimilate the differences among gender in being, impulsive shopper, sentimental shopper, and planned or researched shopper. The tables indicate that out of the total sample male were 46 female were 68. It is observed that of the female the male respondents are frequently impulsive as a total of 18 of 46 that is 46% compare to 10 of 68 female have frequently been impulsive shopper.

Table 1: Comparison between the impulsive behavior between male and female

		Impulsive/unplanned					
		Very Frequently	Frequently	Neutral	Less Frequently	Never	Total
gender	female	3	10	24	20	11	68
	male	1	18	13	7	7	46
Total		4	28	37	27	18	114

The observation of this study shows that the maximum number of female respondents have a negative notion of being sentimental , that have not selected neutral but decidedly 23 counts of never shows the psychological impact of sentimental is negative. Therefore we can infer that e- shoppers are not sentimental

Table 2: Comparison between the sentimental behavior between male and female

		sentimental				
		Frequently	Neutral	Less Frequently	Never	Total
gender	female	5	21	19	23	68
	male	6	10	14	16	46
Total		11	31	33	39	114

The observation has highest number of count in being a frequent planned purchaser rather both the male and female show major similarity

Table 3: Comparison between the planned behavior between male and female

		planned					
.		Very Frequently	Frequently	Neutral	Less Frequently	Never	Total
gender	female	16	31	13	7	1	68
	male	13	22	7	3	1	46
Total		29	53	20	10	2	114

In this it is observed that again maximum number of respondents have researched before buying online.

It is understood that the trust factor in online is not yet grounded so any online customer studies the purchase plans and researcher before making a purchase.

Table 4: Comparison between the Researched behavior between male and female

		researched					
		Very Frequently	Frequently	Neutral	Less Frequently	Never	Total
gender	female	21	28	12	4	3	68
	male	16	18	2	6	4	46
Total		37	46	14	10	7	114

The second objective is the influence of internet usage and shopping behavior exhibited in an self-analytical form.

There seems to be an equal balance of the impulsive buyers in both online and offline shopping as 27 option less frequently and 28 more frequently. The maximum stayed undecided or unrevealed**.**

Table 5: Internet usage and behavior dimension-impulsive

		Impulsive/unplanned					
		Very Frequently	Frequently	Neutral	Less Frequently	Never	Total
internetuse	Strongly Agree	3	12	24	11	8	58
	Agree	1	13	12	9	9	44
	Neutral	0	3	1	7	1	12
Total		4	28	37	27	18	114

Table 6: Internet usage and behavior dimension-sentimental

		sentimental				
		Frequently	Neutral	Less Frequently	Never	Total
internetuse	Strongly Agree	7	13	21	17	58
	Agree	4	14	11	15	44
	Neutral	0	4	1	7	12
Total		11	31	33	39	114

Table 7: Internet usage and behavior dimension-planned

		planned					
		Very Frequently	Frequently	Neutral	Less Frequently	Never	Total
internetuse	Strongly Agree	14	30	8	5	1	58
	Agree	13	18	9	3	1	44
	Neutral	2	5	3	2	0	12
Total		29	53	20	10	2	114

Table 8: Internet usage and behavior dimension-researched

		researched					
		Very Frequently	Frequently	Neutral	Less Frequently	Never	Total
internetuse	Strongly Agree	21	25	5	6	1	58
	Agree	12	17	7	4	4	44
	Neutral	4	4	2	0	2	12
Total		37	46	14	10	7	114

CONCLUSION

It is observed that of the female the male respondents are frequently impulsive as a total of 18 of 46 that is 46% compare to 10 of 68 female have frequently been impulsive shopper.

The maximum number of female respondents have a negative notion of being sentimental , shows the psychological impact of sentimental is negative. Therefore we can infer that e- shoppers are not sentimental. The observation has highest number of count in being a frequent planned purchaser rather both the male and female show major similarity.it is observed that maximum number of respondents have researched before buying online.

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AN IMPACT OF COVID-19 ON CONSUMER BUYING BEHAVIOUR

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ABSTRACT

As we know, today we all are faceing the problem of Coronavirus desease. The Coronavirus (COVID-19) affects different people in different ways. Due to Covid-19, Some people suffered form health problem, some suffered for money problem and some suffered for other reason. And this is the reason, the buying behaviour of Indian consumer has changed. Consumers in India are now focused on their most basic needs only. This paper is focused on the impact of Covid-19 on buying behaviour of consumer of Aligarh city (U.P.). And to know the lockdown and social distancing orders have changed the consumer habits of buying as well as shopping. The study has been conducted on 123 respondents from the different areas of Aligarh city by using an questionnaire using convenience sampling technique.

KEYWORDS:- Buying behaviour, Coronavirus, Lockdown.

OBJECTIVES:-

1. *To analyze the impact of coronavirus on consumer buying behaviour during lockdown.*

2. *To Know that what consumer select online shopping or traditional shopping during lockdown.*

INTRODUCTION

COVID-19 is a disease caused by a new strain of coronavirus. 'CO' stands for corona, 'VI' for virus, and 'D' for disease. Formerly, this disease was referred to as '2019 novel coronavirus' or '2019-nCoV.' On the evening of 24 March 2020, the Government of India under Prime Minister Narendra Modi ordered a nationwide lockdown for 21 days, limiting movement of the entire 1.38 billion or 138 Crore population of India as a preventive measure against the COVID-19 pandemic in India. All services and shops closed except pharmacies, hospitals, banks, grocery shops and other essential services, closure of commercial and private establishments (only work-from-home allowed), closure of all places of worship, suspension of all non-essential public and private transport, fighting, gaming, training, research institutions. Since the COVID-19 pandemic began, there has been lots of talk about how people have reacted to being forced to work from home. During the lockdown approximately 70% of the businesses dealt with reduce cash flows with the manufacturing sector being the worst hit. Additionally, delay and cancellation of projects have been also a major cause of consern, especially in the tertiary sectors, particularly retail, non-profit, consultancy, education, and financial services.

During the Covid-19 and after the lockdown the buying behaviour of consumer has changed. Consumers in India are now focused on their most basic needs while cutting back on extras. Shopping behaviors amongst Indian consumers has evolved during the ongoing COVID-19 pandemic. During the early stages, a large number of Indian consumers were either in containment zones or there were limited options available for making their necessary and optional purchases. This led to consumers trying new channels, products and brands, which in turns has resulted in changes to consumer's shopping habits and their path to purchase. A survey found that 90% of consumers are making lasting changes to how they live, work and shop – signalling a need for consumer brands to embrace new approaches for the long-term rather than wait to return to pre-pandemic strategies.

So, the main purpose of this research paper is to examine the impact of Covid-19 on consumer buying behaviour.

LITERATURE REVIEW:-

1) **Consumer Behavior:-** A consumer's buying decision depends on the type of products that they need to buy. The behavior of a consumer while buying a coffee is a lot different while buying a car. Based on observations, it is clear that purchases that are more complex and expensive involve higher deliberation and many more participants. Consumer buying behavior is determined by the level of involvement that a consumer shows towards a purchase decision. The amount of risk involved in a purchase also determines the buying behavior. Higher priced goods tend to high higher risk, thereby seeking higher involvement in buying decisions.

There are four type of consumer buying behavior:

1. Complex buying behavior

2. Dissonance-reducing buying behavior

3. Habitual buying behavior

4. Variety seeking behavior

2) **According to K. Susmitha,** Feb 2021, "Impact of COVID 19 on E-Commerce" E-Commerce is most considered and chosen way of purchasing different types of products and services. Nowadays E-commerce has to be replaced with traditional purchasing. The only reason behind is a lot of variety is available to customers to choose their own product in fingertips from all over world. Due to this covid19 pandemic, E-Commerce business also facing some challenges which are not expected before. This paper studies about how covid 19 impacts e-commerce business and change in demand and buying behaviour of consumer all of a sudden. According to V. K. Pham, (2020), "A study on the COVID-19 awareness affecting the consumer perceived benefits of online shopping in Vietnam" The result shows Covid-19 plays a moderating role in consumer's awareness of utilities, which encourages shoppers towards Online shopping. However, the affection of society could be a reason that consumers become more hesitant to shop online. In the meanwhile, awareness of the Covid-19 pandemic and marketing policies do not impact on online shopping significantly during the Covid-19 pandemic which is a conflict with previous researches. These findings can contribute to understanding consumer behaviour comprehensively, help companies deal with similar situation as well as recommendations for the government to support businesses effectively in the future. According to J. Sheth, "Impact of Covid-19 on consumer behavior: Will the old habits return or die?" The COVID-19 pandemic and the lockdown and social distancing mandates have disrupted the consumer habits of buying as well as shopping. Consumers are learning to improvise and learn new habits. For example, consumers cannot go to the store, so the store comes to home. While consumers go back to old habits, it is likely that they will be modified by new regulations and procedures in the way consumers shop and buy products and services. New habits will also emerge by technology advances, changing demographics and innovative ways consumers have learned to cope with blurring the work, leisure, and education boundaries.

RESEARCH METHODOLOGY:- The study is based on primary and secondary data both. We used the probability sampling method by systematic random sampling technique. The study covers opinion of customer about impact of Covid-19 on buying behaviour during lockdown. Secondary data which is collected from articals, reports, books, journals, periodicals and newspapers.

DATA ANALYSIS AND INTERPRETATION:- This study is analyzed and examined with the help of the questionnaire. This questionnaire is based on knowing the paradigm shift of consumer behavior towards e-commerce during this COVID-19 pandemic lockdown. The recorded responses of a total of 123 consumers from the different areas of Aligarh city. The major findings of the research are explained below:
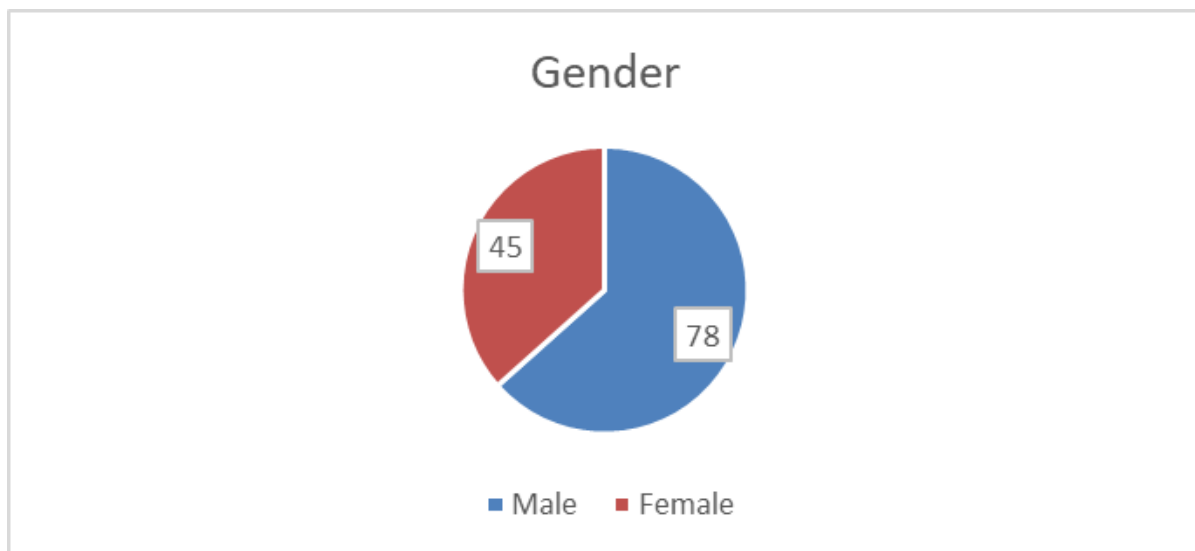
(Figure 1:- Gender of the responded)

Figure 1 explains the sample distribution on the basis of gender. Out of 123 respondents, 63% were male and 37% were female.
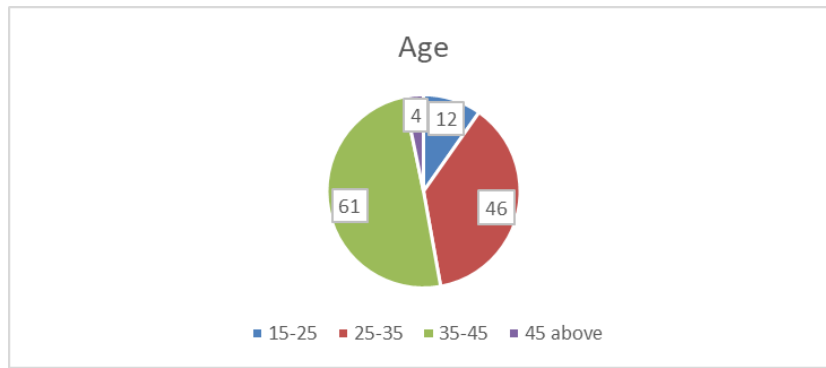
(Figure 2:- Age of the respondent)

Figure 2 explain the age of the respondent in which 10% of came from the age group of 15 to 25, 37% came from the age group of 26 to 35, 50% came from 36 to 45 and 45 above was only 3%.
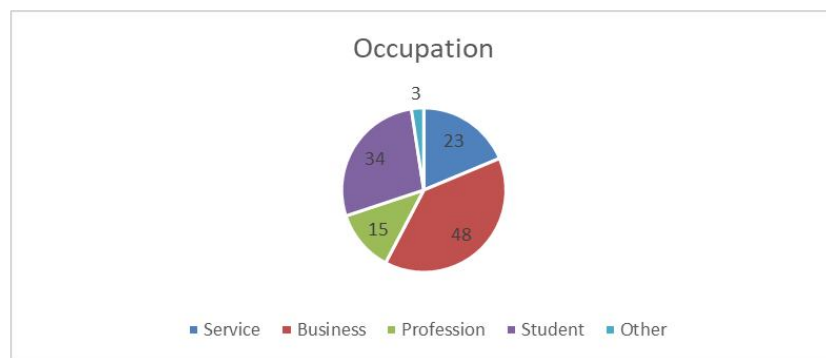
Figure 3:- Occupation of the respondent

Figure 3 explain that the occupation of the respondent in which 19% of the respondent were service, 39% were business person, 12% were profession, 28% were student and only 2% were other.
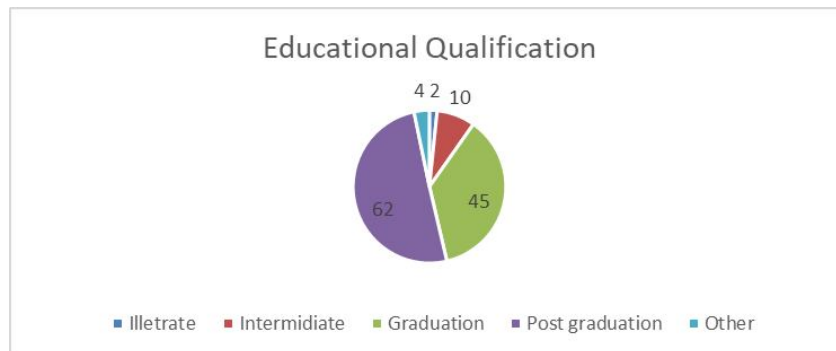
Figure 4:- Educational qualification of the respondent

Figure 4 shows that the educational qualification of the respondent. In this figure 1.6% respondent were illetrate, 9% were intermidiate, 30% were graduation, 50% were post graduation and other were 3%.
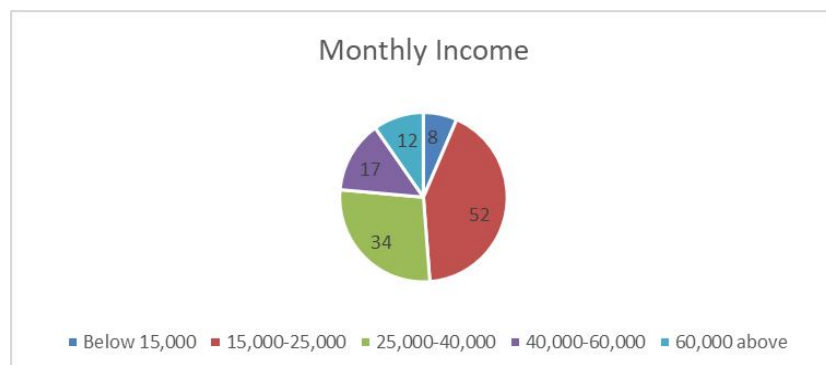
Figure 5:- Monthly income of the respondent

Figure 5 explain that 7% of the respondent monthly income were below 15,000, 42% respondent monthly income were 15,000 to 25,000, 28% respondent were 25,000 to 40,000, 14% respondent were 40,000 to 60,000 and only 7% respondent monthly income were 60,000 above.

Based on information gathered from the survey of 123 sample of Aligarh city, more than 70% of respondent said that they have not purchase goods (FMCG) from online stores during the period of lockdown while 30% respondent have purchased goods online. Most of the respondent 80% said that retail shops were more convenient than online shops in which most of the respondent were business and student. More than 70% respondent think that during the lockdown period, retail shops were play a vital role rather than online stores. Most of the respondent were strongly agree to purchase the goods(FMCG) from the retail shops because it was more convient to go near by retail shops rather than online stores. Because retail shops were vary near from their home and it is very convient to go near shops to purchase goods during the period of Covid-19.Based on this survey, More than 65% of the respondent agree that they increase their frequency of buying FMCG goods from retail shops in the lockdown period because they think it is the better choice to go retail shops which is near by their home. The work-life boundaries were now blurred as people work at home, study at home, and relax at home.

Instead of most of the respondent said that after lockdown they will go again online stores. More than 40% of the respondent agree that online stores is going to replace the traditional shopping, but 25% respondent said neutral and rest of the respondent were disagree for this statement. The lockdown and social distancing to combat the covid-19 virus has generated significant disruptions on consumer behavior. All consumption is time bound and location bound.

CONCLUSION:-

This paper investigates the change of consumer buying behaviour during Covid-19 outbreak in terms of risks and benefits. According to result of the study it can be indirect that delayed online services and sudden price rise of products have a noticeable effect on purchase behaviour of consumers. It is also clear from the lockdown situation that the buying behaviour of consumers has been immensely affected. According to some article demand for the FMCG goods was so high that it's difficult for the E-Commerce companies to fulfill the demand of the customers. This is mainly due to maintenance of social distancing guidelines governed by WHO (World Health Organizations) for protecting themselves and their family. Most of the consumers are trying to buy products online but due to delayed delivery they became dissatisfied with the option of online shopping. And this is why most of the customer go through retail (kirana) shops. Since the consumer is unable to go to the store, the store has to come to the consumer. Consumers are learning to improvise and learn new habits. For example, consumers cannot go to the store, so the store comes to home.

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QUESTIONNAIRE

1) What is your gender?

a) Male-   b) Female-

2) What is your age?

a) 15-25   b) 25-35   c) 35-45   d) 45 above

3) What is your occupation?

a) Service   b) Business   c) Profession   d) Student   e) Other

4) What is your Educational Qualification?

a) Illetrate   b) Intermidiate   c) Graducation   d) Post Graduation   e) Other

5) What is your Monthly Income?

a) Below 10,000   b) 10,000 – 25,000   c) 25,000 – 40,000   d) 40,000 – 60,000   e) Above

6) Have you purchased (FMCG) online during the period of Covid-19?

a) Yes   b) No

7) Which was more convenient to purchase you during the period of lockdown?

a) Online shops b) Retail shops

8) During the lockdown period, which shops increased your frequence of buying FMCG goods?

a) Online shops b) Retail shops

9) Do you think online shops (for FMCG goods) was playing a vital role during the lockdown.

a) Strongly agree   b) Agree   c)Neutral   d) Disagree

e) Strongly Disgree

10) During the period of lockdown retail shops was better choice to you?

a) Strongly agree   b) Agree   c) Neutral   d) Disagree

e) Strongly Disagree

11) Do you think the online shops is going to replace your traditional offline shopping?

a) Strongly Agree   b) Agree   c) Neutral   d) Disagree

e) Strongly Disagree

12) Would you consider in buying goods from online stores after lockdown?

a) Strongly Agree   b) Agree   c) Neutral   d) Disagree

e) Strongly Agree

AN INTELLIGENT AND OPTIMAL RESOURCE ALLOCATION APPROACH IN SENSOR NETWORKS FOR SMART VEGETATION-IOT

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A Wireless Sensor Network (WSN) is of foremost significance in working with savvy Natural Vegetation Internet of Things (Vegetation-IoT). It interfaces various sensor hubs or gadgets to foster a strong structure for efficient and consistent correspondence with worked on through- put for canny systems administration. Such improvement needs to be worked with by a sufficient and keen AI based asset portion approach. With the following flood in the volume of gadgets being sent from the brilliant Vegetation-IoT, applications like canny water system, shrewd harvest checking and keen fishery would be generally profited. In any case, the current asset designation techniques would be wasteful for such expected energy effective systems administration. To this end, we create a disseminated computerized reasoning methodology that applies effective multi-specialist learning over the WSN situation for wise resource portion. The methodology depends on powerful clustering which coupled firmly with the Back-Propagation Neural Network and engaged by the Particle Swarm Streamlining (BPNN - PSO). We execute the general edge work utilizing a Bayesian Neural Network, where the yields from BPNN-PSO are provided as loads to the hidden neuron layer. We see that the expense capacity and energy utilization show a considerable improvement in terms of helpful systems administration and proficient. The methodology is approved with recreations under sensible suspicions.

Key terms: Vegetation, horticulture, Cultivation, Inter cluster, Tensor Flow and Hyper spectral remote sensing

I. INTRODUCTION

The worldwide populace is anticipated to contact 9.6 billion by 2050 that represents a major issue for the agribusiness business [1]. Regardless of common difficulties like outrageous climate conditions, unfortunate environmental change, and its effect on cultivating, the resulting interest for food has been progressively immovable. We should fulfill these expanding requests; therefore, researchers have begun researching savvy IoT advances for Agriculture (Vegetation-IoT) [2]. Such advances will empower the agribusiness business to further develop usefulness, beginning from enhancing the utilization of manure to expanding the productivity of cultivating. Our target for Vegetation-IoT is to foster a structure for observing the harvest field with the assistance of sensors (for light, stickiness, temperature, soil dampness, and so forth) and arranging the water system framework. Remote Sensor Network (WSN), a fundamental structure block for Vegetation-IoT [3], plan a strong enormous scope autonomous checking and control network by arbitrarily deploying an enormous number of little sensor gadgets, otherwise called hubs, having correspondence and registering capacities. All gadgets are associated through remote channels to finish their jobs and learn cooperatively. A undeniable level structure of a WSN-based Vegetation-IoT is depicted in Fig. 1, where various Sensor Nodes (SNs) are conveyed for a few parts of horticulture, from steers management to hardware activity. All the information from SNs are gathered by the sink hub through remote information trade interfaces even with arbitrary spatial positions and extensive developments. The information is regularly moved to the centre organization through various entryways, for example, a Base Transceiver Station (BTS) for additional preparing, information examination, which, thusly, might actually computerize the whole Vegetation-IoT framework. Such computerization instrument is additionally upheld by a helpful correspondence arrangement and bunch development between the hubs dependent on the application necessities. We foster a particularly natural component to embed human-level knowledge in the Vegetation-IoT.
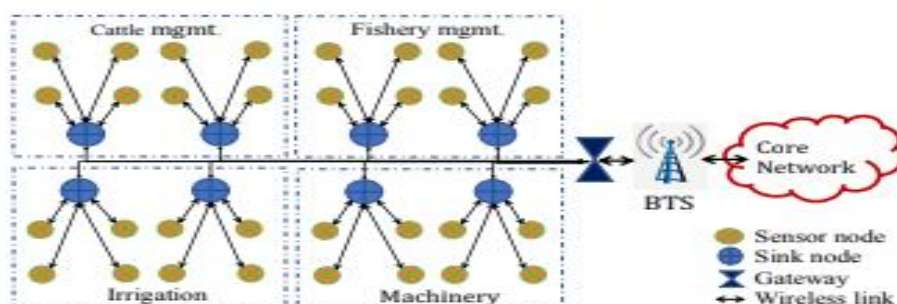
Fig 1: A theoretical perspective on the WSN system for clever Vegetation-IoT

It is trying to arrange the hubs in the Vegetation-IoT to accomplish powerful distribution of assets, for example, network band-width and energy of the WSN [4]. Presentation of Distributed Artificial Intelligence (DAI) for circulated wise preparing has as of now conquer the shortcoming of conventional unified learning engineering. Accordingly, in light of Distributed Problem Solving (DPS) approach, we propose a Multi-Agent System (MAS) to misuse the knowledge and adaptability. The new MAS, fundamentally similar common WSN, approach examines insight in the conduct coordination and community oriented works among various specialists [5].

In the proposed model, the different sensors have gone about as multi-specialists, and hence the DPS for DAI approach has been utilized to upgrade the helpful organizing thought. To take care of the issue of effective hub assignment for WSN in Vegetation-IoT and acknowledge ideal asset portion with low energy utilization and low intricacy, the WSN dependent on DAI is to be dissected and concentrated hypothetically. We initially plan an asset distribution model of WSN dependent on multi-specialists. From that point onward, we form a streamlining issue for the cycle of asset assignment; the proposed Back Engendering Neural Network (BPNN) in the neural network has been embraced to foster a target capacity and track down an ideal asset allotment plot. The idea of the bunching [6]–[8] is depicted as comparable items that fulfill the target capacity can be gathered into a group, and the articles between various groups should be totally different. In light of it, our methodology separates the asset assignment measure into two stages: inter cluster development followed by an intra-group arrangement. In view of the organization status of the group, the Cluster Head (CH) is chosen among the bunches that work with the portion of the relating assets. The CH distribution to the assets will be performed first, trailed by a self-evaluation, and contrasting whether the current energy is higher than the objective energy limit. This distinguishes whether it is the assignment to be prepared or the following phase of asset portion is to be performed.

Considering restricted energy just as life pattern of the hubs in a bunch, the distance among hubs and energy utilization are characterized utilizing wellness capacities. All the more explicitly, two neural organization based streamlining calculations are utilized to improve asset assignment, which will at long last find the ideal hub arrangement. For this, we build up an asset designation model of WSN dependent on DAI. The advanced conditions are the setup of sensor hubs and the hub inclusion, which are characterized as the wellness work. The oddity of the proposed model lies in the execution of Bayesian Neural Network (BNN) in BPNN for Vegetation-IoT applications. The current works on IoT and WSN essentially center around systems administration and calculations utilizing distinctive improvement methods.

II. RELATED WORKS

There are many exploration results on asset portion techniques in WSN. Presentation of grouping can successfully decrease energy utilization of the framework just as equilibrium the organization load. Creators in [7] utilized basic fake fish school and subterranean insect state calculation for asset portion of WSNs, and furthermore streamlined the grouping interaction. Creators in [9], [10] likewise utilized grouping to further develop the LEACH-CS calculation and proposed a low-energy versatile bunching asset allotment convention, which depends on market instrument. The market system plot pointed toward expanding benefit to acknowledge disseminated asset assignment through the arrangement and change of specialists. Thinking about the QoS, creators have received a brought together asset distribution strategy in [11], [12] to limit the designated energy utilization. In [13], an asset distribution model dependent on a lining network was set up. The consistent state examination of the model was utilized to track down an ideal asset portion plot. These techniques chiefly consider issue according to the viewpoint of lessening network energy utilization. In any case, as the quantity of clients develop that requests diverse QoS necessities of various clients. Thusly, a more unique and effective asset allotment system should be set up. To expand use of assets, creators booked the errands sensibly as indicated by the QoS of various clients to apportion them to various hubs in [14]. Even with the heterogeneity of WSN, reference [15] receives the asset portion strategy dependent on heterogeneous factual QoS to change the objective into the augmentation of organization throughput. A few scientists utilize shrewd calculations to enhance the presentation of asset allotment. In [16], Genetic Algorithm (GA) is utilized to enhance the design of sensor hubs, where the hub inclusion is characterized as wellness work. The wellness work comprises task transmission time and energy utilization. An asset portion calculation dependent on Binary Particle Swarm Optimization (BPSO) is embraced in [14] to streamline the hub setup and asset booking of WSNs. To confirm the plausibility of the plan, distinctive topological constructions and move capacities are broke down and talked about. In [17], the creator utilized neural organization to further develop BPSO to enhance the asset designation interaction of WSNs and altogether enhance the union speed. Considering a genuine WSNs working climate is constant and dynamic. Creators in [18] proposed a specialist based WSN asset portion structure.

Since the specialist is liable for information assortment, combination and dispersion in the organization, a precise area data and reaction season of the specialist will influence the postponement and work effectiveness of the whole organization [19]. Reference [20] embraced a specialist based Fuzzy Group Optimization calculation (FGO) to lessen energy utilization and delayed the existence pattern of hubs in the WSNs. In [21], creators decrease the quantity of sensors to be chosen utilizing Multiplayer Perceptron (MLP), Support Vector Machine (SVM) and Naive Bayes for expanding WSN lifetime.

III. CNN AND VEGETATION APPLICATION

Notwithstanding, the utilization of CNN to UAV symbolism for planning vegetation properties stays uncommon because of different difficulties. These incorporate (1) the intricacy of normal vegetation shelters, (2) the requirement for spatially unequivocal and broad reference information for preparing and approval and (3) that planning approaches are not committed to portray single pictures, yet to find and describe explicit highlights inside pictures. 1) Complexity of normal vegetation coverings: CNN are regularly utilized in order undertakings (Krizhevsky et al. 2012; Hu et al. 2015; Wcaldchen and Mcader 2018, Wagner et al. 2019).
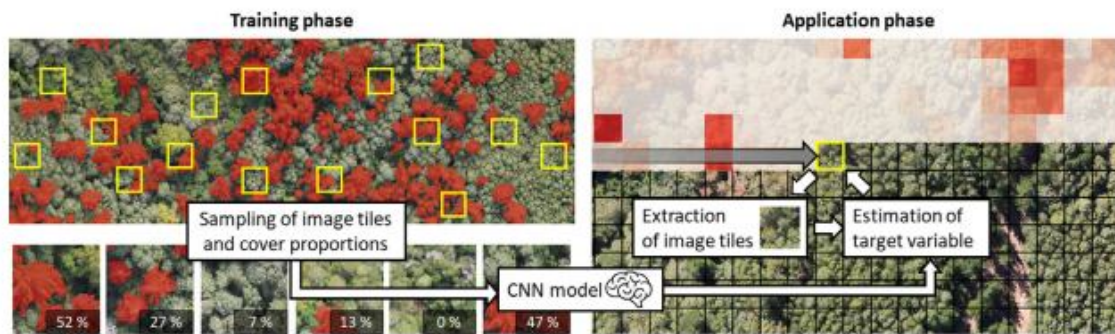
Fig 2: Convolutional Neural Networks have effectively been effectively applied in vegetation related applications, for instance, the picture based discovery of plant sicknesses, plant phenotyping (Ubbens and Stavness 2017) and picture based recognizable proof of plant species (see for example Pl@ntnet, Flora Incognita, Joly et al. 2016)

In any case, as a reaction to steady changes of ecological elements, vegetation coverings regularly include comparing continuous changes in species cover, local area organization or shelter properties (Foody et al. 1992; Schmidtlein and Sassin 2004; Rocchini et al. 2013). Besides, pixels may contain more than one vegetation type, even in extremely high goal information. In this way, vegetation frequently will in general be all the more properly depicted by nonstop measurements (for example the inclusion of an animal varieties [%]) and a powerful and adaptable planning approach ought to in a perfect world portray the objective variable utilizing a ceaseless scale instead of discrete classes. 2) Reference information accessibility: The prescient exactness of CNN ordinarily profits by huge amounts of preparing information (otherwise called names). However, in most far off detecting applications reference information are by and large a scant ware because of the expense of ground-based testing and troubles in getting to destinations. Besides, the utilization of field information might be weakened by the failure to precisely adjust the geolocation of field-based perceptions with far off detecting symbolism and examining inclination coming about because of ground-based cover gauges (Lunetta et al. 1991; Leps and Hadincov a 1992; Valbuena et al. 2010; Kaartinen et al. 2015; Leit~ao et al. 2018). One option is to utilize spatially unequivocal perceptions from UAV symbolism. This is attainable if previous ground-based examples are accessible to help the visual outline of the objective shelters or if the objective variable is the front of an effortlessly distinguished species or vegetation type (Vanha-Majamaa et al. 2000; Luscier et al. 2006; Lisein et al. 2015; Kattenborn et al. 2018, 2019). 3) Location and portrayal of highlights inside pictures: Originally, CNN approaches were created to examine pictures where the objects of interest cover a generous piece of the picture and the whole picture is alloted to a class (Krizhevsky et al. 2012). Conversely, a utilization of CNN in vegetation distant detecting should empower to find vegetation highlights inside the orthoimagery and show comparing spatial slopes. An answer for this issue is to apply CNN to similarly dispersed tiles separated from the orthoimagery.

IV. ADVANCED RESOURCE ALLOCATION SCHEME IN INTRA-CLUSTER BASED ON PSO-BPNN

To understand the ideal asset distribution in the framework bunch and further develop the existence pattern of the organization, we will enhance the set target work in this part. Neural networks have been end up being viable in approximating the necessary precision of estimation capacities [14], be that as it may, BPNN is

broadly utilized practically speaking. We will utilize the neural organization to assess the target capacity and track down the best asset allotment methodology. In our execution, BPNN is made out of a three-layer network structure, which has a component of mistake input, and has moderate intermingling issue. Hence, we receive Particle Swarm Optimization (PSO) calculation to further develop the learning velocity of BPNN. The stream outline portrayed in Fig. 2 is portrayed as follows:
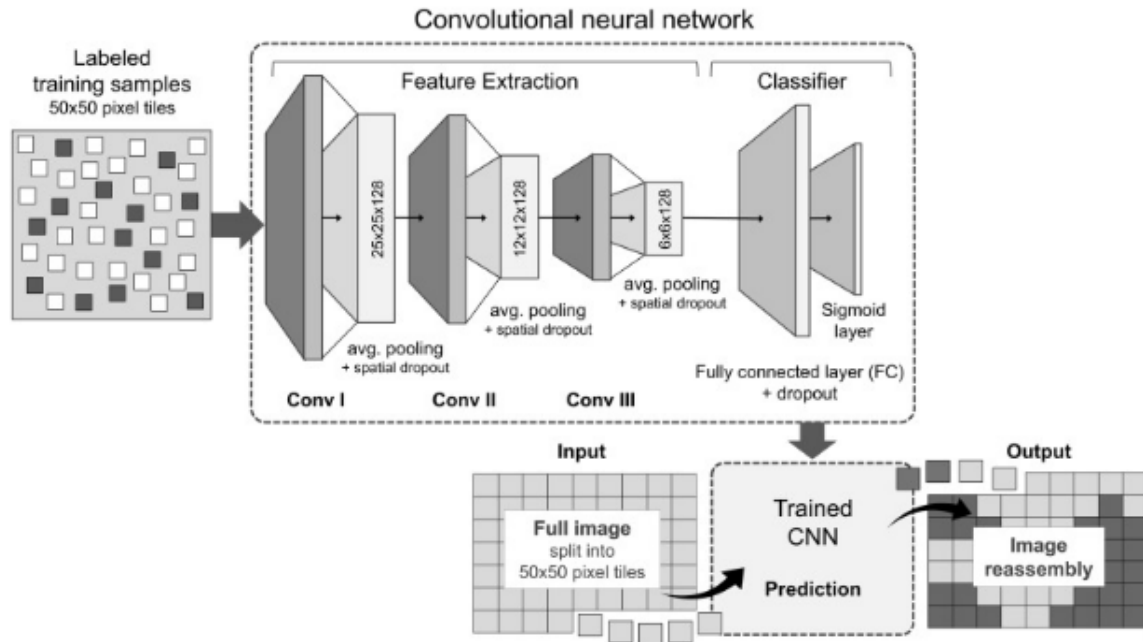
Fig 3: Illustration of the CNN engineering and the order interaction. The organization was prepared with physically named tests with a tile size of 50 × 50 pixel. The prepared classifier was then applied on entire recurrent photos, which were likewise parted into 50 × 50 pixel tiles. The classifier predicts the yield for each single tile and reassembles them to the first picture size.

Stage 1-The preparation test set of BPNN is started dependent on target works that are detected by the heterogeneous hubs, hub number and their spatial sending. The cycle begins at t = 0ms during the preparation of the example information regarding their underlying developments.

Stage 2-Based on the preparation test set of BPNN, the first information is then standardized. The standardization interaction is utilized for normalizing numerical displaying of the technique alongside other parametric conditions.

Stage 3-The model presently executes Particle Swarm introduction utilizing the standardized information planned on to training sample information of the goal work. This fills in as the preoptimization stage, where the information are produced dependent on unique bunching and standardized in like manner.

Stage 4- Here, the model is making a wellness work dependent on the standardized and prepared goal and cost capacities. This progression will act as the underlying advancement stage which conveys further the target capacities dependent on the BPNN yields.

Stage 5- In this stage, in light of the past wellness work yields, the ideal wellness work is ordered to refresh the molecule position and speed noted from the spatially dispersed hubs.

Stage 6- This is the first step of the proposed model, where the ideal number of cycles is determined dependent on the BPNN-PSO approach. In the event that the ideal number of cycles isn't reached, molecule wellness is again determined and continues for improvement.

Stage 7- As soon as the ideal number of emphasess is accomplished during agreeable correspondence among the Vegetation-IoT hubs, the information stockpiling for iterative calculations come into the image, which empowers setting up the new preparing set for the next time occurrence.

Stage 8-As soon as the capacity improvement happens during dynamic grouping, the BPNN cost capacities are refreshed and comparing ideal wellness capacities are determined. In view of this cycle, the best asset allotment plan is persistently refreshed and executed concerning time.

The proposed BPNN training method is briefly described as follow:

Algorithm 1: Training of BPNN for asset portion

Input : X; Y 1*l framework

Output : X; Y 1*l network

for I = 1 to l do

for j = 1 to l do

C[i,j] = 1;

end

end

while C[i,j] <= !l

i(i = 1; 2; :::; k) do

C[i,j] =1;

loop from 1 to k;

for bj

m = m[i]+1;

for l = 1 to m do

e = !eF + !aC;

end

end

end

CNNs are made out of three primary segments: convolutional layers, pooling layers and completely associated layers (Voulodimos et al., 2018). The initial two segments are answerable for programmed highlight extraction by applying countless various channels on the info information. This interaction of highlight extraction is performed on numerous levels, whereby the yield of each level is the contribution to the accompanying. From one level to another, the removed highlights expansion in intricacy - from rather basic highlights (for example edges) on the most reduced level to more intricate highlights on the most elevated level (Gu et al., 2018).

By passing enormous amounts of named preparing information through the organization, the model progressively figures out how to perceive the applicable highlights, which are important to recognize classes. For the programmed grouping of woody vegetation, we fostered a CNN comprising of three convolutional layers and one completely associated layer.

Every one of the three convolutional layers was sifted with 128 portions of size 3×3. Normal pooling with a 2×2 channel was performed on each convolutional layer. Other than the ordinary dropout on the completely associated layer (dropout rate = 0.7), we moreover applied spatial dropout (Tompson et al., 2014) on each convolutional layer (dropout rate = 0.3). This was for our situation more fruitful in forestalling overfitting and further developing speculation. Dropout was applied on the preparation set as it were. We added a sigmoid capacity to the last layer, which is liable for the parallel characterization. The ideal design of the CNN was resolved through a heuristic experimentation measure. We carried out the CNN utilizing the R-bundle "R Interface to keras" (Chollet and Allaire, 2017) and Tensor Flow backend.

V. CONCLUSION

Convolutional Neural Networks regression models are a powerful tool to harness high resolution data acquired to predict vegetation patterns. In many cases, where spectral information is scarce or does not help in identifying the given vegetation or species, spatial patterns can be essential. This cutting-edge technique, in concert with hyper spectral remote sensing in a multi-temporal setting will pave the way toward unprecedented accuracy in future vegetation mapping. At the same time, CNN alone will revolutionize the way we use high resolution spatial imagery. The high predictive accuracies obtained in our case studies using low cost RGB sensors highlights the potential application for a wide range of users. We conclude that combining UAV and CNN will provide ground-breaking opportunities for applied vegetation mapping. Moreover, satellite images are already

approaching the high spatial resolutions relevant for the methods tested in this contribution, opening up a wealth of further applications.

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ANALYSIS OF SOCIAL NETWORKING SITES ADDICTION: A SYSTEMATIC REVIEW

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ABSTRACT

Overuse in social networking sites has become a worldwide epidemic as a result of the prevalence of mobile devices. The rising issue of social media addiction has been recognized. Addiction of social media is associated with negative effects such as lowered productivity, toxic social interactions, and decreased life satisfaction. Following the regression and statistical research, the literature on social networking site addiction was included and extensively reviewed. There were a total of 62 studies that met the requirements for inclusion. Most of the study looked at addiction to social media platforms, the internet, and Facebook; however, there were also studies on addiction to online gaming, mobile phones, and YouTube. Depression, fear, mood swings, suicidality, and sleep disorders are all risk factors linked to internet addictions, according to the primary study. According to clear findings among literatures, Facebook and internet addiction are common among adolescent.

Keywords—Facebook Addiction, Internet Addiction, Social Networking Addiction, Mobile Addiction, Problematic usage.

INTRODUCTION

Social networking networks (SNS) are transforming the way people interact by allowing users to share with others in a variety of ways, such as updating status, sharing notes, exchanging messages, and accessing the content uploaded by others. The use of social networking sites (SNS) is spreading around the globe [1]. In the student's life, social media plays an important role. Accessing information, providing information, and communicating through social media is often simpler and more convenient. For many people, it is a part of their daily lives. Addiction is defined as "the state of being addicted to something" unable to stop taking or doing anything that is detrimental to one's health. The internet has become an integral part of people's daily lives in contemporary society, but it can be harmful to one's physical and mental health if used excessively. With a population of 2.1 million, Facebook is the most popular social media platform with over a billion where some users only come here once in a while, others are regulars [2].

Smartphone addiction is linked to cyberloafing and stress. Cyberloafing is not influenced by social support. The suggested model was discovered to have a 19% explanatory rate for smartphone addiction. In terms of perceived social support, stress, and smartphone addiction, there was a large difference between genders, but there was no significant difference in terms of cyberloafing. Female students were found to have higher levels of smartphone addiction, stress, and perceived social support. As a result, gender is an important variable to take into account [3].

The level of smartphone addiction was found to be alarmingly high. Overuse and technical dimensions are extreme, while the other dimensions are mild. They spend a lot of time on their phones and are reliant on them. They provide a variety of scientific applications. Students are expected to rely on a smartphone for even the most basic daily tasks and work assignments. Overdependence may have negative health and educational consequences [4]. Excessive use of the Internet has been shown to have a negative impact on academic achievement and family relationships and young people's social and emotional growth Internet addiction is one the issues identified is Internet Addiction (IA) [5].In the last ten years, the prevalence of IA among Hong Kong teens has ranged from 3.0 percent to 26.8%. Adolescents' physical, emotional, and psychosocial development was negatively impacted by IA. Being male, having a higher school grade, poor academic achievement, having depression, suicidal ideation, coming from a dis organized family, having family members with IA, having parents with a lower education level, and using a restrictive parenting style were all risk factors for IA [6]. The seriousness of PSU, depression, and anxiety were all linked to COVID-19 anxiety. Using developed cut-off scores, 12 percent of participants were found to have moderate depression and 24% had moderate anxiety.COVID-19 anxiety was found to be linked to PSU severity using structural equation modelling, mediating the relationship between general anxiety and PSU severity. COVID19 anxiety, on the other hand, no longer expected PSU severity when PSU was controlled for general anxiety and depression severity [7].

Excessive internet use seems to have been widespread during the COVID-19 pandemic phase, with young adults being the most susceptible [8]. Undergraduate students were very likely to use social media internet connectivity for academic reasons, and they were also very likely to become addicted to it. The majority of pupils are aware

of the positive effects of social media on their lives academics, but not on their mental and physical health. Time spent on social media, addiction, and academic performance are all factors to consider [9]. Instagram is the most influential social media app among young people all over the world at the moment. Instagram is used by more than 70% of people between the ages of 12 and 24. Female students are more aware of Instagram advertisements than male students. When compared to young adults in Europe and the United States, Taiwanese young adults prefer images and videos to posts, indicating that they prefer images and videos to posts. The impact of loneliness, self-esteem, body satisfaction, and testosterone levels on social network addiction has been determined [10].

To reduce the prevalence and influence of social media addiction on different facets of life, including sleep, smartphone applications such as WhatsApp could be warned. WhatsApp usage had no correlation with medical students' academic achievement due to its convenience and low cost. Medical professors claimed to have used for less than 2 hours every day [11].The study included that there is a strong link between age and internet addiction, with older students becoming more addicted to the Internet than younger students. This may be due to the fact that they have been exposed to the Usage of the internet in different ways, such as chatting, emailing, and calling, as well as social media. In addition, There were major gender disparities in terms of Internet use, with men becoming more addicted compared to women [12].

The disparity in mean depression score between boys and girls was greater among older students (reference: younger), overweight or obese students (reference: average weight), those who slept less than 5 hours a night (reference: eight or more), and those who were physically active students. For all four GHQ subscales, somatic, anxiety, social instability, and extreme depression, the girls had higher mean scores than the boys; There was a statistically important difference between fear and social instability [13].

Based on the available literature, studies were analyzed to know the usages of the Internet and addiction in the social media sites which also includes the usages of internet, namely online gaming, online chatting and gambling. Regarding samples, most participants were educated students and adolescent's .From the survey it's been observed that addiction causes Anxiety and depression.

METHODOLOGY
Sample Collection
Based on the literatures surveyed, most of the samples were collected by the questionnaire survey among different categories like University students and Adolescents. The effects of mobile addiction on students' behavior, academic success, and wellbeing are being investigated [4].

The following questions are discussed in one study:

1. What percentage of participants are addicted to their smartphones?

2. What are the most telling signs that participants are addicted to their smartphones?

3. Is there a statistically meaningful difference between men and women when it comes to smartphone addiction?

4. Is there a statistically important difference between social status and mobile addiction?

5. Is there a statistically important difference in mobile addiction dependent on educational attainment?

6. Are there statistically meaningful variations in mobile addiction depending on the amount of hours spent on the computer per day?

7. Is there a statistically relevant relationship between monthly income and mobile addiction? [4].

Factors Associated with addiction
"Addictive conduct" (e.g., smoking, eating, drinking etc.) is characterized as "a repetitive habit pattern that raises the risk of illness and/or related personal and social problems" [14].

A. FB Addiction
As indicated by univariate investigation, there were 29 elements identified with FB compulsion: GPAX, research methodology, conjugal status of guardian, nurturing form, father's schooling level, mother's schooling level, number of kin, kin relationship style, guardian, monetary status of parent, adequacy of family account, adequacy of individual accounting, length of being FB client, number of FB usernames, number of FB friends, devices for accessing FB, source FB Notwithstanding, Sex, school place, personal finance sufficiency, and length of FB use during work days were found to be the only six factors influencing FB dependency in the

multivariate study., time accessible to play in the special times of year, and gadget for FB access [15]. Motives for contact, passing time, and entertainment were established as major contributors to FA among female university students [16].

Facebook addiction [17] syndrome/Disorder (FAS/FaD) [18] is a form of internet addiction disorder (IAD).The Bergen Facebook Addiction Scale is a novel psychometric instrument that tests each of the six features of addiction (BFAS) [19, 20]. It consists of six specific conditions, to which participants must respond with one of the five options listed below: (1) seldom, (2) very rarely, (3) occasionally, (4) often, and (5) very regularly.

1. You devote a significant amount of time to dreaming about Facebook or planning how to use it.

2. You have a growing urge to use Facebook.

3. You use Facebook to stop coping with personal issues.

4. You have managed, but failed, to limit the use of Facebook.

5. You get agitated or troubled if you are not allowed to use Facebook.

6. You spend a lot of time on Facebook that it has harmed your career or studies.

B. Internet Addiction

[12] was determined to use the Internet Addiction Test (IAT). It's a 20-item self-reported Likert scale with a 0 to 100 score set. Salience, Excessive Internet Use, Neglecting Work, Anticipation, and Lack of Self Control are the six variables assessed by the scale. Cronbach's Alpha reliability ratings ranged from.54 to.82, and the scale was also considered to have strong validity. In India, studies showed a high degree of reliability.

1. According to [21] if a person meets five of the eight requirements set out by Young, they can be classified as an Internet addict:

2. An excessive dependence on the Internet

3. Use to be online for a long time

4. Attempts to reduce the amount of time spent on the internet that were unsuccessful

5. Withdrawal symptoms (e.g., restlessness, dysphoria) can occur while attempting to restrict Internet use.

6. Issues with time management (e.g., daily activities)

7. Excessive Internet usage jeopardizes relationships (e.g., families, education, jobs, and friends).

C. Social networking sites Addiction

Other addictive habits, such as Online addiction, heavy usage of the Internet, microblogs, blogs, or social networking sites [9], have been a part of our lives over the past decade. All in all, social networking sites are the most frequently used social media channel, and the term Social Networking Sites addiction has gained popularity [14]. According to the results of the report [22], heavy use of social media platforms by students is related to a rise in psychiatric symptoms, including symptoms of Anxiety and depression. For evaluating smartphone addiction, the SAS-SV displayed good reliability and validity. The short version of the smartphone addiction scale, which was developed and validated in this review [23], could be used to measure smartphone addiction in community and research settings.

D. Analyzing method

Regression analyses [9, 24, 25] were mostly used for analyzing the data. A logistic regression analysis [26] was carried out for Internet addiction status as a binary outcome variable (i.e., the difference between dependent variable was addicted and not addicted) and the key consequences of all application uses and all Personality characteristics as predictors [27].With internet addiction as the dependent variable and age, gender, anxieties, gaming habit, obesity, and alcohol consumption as covariates, researchers looked at the relationship between internet addiction, mobile phone usage, and academic department. The level of statistical importance in all experiments was set at alpha = 0.05. IBM SPSS Statistics Version 24 was used to evaluate the results [28, 29]The backward LR approach was used in a logistic regression study that included both personality characteristics as well as the following Internet applications: MSN, Twitter, chat, SNS, and video gaming were used as Internet addiction status was used as a pattern type predictor [27].
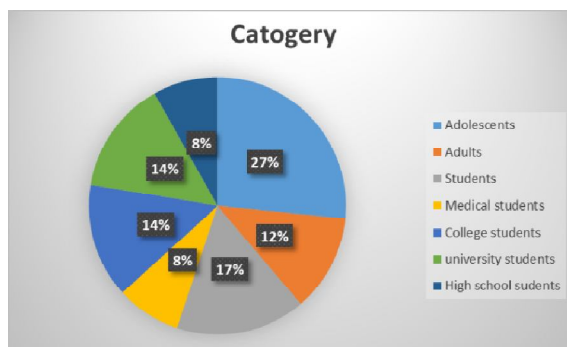
Category of addiction

E. Statistical Methods

SPSS [29-31] was used to measure informative and inferential statistics (version 23). ANOA [32]was used to explore discrepancies between three degrees of social alienation and social support (low, medium, and high) [24], as well as health symptoms associated with mobile misuse (all somatic and psychological symptoms). Using a Pearson correlation, the relationship between social security and social affirmation (in both studies, for men and women aged 12 to 22 years) and social media addiction, health problems (somatic and psychological), frequency of social media use, and participation in social groups was investigated [17, 33]. The aim of this research is to investigate the connection between social isolation and social support, as well as how people use social media [10, 12]. The Statistical Packages for social Sciences, version 22.0, was used to statistically analyze all of the responses, according to [34].

The 18th edition of a statistical package in social sciences research [35] (SPSS Inc., Chicago, IL, USA) was used to analyze the data, which included the standard deviation and the mean. The normality of the data was determined using the Kolmogorov-Smirnov test, which revealed abnormal distributions of variables related to social media addiction and GPA. Use Spearman's correlation coefficient to study the association between social networks and GPA. The Mann-Whitney U test is used to compare substantive qualitative variables (such as gender) of social media addiction outcomes, as well as ordinal qualitative variables (such as education level and school) and quantitative variables (such as gender) age). This test is used to analyze nominal The scores of qualitative variables (such as gender), while the KruskalWallis H test is used to compare the scores of ordinal qualitative variables (such as education level and school) and quantitative variables (such as age). And groups).). The significance level is described as a p-value less than 0.05.[36].
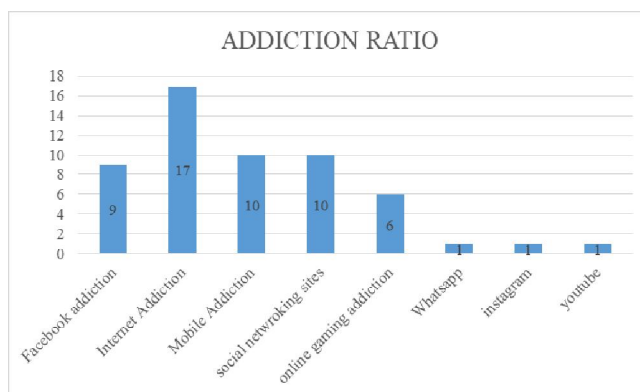
Addiction ratio

F. Depression and Anxiety

The Depression Anxiety-Stress Scales 21 [37, 38] which is a well-established tool in nonclinical and clinical samples, were used to measure depression and anxiety symptoms. Each subscale has seven things (For example: 4-point Likert scale (0 = does not apply at all, 3 = applies a lot or most of the time) 4-point Likert scale score (0 = does not apply at all, 3 = se applies to me many or most of the time) scored on a 4-point Likert scale (0 = does not apply to me at all, 3 = applies to me a lot or most of the time) that are scored on a 4-point Like. The higher the ranking, the more severe the symptom is. The internal reliability of depression scale 0.84, while the anxiety scale has an internal reliability of 0.78. 35 Depression scale: current reliability: a = 0.92, anxiety scale: a = 0.84 [2].

The depressive and somatic symptoms scale was used to assess depression (DSSS). Somatic symptoms in depressed patients are significant for a variety of reasons. For instance, somatic symptoms may confound or obscure a depression diagnosis. 10 Second, residual symptoms, which are often somatic in nature, can raise the likelihood of relapse. 11 to 13 Patients with Major Affective Disorder(MAD) and somatization had more and longer psychotic episodes, as well as more depressive signs, than patients without somatization [18].

The Depression Scale of the Center for Epidemiological Studies (CES-D) [26] was used to evaluate depression. It includes 20 items. Each thing was scored on a four-point scale (1 = never, 4 = always), with higher scores indicating bad depression conditions. The CES-D has been used with sufficient reliability and validity in Chinese samples. Cronbach's alpha for the CES-D was 0.91 in the current analysis [1].

CONCLUSION

Age, faith, citizenship, level of schooling, number of years using SNSs, level of income, ego power, and locus of control among the variables were analyzed. Undergraduate students were very likely to use social media internet access for academic purposes, and they were also very likely to become addicted to it. The majority of students are aware of social media's positive effect on their education, but not on their personal and social well-being. The amount of time spent online, addiction, and educational outcomes were all related. The only substantial variation was found in the amount of time spent on Facebook and other SNSs on a regular basis. Depression and anxiety were founded as the major symptoms using the Depression Anxiety-Stress Scales 21.Regression analysis and ANOVA are used for analysis of the data. By the analyses and according to the findings of this study, adolescents are mostly addicted to Facebook and internet.

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AUTOMATED INTELLIGENT SYSTEM WITH DENSITY-BASED SPATIAL CLUSTERING ALGORITHM TO CONTROL AIR CONDITIONER WITH RESPECT TO BODY TEMPERATURE USING HUNT'S ALGORITHM

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ABSTRACT

Changes is the only thing which never Change, our body temperature keeps on changing according to the indoor and out air conditioners allow you to change the temperature of your living space by a few degrees. To moderate the humidity level in the room the dehumidifier was used to make the air comfortable more than and it will be very much useful in summer seasons. But there are some disadvantages are also like we are can able to set the temperature at a level like 18 – 16 means dry and irritated eyes, mouth, headaches, nasal passages, throat, Raynaud's disease, sore throat, laryngitis, arthritis. So to avoid this situations this research paper proposed method consist of a device which can able to read the body temperature and storing it as a dataset and using sensor data analytics the dataset set was injected to the orange data mining tool by density-based spatial clustering algorithm for the analysis and according to the body temperature time wave and notice the fluctuations the device trigger the signal and controls the air conditioner by increasing and decreasing the temperature with the Hunt's decision algorithm. Thus this automated function can be easy installed because of the infrared signals can able to control the old and new multiband air conditioner. Keeping the human body in a perfect temperature can make the life, mind and sleep much more comfortable using the intelligent computer systems with the sensor data analytics algorithms.

Keywords: Air Conditioner, Data Mining, Hunt's Algorithm, Sensor Data Analytics, DBSC.

I. INTRODUCTION

Thus Everyone's body runs at a slightly different normal temperature, but the average is 98.6 degrees Fahrenheit. Air conditioner is chief reason for huge symptoms of arthritis, low blood pressure and neuritis, causing pain controller even some difficult for those stomach on inhaling their chief winds. People who inhale lot of period in an air conditioned atmosphere become high in rate of intolerant of sun light and heat. A chill shower or bath will also lead to cool our body temperature. Sit in front of the air conditioner. Air conditioning is the outright finest method to halt cool while it's warm outside.

But the issue we may face in future because of the constant chillness and sometimes we may lead to wake up and off the air conditioner at late night due to heavy chillness and again we may turn on for the chillness by disturbing our precious sleepy nights. So to avoid this situation this research paper came up with the solution of monitoring our body temperature with the help of a health band for one week or twice and then even without the band the data's received by the band will help us to predict our body temperature routine and can able to analyzed the with sensor data analytics. This process is done with the orange data mining tool using the density-based spatial clustering algorithm. The algorithm creates a class interval and during each class interval it predicts the nearest matching data points and eliminates other the data as noise points. Then it creates a mean standard data point for the each class interval.

According to the each class interval data point the signal insist the mounted device to control the air conditioner according to the behavior. The decision to control the air conditioner temperature was governed by the Hunt's algorithm to make the decision fast and accurate. Thus the controlling of the air conditioner is done via infrared blaster. Because the connectivity is common for the each and every air conditioner system. So it is possible to make it real time and installation can be easier and flexible.

II. DENSITY-BASED SPATIAL CLUSTERING

Density-based spatial clustering algorithm is a procedure which starts with a random unvisited starting data point. All data points inside a space 'Epsilon – Ɛ classifying as nearby data plots. We need a minimum number of points within the neighborhood to start the clustering process. Upon this type conditions, the present information fact converts the initial socket in the group. Then, the fact gets categorized as 'Noise.' And else case, the present fact converts a visited point. All facts inside the space Ɛ converted portion of the similar group. Iterate the process for all the new-fangled facts additional to the band collection. Continue with the process until we visit and label each point within the Ɛ neighborhood of the cluster.

DBSCAN(dataset, eps, MinPts){

C = 1

for individual dataset unvisited point p in {

mark p as visited

Neighbors N = the neighboring points of p

if |N|>=MinPts:

N = N U N'

if p' is not a any cluster member:

add p' to cluster C

}

On achievement of the procedure, fright over through a new-fangled unvisited fact thus foremost to the detection of extra bands or noise. Latterly of the procedure, we confirm that you spot apiece fact as moreover band or noise.

III. HUNT'S ALGORITHM

Hunt's Algorithm is unique of the initial and it aids as a base for about of the extra composite procedures. In Hunt's algorithm, a final decision tree is taken in a recursive manner by dividing the exercise proceedings into consecutively cleaner subsets. Here CI be the band of iteration fields that are linked with node t and y = {y1,y2,...,yc} be the class labels. The subsequent is a recursive depiction of Hunt's algorithm. The chief stages of procedure are:

Step 1: Initialize the tree root.

Step 2: Calculate Entropy for The Classes.

Step 3: Analyze Next Fragmented for Apiece Feature.

Step 4: Compute Data Improvement for apiece divided.

Step 5: Perform the Split.

Step 6: Perform Further Splits.

Step 7: Complete the Decision Tree.

Decision Tree Splitting Method.

A. Reduction in Variance
- For apiece split, independently compute the alteration of apiece child bulge.
- Analyze the modification of apiece split as the biased regular alteration of child Nodules.
- Top source divided with the lowermost adjustment.
- Initialize the process 1-3 till the whole mono nodes are obtained.

B. Tree
The Hunt's Algorithm is solitary of the initial and aids as a base for about of the further compound procedures. The decision tree is fabricated in a recursive manner till apiece trail finishes in a untainted subclass (cruel apiece trail engaged necessity finish through a session selected). Around three stages that are complete till the tree is entirely grownup. Observe the highest information and discover the finest feature for the primary nodule. Fragmented the greatest information grounded on this characteristic. Recourse on each consistent child nodule selecting additional traits.

III. MIT APP INVENTOR
App Inventor hire agreement to grow requests for Android phones by means of a web browser and moreover an associated phone or emulator. The App Inventor waitpersons store our exertion and assistance us to retain pathway of our developments. We develops apps by developing with: The App Inventor GUI interface, which can able to select the options for own idea app. App Inventor is open and cost free, online-based platform which allows us to create our idea into mobile applications with the help of coding blocks based language. We entrance App Inventor using an internet connector like (Safari, Firefox, Chrome). Massachusetts Institute of Technology (MIT) App Inventor is an internet tool platform combined extension hinterlands online tool suggested by Google in the initial

stages. Outstanding for framework software design advance, knowledge program design ideas, and considerate topographies of app enterprise. Remarkable instrument for education considerate, essentials, troubleshooting and perseverance of program writing. This is a prodigious appetizer package for app structure.

Fig 1: Data Table

To twitch straight go to ai2.appinventor.mit.edu, or click the orange "Create" badge from the App Inventor website. Using the password and username of the google accounts we can able to login in the app inventor window. Click "Continue" to dismiss the splash screen. Start a new project. In this research paper we have used the MIT app inventor to control the air conditioner using the mounted android device which holds an infrared (IR blaster) to make the air conditioner increase and decrease.

IV. METHODOLOGY

In the initial stage we use the health band to monitor the body temperature by keeps on receiving the signal form the band and storing it in the dataset. This process will be continued for a week or twice to make the model more efficient and accurate at the result. After collecting the data set and preprocessing done at the earliest and using the density-based spatial clustering algorithm the noise data points are get removed and mean data of the each class interval of one hour was calculated with the help of DBSC algorithm so from the data set we can obtain the each mean value of the one hour class interval of a day which was sorted by after supervising the sensor data analytics of a week or twice.
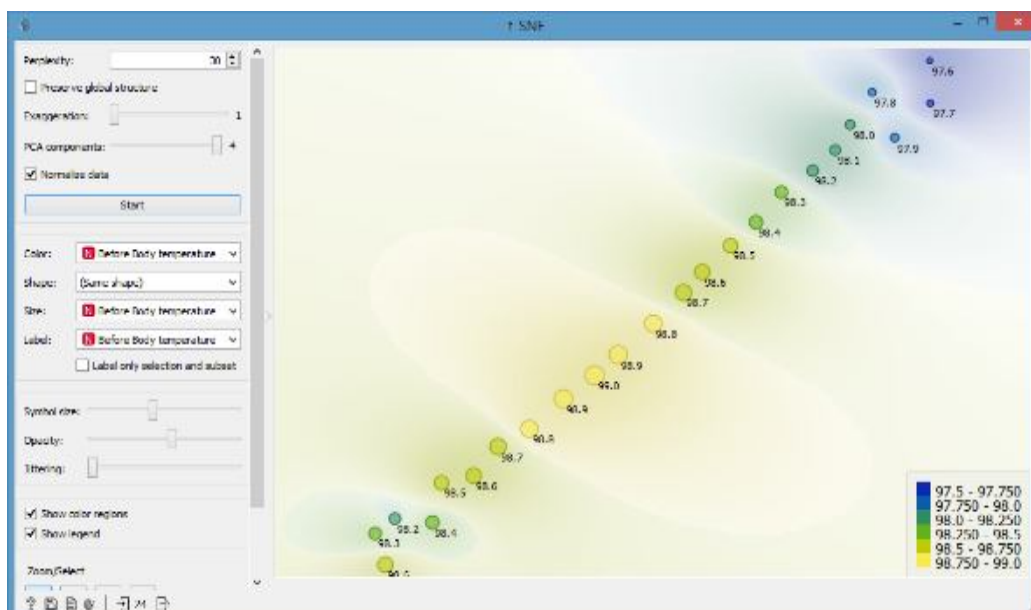
Fig 2: Before Body Temperature

Using the Hunt's Algorithm the each class interval value was noticed and according the respected temperature the air conditioner get commended to increase or decrease the temperature automatically without the interference of the human and work done with the help of infrared waves form the mounted device which holds the IR blaster.
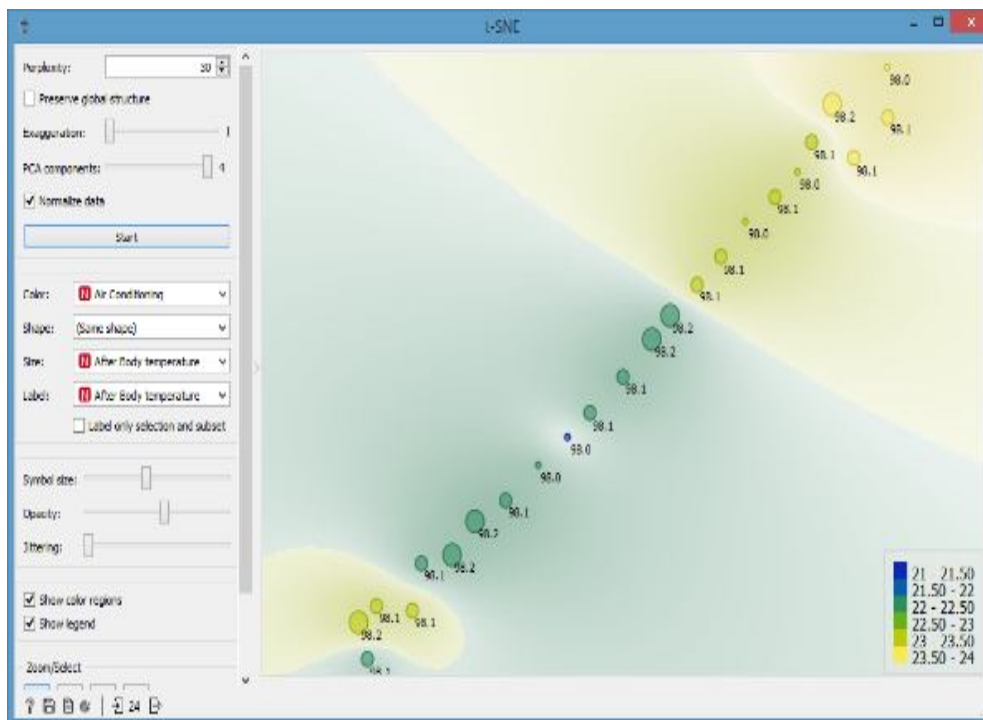
Fig 3: After Body Temperature

So this technology make the human so comfortable during the sleep and maintain the healthy temperature in the room environment.

V. CONCLUSION

This research paper has a wide scope in future because now people are suffering and facing health issues due to not sleeping well. So our research paper helps the society to come up with a solution of automated air conditioning system with appropriate body temperature of each individual or the family in respect to their room temperature. Thus the data table was successfully injected in orange data mining tool and the expected result was obtained and a prototype was developed successfully.

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BENEFICIAL EFFECT OF POLY HERBAL FORMULATION (PHF) ON ALTERED GLYCOPROTEIN COMPONENTS IN HIGH FAT DIET INDUCED TYPE 2 DIABETIC RATS

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ABSTRACT

The aim of present study was to investigate the antidiabetic potential of polyherbal drug on rearrangements in plasma and tissues glycoprotein components in high fat induced type 2 diabetic rats. The levels of blood glucose, Glycosylate hemoglobin (HbA1c), plasma and tissues glycoproteins such as hexose, hexosamine, fucose and sialic acid were significantly increased whereas plasma insulin levels were significantlydecreased in diabetic rats. On oral administration of Poly Herbal formulation at a concentration of 250 mg/kg b.w twice daily to diabetic rats for the period of 45 days, inverted the above-mentioned biochemical changes to near normal levels. The anti-hyperglycemic effect of Poly Herbal Formulation was comparable with Metformin, a known hypoglycemic drug. Based on the results obtained from the present study, it may be concluded that Poly Herbal Formulation possesses significant productive effect onglycoprotein metabolism in addition to its antidiabetic effect.

Key words: Poly Herbal Formulation, high fat diet, hexose, hexosamine, sialic acid, fucose, type 2 diabetes

INTRODUCTION

Diabetes mellitus is a chronic metabolic disease with the highest rates of predominance and mortality worldwide, often disproportionately hurting the poor and young sub-populations in developing countries. It is characterized mostly by chronic hyperglycemia resulting from defects in insulin secretion and/or its action complications (Pari & Srinivasan, 2010). This eventually leads to improper regulation of carbohydrate, protein and lipid metabolism and ultimately contributes to a key factor in the development and the progression of micro and macrovascular (Zhang *et al*., 2019). The World Health Organization (WHO) reported, the number of diabetic patients is expected toincrease from 171 million in year 2000 to 366 million or more by theyear 2030 (Wild *et al*., 2004).

Anti-diabetic drugs, such as Thizolidinediones, α-glucosidase inhibitor and biguanides have been synthesized for the pharmacotherapy of diabetes mellitus. However, the long term medication caused many side effects to the patients, such as flatulence, discomfort, and diarrhea (Haihong *et al*., 2019). The plant phytochemicals such as flavonoids, poly phenols and polysaccharide have been identified to have antidiabetic function with less side effect cast effectiveness than synthetic drug (Sundaram *et al*., 2019). Nowadays, there is much interest in the usefulness of herbal plants and their constituent – flavonoids, because their intake appears to be connected with a reduced risk of certain chronic diseases and increased survival (Chen *et al*., 2002).

Phytochemicals(e.g., polysaccharide and polyphenol) from natural herbs as either pharmaceutical or dietary supplements is being explored. Amounts of plant polysaccharides have been identified to have anti-diabetic functions with low side effects through various mechanisms, including ameliorating β-cell dysfunctions, decreasing α-glucosidase activities, increasing insulin efficacy, balancing hepatic glucose metabolism, etc.

Gymnema sylvestre is a highly effective anti-diabetic medicinal herb. Leaves contain lupeol, β-amyrin, stigmasterol, pentriacontane, hentricontane, α and β chlorophyll, resin, tartaric acid, gymnemic acid (anti sweet compounds) the mixture of triterpenesaponins, anthraquinone derivatives, alkaloids, betaine choline and trimethylamine (Karadeniz *et al*., 2005). Traditionally, the leaves of G. sylvestre were used for the treatment of diabetes and other disorders, while the flowers and bark are given in diseases related to phlegm (Kirtika & Basu, 1975). A recent review described the antimicrobial, hepatoprotective, antihypercholesterolemic and anti-inflammatory activities of leaves of this plant (Kanetkar *et al*., 2007; Agarwal *et al*., 2000). They are also used for making antidiabetic formulations in folk, ayurvedic and homeopathic medicines.

Cassia auriculata Linn. is found throughout central and southern parts of India and it has been widely used in Ayurvedic medicine especially as an antidiabetic, in the treatments of rheumatism, dysentry, asthma, cough and renal disorders (Kirtika & Basu, 1975; Kumar *et al*., 2002; Kumar Rajagopal *et al*., 2003). All the parts of this plant are an excellent source of antioxidants which has proved their immense potency against degenerative diseases. Effect of aqueous extract of the flowers was examined on antioxidants and lipid peroxidation in the brain of streptozotocin induced diabetic rats which showed the significant decrease in thiobarbituric reactive substances and hydroperoxide in brain (Latha & Pari, 2003).

Trigonella foenum graecum (Fenugreek) is belonging to the family of Fabaceae which is an annual herbaceous legume and consumed as a spice as well as a vegetable in different parts of the world. The recent researches have proved its potential against Atherosclerosis, Constipation, Diabetes, High cholesterol and Hyper-triglyceridemia (Ansari, 2005; Taylor & Zaman, 1997; Raju *et al*., 2001; Kaviarasan *et al*., 2007). The seeds of fenugreek contain alkaloids, flavonoids, saponins, amino acids, tannins and some steroidal glycosides, proteins and act as an antioxidants or inhibitors of oxidation which retard or prevent the oxidation in general and prolong the life of oxidizable matter (Ministry of Health and Family Welfare, 1996). It has also been used as an appetite stimulant (Petit *et al*., 1993) and as a laxative (Riad & El-Baradie, 1959).

Cinnamon (Cinnamomumverum, synonym C. zeylanicum) is a small evergreen tree, 10-15 meters tall, belonging to the family Lauraceae, native to Sri Lanka and South India. The available *in vitro* and animal *in vivo* studies suggest that cinnamon has anti-inflammatory, antimicrobial, antibacterial, antioxidant, antitumor, cardiovascular, cholesterol-lowering, and immunomodulatory effects (Denys, 2012). Aqueous extracts from cinnamon have been shown to increase in vitro glucose uptake and glycogen synthesis, increase phosphorylation of the insulin receptor and likely help trigger the insulin cascade system (Imparl-Radosevich *et al*., 1998; Jarvill-Taylor *et al*., 2001).

Syzygium cumini Linn (Family: Myrtaceae), commonly known as Jam is a popular seasonal fruit in India, Bangladesh and many other South East Asian countries. It is not only a delicious fruit but also an important traditional and modern medicine. Different parts of the plant especially fruits, seeds and stem bark possess promising activity against diabetes mellitus and it has been confirmed by several experimental and clinical studies and several earlier investigations have been reported from the different parts of the plant with antioxidant (Bopp *et al*., 2009; Bhuyan *et al*., 2010; Pandey & Khan, 2002; Mandal *et al*., 2008; Banerjee *et al*., 2005; Sultana *et al*., 2007). The plant possesses a large number of chemical compounds such as vitamin C, gallic acid, tannins, anthocyanins, acetyl oleanolic acid, triterpenoids, ellagic acid, isoquercitin, quercetin, kaempferol and myricetin in different concentrations. Most of these compounds have been reported to possess nutritive and therapeutic potentials (Gupta & Sharma, 1974; Bhatia & Bajaj, 1975; Noomrio & Dahot, 1996).

High fat diet (HFD)-induced hyperglycemia in rodents is considered to be a good model for the preliminary screening of agents active against diabetes and is widely used (Ivorra et al., 1989). In this model, diabetes arises from destruction of the islet cells of the pancreas, causing degranulation or reduction of insulin secretion. In this type I model of diabetes, insulin is markedly depleted, but not absent (Pushparaj et al., 2001).

To our knowledge, there is no investigation had been carried out on the effect of this PHF in High Fat diet (HFD) induced diabetic rats with special reference to glycoprotein component. Therefore, the primary objectives of this study were Poly Herbal Formulation and assess its effect on dearrangement in glycoprotein levels in the high fat diet induced type 2 diabetic rats. The results were also compared withMetformin as a standard reference drug

MATERIALS AND METHODS
Sources of chemicals
All fine chemicals were purchasedfrom Sigma Chemical Company (St. Louis, MO, USA). All other chemicalsused were of good quality and analytical grade and obtained from Himedia, Mumbai, India

Preparation of Poly Herbal Formulation
The flower of *Cassia auriculata* and leaves of *Gymnema sylvestre* were collected from a local garden in southern part of india (kanchipuram and villupuram District, Tamilnadu). Seeds of *Trigonella foenumgraecum* (Fenugreek), bark of *Cinnamomum Zeylanicum* and fruit of *Syzygium cumini* (L.) at the commercially matured stage, were purchased from the market and the plant materials were air dried under the shade, to fine power using cutting mill and mixed with define ratio.

Animals
Adult male Wistar rats (180±15 g)were obtained from Central Animal House facility, Sri Muthukumaran Medical college Hospital & Research Institute Chennai-600 069, Tamil Nadu, India. The rats weremaintained at standard condition of humidity (60 ± 5%), an ambient temperature (25±2^{0}C) and light (12 h light/dark) Animals were given standard commercial rat chowand water ad libitum and housed under standard environmentalconditions throughout the study. The study has got the approval from the Institutional Animal Ethical Committee (IAEC), regulated by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Environment & Forests (Animal Welfare Division), Government of India (IAEC No.06/2008).

Induction of Type 2 Diabetes

Rats will be fed high-fat diet (HFD) containing cholesterol 1.5%, cholic acid 0.5%, coconut oil 30%, standard rat feed 68% and 30% sucrose through drinking water for the period of 60 days. On the 59th day of feeding, after overnight fasting, blood glucose will be checked and the rats which have blood glucose above 120 mg/dl will be chosen as type 2 diabetic rats. Treatment would be started on the next day after confirmation of type 2 diabetes and this would be considered as 1st day of treatment and it will be continued for 45 days. The rat will be fed with HFD during this period. Body weights of the various groups will be recorded prior to induction of type 2 diabetes and end of the 60 days of treatment with the Poly Herbal Formulation.

Experimental design

The animals were divided into five groups of six animals in each. Poly Herbal Formulation and standard antidiabetic drug metformin were dissolved in distilled water and administered orally using an intragastric tube for the period of 45 days.

Group I   Normal control

Group II   Diabetic control (cholesterol 1.5%, cholic acid 0.5%, coconut oil 30%, standard rat feed 68% and 30% sucrose through drinking water for the period of 60 days)

Group III   Diabetic + Poly Herbal Formulation (250 mg/kg b.wt) (Rahul et al., 2019)

Group VI   Diabetic + Metformin (50 mg/kg b.wt)

Group V   Normal + Poly Herbal Formulation (250 mg/kg b.wt)

At the end of the experimental period (45th day), the animals were subjected to anaesthesia and sacrificed by cervical decapitation. Blood samples from experimental animals were also collected in collection tubes coated with or without EDTA for the separation of plasma and serum to determine blood parameters.

Extraction of glycoproteins

To 100µl of plasma, 5.0 ml of methanol was added, mixedwell and centrifuged for 10 min at 3000×g. The supernatant wasdecanted and the precipitate was another time washed with 5.0 ml of 95% ethanol, recentrifuged and the supernatant was decanted to obtain the precipitate of glycoproteins. This was used for thefurther estimations.

For extraction of Tissue glycoproteins, a known weightof the tissue was homogenized in 7.0 ml of methanol. The contentswere filtered and homogenized with 14.0 ml of chloroform.This was filtered and the residue was successively homogenized inchloroform–methanol (2:1, v/v) and each time the extract was filtered.The residue (defatted tissues) was obtained and the filtratedecanted. A weighed amount of defatted tissue was suspended in 3.0 ml of 2 N HCl and heated at 90^0C for 4 h. The sample was cooled and neutralized with 3.0 ml of 2 N NaOH. Aliquots from this wereused for estimation of fucose, hexose, hexosamine and sialic acid.

BIOCHEMICAL ANALYSIS

Determination of plasma glucose and insulin

Plasma glucose was estimated by the method of Trinder using a reagent kit (Trinder, 1969). Plasma insulin was assayed with an ELISA kit by the method of Burgi (Burgi *et al*., 1988).

Oral glucosetolerance test (OGTT)

Throughout the 45 days of treatment period, fasting blood glucose levels were measured on lateral tail vein blood sample at 2, 4 and 6 weeks using an GlucoOne glucose meter (M/s Tianjin Empecs Medical Device Co. Ltd, Tianjin). OGTT was also performed on the last day of the study using a methodology of Wang (Wang *et al*., 2011). After 12 h fasting, the rats of all groups were orally administered with 2 g kg b.wt of glucose dissolved in distilled water. After glucose administration, Blood glucose levels were measured at half an hour intervals (0, 30, 60, 90 and 120 minutes) using the glucose meter. The results were expressed as area under the curve.

Determination of glycoproteins

The plasma and tissue hexose content was estimated by the method of Niebes (Niebes, 1972). Sialic acid in plasma and tissues wereestimated by the method of Warren (Warren, 1975) and hexosamine by the method of Wagner (Wagner, 1979). Fucose was estimated by the method of Dische & Shettles (Dische & Shettles, 1948).

Statistical analysis

The results are expressed as mean ± standard deviation (SD). Differences between groups were assessed by ANOVA using the SPSS software package for Windows.Post hoc testing was performed for inter-

groupcomparisons using the least significance difference(LSD) test; P-values of $< .05$ were considered as significantly changed.

RESULTS
Effects of Poly Herbal Formulation on body weight, plasma glucose and insulin levels

Figure 1 & 2 depicts the alterations in the levels body weight, Blood glucose (0 day and 45th day) and insulin. Significantly increase levels of Blood glucose was observed in HFD-induced diabetic rats. After the oral administration of PHF for 45 days resulted in significantlydecrease the fasting blood glucose levels. Pancreatic insulin secretion is controlled the plasma blood glucose levels. The antihyperglycemic effect of PHF may be due to improved insulin secretion from the existing beta cells and /or regenerated eta cell of pancreas. Which in turn enhance glucose utilization by peripheral tissues of diabetic rats moreover by promoting glucose uptake and metabolism or by inhibiting hepatic gluconeogenesis and decreased blood glucose levels

Fig 1: Effect of PHF on body weight in control and high-fat-induced type 2 diabetic rats.
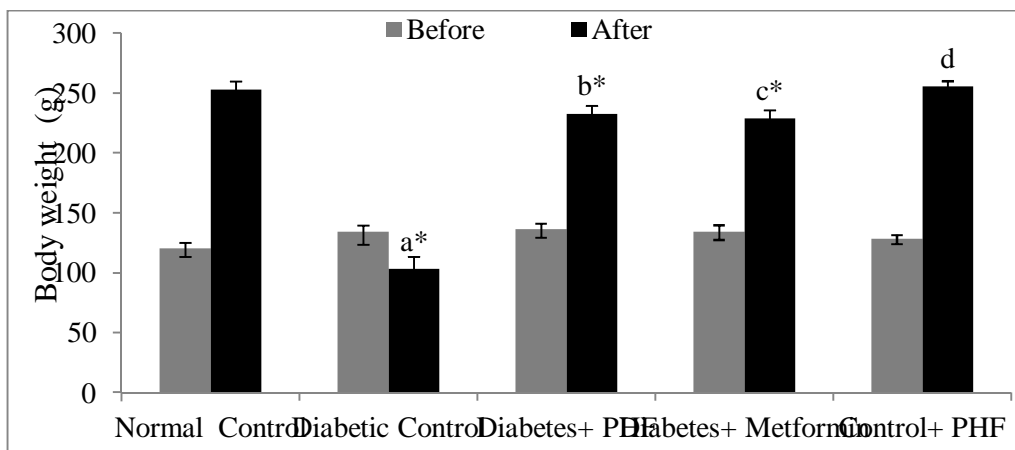
Values are given as mean±SD for six animals in each group. Values are considered significantly different at *P $< .05$ with post hoc LSD test.

[a] Normal control vs Diabetic rats.

[b] Diabetic rats. vs Diabetic+PHF-treated rats

[c] Diabetic vs Diabetic+Metformin-treated rats.

[d] Control vs Diabetic+PHF-treated rats

Fig 2: Effect of PHF on Blood Glucose and Plasma Insulin in control and high-fat-induced type 2 diabetic rats.
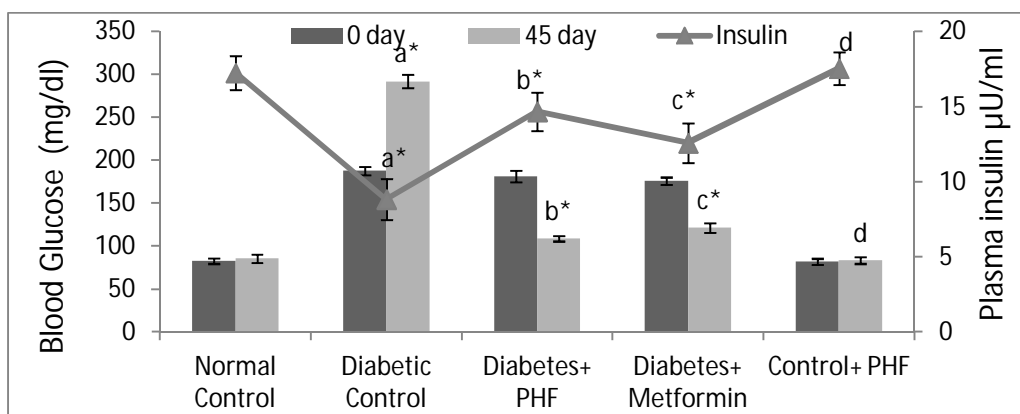
Values are given as mean±SD for six animals in each group. Values are considered significantly different at *P $< .05$ with post hoc LSD test.

[a] Normal Control vs Diabetic rats.

[b] Diabetic rats. vs Diabetic+PHF-treated rats

[c] Diabetic vs Diabetic+Metformin-treated rats.

[d] Control vs Diabetic+PHF-treated rats

Fig 3: Effect of PHF on Oral glucose tolerance test (OGTT) in control and high-fat-induced type 2 diabetic rats.
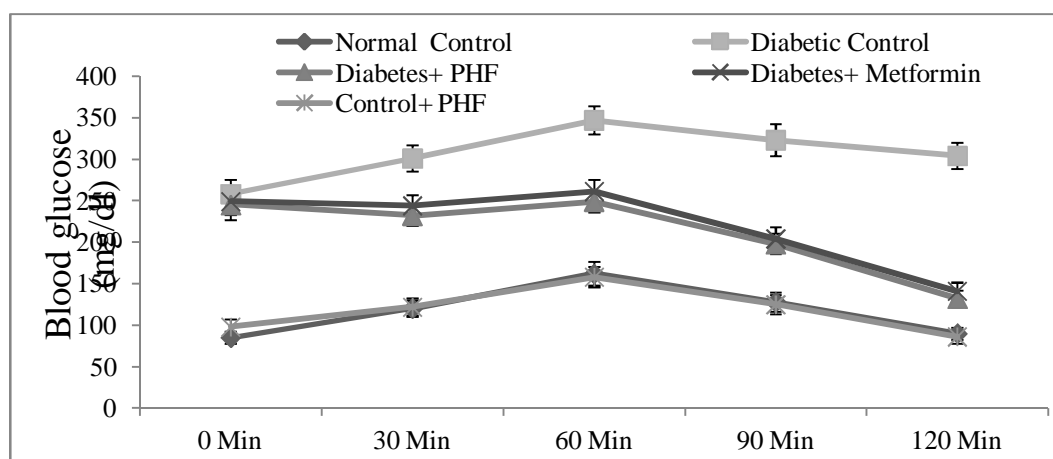
Values are given as mean±SD for six animals in each group. Values are considered significantly different at *P < .05 with post hoc LSD test.

[a] Normal Control vs Diabetic rats.

[b] Diabetic rats. vs Diabetic+PHF-treated rats

[c] Diabetic vs Diabetic+Metformin-treated rats.

[d] Control vs Diabetic+PHF-treated rats

Oral glucose tolerance test in diabetic rat

Figure 3 depicts the results of oral glucose tolerance test in normal and experimental rats. The blood glucose level in both normal and normal drug control rats showed a high peak value at 30 and 60 min after glucose load and decreased to near normal at 120 min. In HFD induced diabetic rat, the blood glucose levels reached the peak value at 30, 60 min and remain higher even after 120 min. But in the case of Poly Herbal Formulation treated diabetic rats showed significant decrease in blood glucose level (190 ± 16.5 at 90 min and 135.5 ± 14.2 at 120 min) at 120 min. the similar result were observed in metformin treated group

Table 1: Effect of Poly Herbal Formulation (PHF) on plasma Glycoproteins level in control and high-fat-induced type 2 diabetic rats.

Plasma	Hexose (mg/dl)	Hexosamine (mg/dl)	Fucose (mg/dl)	Sialic acid (mg/dl)
Normal Control	90.33 ± 4.6	58.83 ± 5.03	32.50 ± 3.3	50.83 ± 3.6
Diabetic Control	$142.38 \pm 6.47^{a*}$	$93.33 \pm 6.25^{a*}$	$58.83 \pm 5.1^{a*}$	$80.66 \pm 5.3^{a*}$
Diabetes+ PHF	$97.50 \pm 5.75^{b*}$	$61.67 \pm 5.92^{b*}$	$36.83 \pm 2.4^{b*}$	$58.83 \pm 2.1^{b*}$
Diabetes + metformin	$95.66 \pm 2.80^{c*}$	$68.33 \pm 5.27^{c*}$	$38.50 \pm 4.6^{c*}$	$62.33 \pm 5.12^{c*}$
Control+ PHF	92.16 ± 4.11^{d}	60.16 ± 2.99^{d}	33.83 ± 1.6^{d}	52.16 ± 3.5^{d}

Values are given as mean±SD for six animals in each group. Values are considered significantly different at *P < .05 with post hoc LSD test.

[a] Normal Control vs Diabetic rats.

[b] Diabetic rats. vs Diabetic+PHF-treated rats

[c] Diabetic vs Diabetic+Metformin-treated rats.

[d] Control vs Diabetic+PHF-treated rats

Table 2: Effect of PHF on Liver Glycoproteins level in control and high-fat-induced type 2 diabetic rats.

	Hexose (mg/g)	Hexosamine (mg/g)	Fucose (mg/g)	Sialic acid (mg/g)

Normal Control	30.33 ± 3.7	12.33 ± 1.8	17.33 ± 1.1	8.68 ± 0.3
Diabetic Control	$61.83 \pm 4.3^{a*}$	$33.16 \pm 2.4^{a*}$	$34.16 \pm 2.2^{a*}$	$16.01 \pm 1.1^{a*}$
Diabetes+ PHF	$37.33 \pm 2.1^{b*}$	$13.66 \pm 2.2^{b*}$	$18.83 \pm 1.1^{b*}$	$9.71 \pm 0.5^{b*}$
Diabetes + metformin	$36.51 \pm 2.7^{c*}$	$14.34 \pm 2.4^{c*}$	$19.17 \pm 1.7^{c*}$	$10.88 \pm 0.4^{c*}$
Control+ PHF	31.66 ± 3.08^{d}	12.49 ± 2.1^{d}	16.83 ± 2.1^{d}	8.86 ± 0.6^{d}

Values are given as mean±SD for six animals in each group. Values are considered significantly different at *P < .05 with post hoc LSD test.

[a] Normal Control vs Diabetic rats.

[b] Diabetic rats. vs Diabetic+PHF-treated rats

[c] Diabetic vs Diabetic+Metformin-treated rats.

[d] Control vs Diabetic+PHF-treated rats

Table 3: Effect of PHF on Kidney Glycoproteins level in control and high-fat-induced type 2 diabetic rats.

	Hexose (mg/g)	Hexosamine (mg/g)	Fucose (mg/g)	Sialic acid (mg/g)
Normal Control	20.33 ± 1.7	11.41 ± 1.7	9.51 ± 0.7	5.93 ± 0.3
Diabetic Control	$45.33 \pm 4.2^{a*}$	$32.33 \pm 3.2^{a*}$	$23.66 \pm 1.5^{a*}$	$14.86 \pm 0.4^{a*}$
Diabetes+ PHF	$23.83 \pm 2.7^{b*}$	$14.16 \pm 2.3^{a*}$	$11.31 \pm 0.8^{a*}$	$7.18 \pm 0.27^{a*}$
Diabetes + metformin	$25.83 \pm 3.1^{c*}$	$16.67 \pm 2.7^{c*}$	$14.03 \pm 0.4^{c*}$	$7.96 \pm 0.3^{c*}$
Control+ PHF	21.83 ± 2.6^{d}	12.57 ± 2.4^{d}	11.71 ± 0.7^{d}	6.23 ± 0.3^{d}

Values are given as mean±SD for six animals in each group. Values are considered significantly different at *P < .05 with post hoc LSD test.

[a] Normal Control vs Diabetic rats.

[b] Diabetic rats. vs Diabetic+PHF-treated rats

[c] Diabetic vs Diabetic+Metformin-treated rats.

[d] Control vs Diabetic+PHF-treated rats

Effects of Poly Herbal Formulation on glycoprotein components

The levels of plasma and tissue glycoproteins such as hexose, hexosamine, fucose, and sialic acid are presented in **Table 1, 2 & 3** respectively. When compare to normal rats, the levels of glycoproteins were significantly changed in plasma and tissue of HFD induced diabetic rats. On 45 days oral administration of Poly Herbal Formulation and metformin the levels of hexose, hexosamine, fucose, and sialic acid were significantly decreased in plasma. The levels of hexose, hexosamine, and fucose were significantly increased whereas the levels of sialic acid were significantly decreased in tissue.

DISCUSSION

Many countries expenditure at least 10% of total health care for the treatment of serious illness with multiple complications and premature mortality of diabetes mellitus (Pari & Srinivasan, 2010). Three fourth of the world population cannot afford the products of allopathic medicine and thus, have to rely upon the use of traditional medicines, which are largely derived from plants (Sato et al., 2003). Some substances have shown antidiabetic effect by influencing ß-cell to stimulate insulin secretion and restore insulinsensitivity.

In the present study, diabetic rats showed higher FBG and insulin levels thanthat of control rats. In this regard, studies have shown that high fat diet and sucrose feeding in rodents leads to the development of whole body insulin resistance andimpaired ability of insulin to stimulate glucose uptake inthe skeletal muscle (Hanhineva et al., 2010; Defronzo, 2009). Therefore, high fat diet☐inducedincrease in blood glucose and insulin levels recorded inthe present study may be due to hyperglycemia☐inducedinsulin resistance. However, PHF administration decreased the levels of insulin and FBG to the normalrange probably by improving insulin sensitivity andthus glucose tolerance, indicating that PHF has an antidiabetic potential.

The consumption of natural antioxidant phytochemicalswere reported to have potential health benefits and helpto regenerate β cells and protect pancreatic islets againstcytotoxic effects (Rangkadilok et al., 2007).

Glycosylated hemoglobin (HbA1c) is one of the markerof chronic glycemic control in patients with diabetes mellitus (Koenig et al., 1976). Persistent hyperglycemia leads to the glycosylation of amino groups of lysine residue inproteins (Asgary et al., 1999). This condition favors reduction in the level of total hemoglobinand elevation in glycosylated hemoglobin which in turndirectly proportional to blood glucose (Al Yassin & Ibrahim, 1981). Diabetic rats showed higher levels ofglycosylated hemoglobin indicating their poor glycemiccontrol. The oral administration of PHF and metformin to diabetic rats significantly reduced the HbA1c levelscompared to untreated diabetic rats. This reflects the antioxidant potential PHF and metformin in long-term control of hyperglycemia through insulin secretion.

The increased levels of plasma glycoproteins in diabetic rats could be a significance of abnormal carbohydrate metabolism. High levels of plasma glucose and Insulin deficiency in diabetic condition may result in an increased synthesis of glycoproteins (Patti et al., 1999). The requirement of insulin for the biosynthesis of the carbohydrate moiety of mucoproteins from glucose is thus evident (Konukoglu et al., 1999; Rahman et al., 1990) have been reported increased glycosylation of various proteins in diabetic patients and increased of glycoproteins in diabetics mayalso be a predictor of angiopathic complications.

In our study, we have observed the increased levels of hexose, hexosamine, fucose and sialic acid in the plasma and tissues of HFD induced Type 2 diabetic rats. The increase in plasma glycoprotein components has been associated with the severity and duration of diabetes.

The secretion or shedding from cell membrane glycol conjugatesinto the circulation leads to the elevation of plasma glycoproteincomponents. STZ-induced diabetic rats exhibited a significant modification in the connective tissue macro-molecule (Berenson & Radhakrishnamurthy, 1972). This is due to the depressed utilization of glucose by insulin dependent pathways leads toincrease the formation of hexose, hexosamine, sialic acid and fucose for the accumulation of glycoproteins (Spiro & Spiro, 1971). Administration of Poly Herbal Formulation to diabetic rats decreasedplasma levels of glycoprotein components. This could be due to the decreased hyperglycemic state with increased levels of plasmainsulin in diabetic rats.

CONCLUSION:

The data in our study suggests that Poly Herbal Formulation decreased the hyperglycemia and reversed the abnormalities in the levels of glycoprotein components in Plasma, Liver and Kidney. PHF may have beneficial effects in diabetes mellitus, by the enhancement of insulin action, as evident by the increased level of insulin in diabetic rats treated with PHF, which may be responsible for the reversal of glycoprotein changes. The observed effect of PHF on decreasing the adverse effects of hyperglycemia provides an insight into the pathogenesis of diabetic complications, and may be used in therapeutic approaches.

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CATABOLIC ACTION OF AN ALKALIPHIE ON CONTAMINANT ALPHA NAPHTHOL

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ABSTRACT:

1 naphthol n-methyl carbamate is being used as a carbamate pesticide from a longer period. Apha napthol and beta napthhol are the degradation product of carbamate pesticide as said earlier or it can be byproducts of various azo dyes. Commercially these are used as a raw material for various dyes, drugs, paints and coloring agents in various industries. After the cleaning process the excess of such material is discharged in a river or lake without treatment. Thus it is observed in effluents of different chemical industries as contaminants. Polluted water is one of the main problem all world. Although there are various reports of phenolic hydrocarbon degradation including alpha naphthol are very less in alkaline condition. Thus the research was planned to carry in alkaline condition using an indigenious strain isolated from alkaline Lake Lonar,(MS)India. Study regarding biotransformation of alpha naphthol was carried using Bacillus badius in alkaline condition. 24 hr grown adapted culture was used for seeding the experiment. 30mg/L concentration of alpha Naphthol added in working flask containing bacteria with alkaline medium 200 ml. The experimental concentration of alpha naphthol was used in each Erlenmeyer flask including abiotic standard and in working flasks for growth and bio-transformation. The experiment was carried for 24 hr and the flasks were removed by 6 hr interval for investigation of residual concentration as well as searching the metabolites generated. The metabolites were isolated by solvent extraction method using DCM or Ethhyl acetate. The residual metabolites were characterized by UV-Vis spectrophotometer, FTIR, NMR and GCMS. 3, 4 dihydroxy benzoic acid acid and catechol, muconic acid semialdehyde, were well characterized in this process.

Key Words: alpha Naphthol, Bio-transformation, Bacillus badius, Contaminants.

1. **INTRODUCTION:**

2-Naphthol (β-Naphthol) has a water solubility of 0.6 - 0.8 g/L while Alpha(α–)Naphthol is little more soluble than that 0.85 g/L. It is a toxic hydroxylated metabolite of the PAH Naphthalene. Alpha (α) Naphthol is slightly soluble in water, soluble in alkali and in organic solvents. It has acute oral toxicity, irritation in mucous membrane, toxic to lungs. Alpha naphthol 5% is being used for VP test as Voges - Proskauer reagent A in quantitative analysis of in fermentation of glucose to acetoin or acetyl methyl carbenol. Alpha naphthol is being used as coloring agent in hair dyeing. Sometimes it is used in cosmetic products. Repeated or prolonged exposure to human being can produce target organs damage and may produce general deterioration of health. It is toxic, infectious or corrosive. 1-Naphthol(α-Naphthol) is a high-volume industrial product widely used in the synthetic dyes, perfumes, and pesticides like Carbaryl. It is weakly acidic (pKa9.34), having intermediate hydrophobicity and water solubility. Its stability in aqueous systems is thought to be affected by irradiation, oxygenation, and microbial decomposition.

Although there are several reports on biodegradation of phenolic waste but alpha Naphthol degradation in alkaline condition are very rare. Biodegradation of alpha-Naphthol in industrial waste water was studied by using *Aspergillus niger* isolated from the soil of industrial waste water load[1]. It is also released by microbes into the environment as a metabolic intermediate of various PAH. Naphthol is often liberated into the environment due to biological oxidation of naphthalene by various fungi and bacteria. Phenol and phenolic compounds are common water pollutants affecting on hormones negatively. They affects skin to form blisters and also found genotoxic in fishes in phenolic polluted water bodies. To reduce the toxicity alkaliphiles are being employed for bio-remidiation purpose. CYP450 enzyme belogs to oxidoreductase family acting as monoxygenase or dioxygenase introducing one or two oxygen atoms from molecular oxygen in organic compounds by live cells invio or in vitro[2]. This increases polarity of molecule to detoxyfy the xenobiotics by increasing solublity. Thus use of alkaliphiles being a trend in bioremediation[3-4].

Therefore an attempt was made to observe alpha Naphthol degradation under alkaline condition.

Chemicals: All Chemicals were purchaced from SRL Mumbai, Bacteriological media yeast extract, peptone Purchased from Hi-Media Mumbai.

2. **METHODOLOGY:**

2.1. **Growth media:** The broth media used for biotransformation study consist of yeast extract, peptone, NaCl - 5 g/L respectively. The micronutrients" in mg /L were KH_2PO_4 -170, Na_2HPO_4 -290, $(NH_4)_2SO_4$ -100,

$MgSO_4$, MgO-0.1, $FeSO_4$ - 0.05, CaCO3 0.20, $ZnSO_4$ 0.08, $CuSO_4$ 0.016, $CaSO_4$, Boric acid 0.06, pH-9. The media were sterilized by autoclaving at 121 ^{0}C at15 psi for 20 min. The solid media were prepared in the same way by adding 2% agar.

2.2. Bio-transformstion and residual concentration: Five 500 ml conical flasks containing sterilized 200 ml alkaline broth of pH-9.00 were inoculated by 1 % *Bacillus badius* culture possessing 1.6 OD at 600 nm aseptically. These culture flasks were incubated for 24 hrs at 37 ^{0}C with shaking on Orbital shaker at 110 rpm. The 24 hrs grown culture flasks were induced by adding concentration 30 mg/L of alpha naphthol. These flasks were removed sequentially from 0 to 2 hours by 6 hr. interval. The removed flasks were used for OD at 600 nm to check the growth and then spun to DuPont Sorvoll Cold centrifuge at 10000 x g. Similarly one another flask was kept as abiotic control by adding experimental concentration of alpha Naphthol. The residual concentration was investigated using spectrophotometric method [5] by Jasco Varian-630. These experiments were repeated thrice. The residual sample was characterized by IR, NMR,GCMS analysis after solvent extraction. Alkaline environments not only contain natural soda lakes and soda deserts, but also include the alkaline wastewater derived from anthropogenic activities. In recent years, an increasing number of alkaline waste water with higher pH than 11 have been discharged from cement industry, petroleum refinery, pharmaceuticals, paper and pulp industry[6]. The chemical behavior is governed by its natural physicochemical properties and their metabolic activities. The edaphic factors and biotic factors lead several interactions which contributes the degradation and mineralization of organic compounds. Bulky, nonpolar chemical are lipophilic and/or resistant against biological degradation while polar molecules increases toxicity in water due to high solubility as acute toxicity [7]. Toxicity to human and animals depends on the way of exposure and time. As the physicochemical properties like vapor pressure, solubility, viscosity, adsorption or absorption also affects the rate of biodegradation. In the metabolic pathway of naphthalene or alpha-Naphthol involves the formation of 1,4-naphthoquinone and 4-hydroxy-1-tetralone. Strong binding of these products to soil constituents may leads formation of non extractable residues. Sometimes the oxidation of alpha-naphthol in solution leads to form naphthoxy radicals and it could be facilitated by the reaction of O_2 even formation of superoxide radical, hydroxyperoxyl radicals etc; which may subsequently forms HO_2 and O_2^{-2} . These peroxide ions are considered to be the oxidizing species in aerated water. Naphthoxy radicals are highly reactive and could combine to form aplpha- naphthol dimers, naphthoquinones[8].

2.3. Preparation of Cell extract and Biocatalysis: Cell mass was harvested after 24 hours induction with alpha Naphthol by Du-Pont Sorvall RC-5B centrifuge by spinning at 10000 x g for 15 min at 4 ^{0}C. The cell mass was washed with phosphate buffer pH 8.0 twice and physiological saline. Cell disruption was carried by Sonicator Ultra O Sonic (Mumbai) in the same buffer. The resulting homogenate was centrifuged in cold condition at 15000 x g for 20 min. The cytosolic protein was measured by Lowry using BSA as standard [9]. Toxicants from Mangrove Ecosystems of Goa, humic acid-reducing bacterium, and certain other xenobiotic degraders are showing their contribution in alkaline waste remediation [10]. Catalase, Paroxidase, SOD were studied by standard experimental methods[11-12]. In case of Sulphate reducing bacteria the carboxylate group introduced in naphthalene indicating the activation of naphthalene by carboxylation as the initial degradation step. The cytochrome P450 protein-bound porphyrin complex with the iron-coordinated activate oxygen atom which hydroxylates inert carbon-hydrogen bonds of substrates. Algae and cyanobacteria also employed for Phenolic biodegradation by similar mechanism [13]. Thus Cyp 450 mediated monoxygenase or dioxygenase play important role in metabolism. Catechol 1, 2 dioxygenase is one otf the enzymwe involved in biotransformation process whose activity was measured by Nozaki and others[14] and The bio-catalytic study for cytochrome P450 was carried by using Omura and Sato[15]. The enzyme activity expressed as µM/ min/ mg of protein.

3. RESULTS:

3.1. UV- Vis Spectrophotometic study:
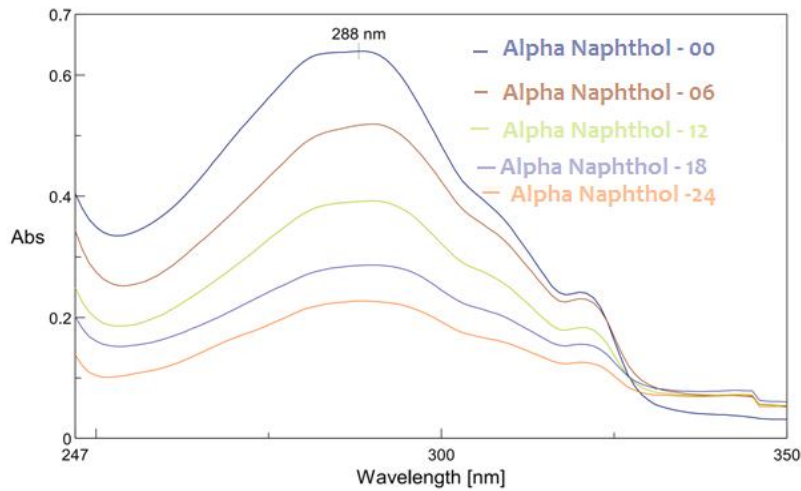
Fig.1. Biodegradation pattern of alpha Naphthol by *Bacillus badius*

The decreasing absorption of alpha Naphthol at certain time interval clearly indicates the use of alpha Naphthol as food source or its transformation into another product.

3.2. Percent degradation and bio-transformation study:
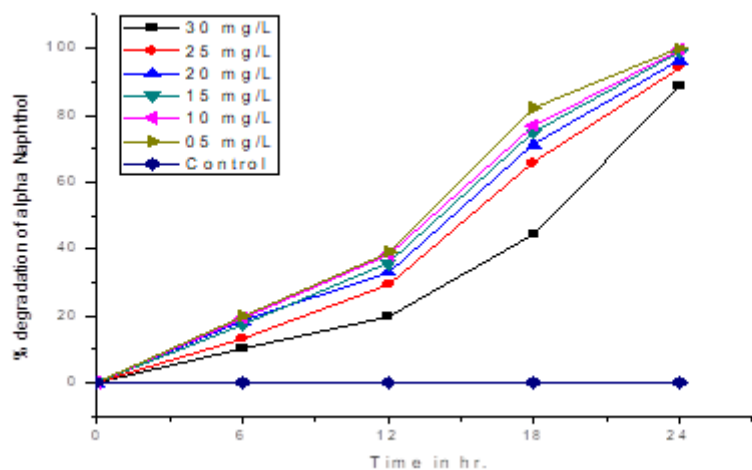
Fig.2 percent degradation of alpha Naphthol by *Bacillus badius*

The [**Fig.2**] clearly shows 100 % degradation of alpha Naphthol within 24hr. with marginal difference; while no change in abiotic control was observed. As the metabolites are being part of TCA cycle after catechol pathway the xenobiotics are turning into CO_2 and Water in this metabolic process.

3.3. Bio-catalysis study:
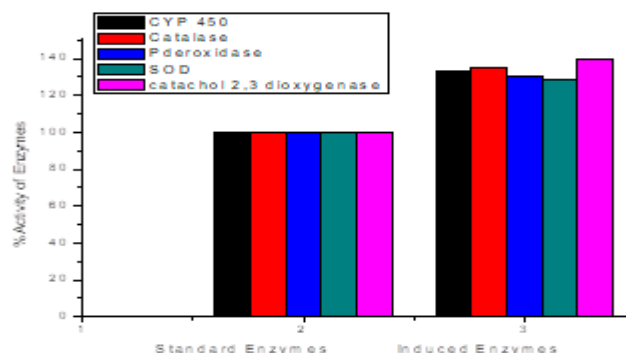
Fig.3. The enzymes involved in biotransformation

Although; many of the enzymes are involved in biotransformation process. Few of the enzymes activity experiments were performed invitro. [**Fig. 3**]. It shows the CYP450, Catalase, Peroxidase, SOD, Catachol dioxygenase are found more induced than normal due to the alpha Naphthol in medium

3.4. Biocatalytic interactions of *Bacillus badius* with alpha Naphthol:
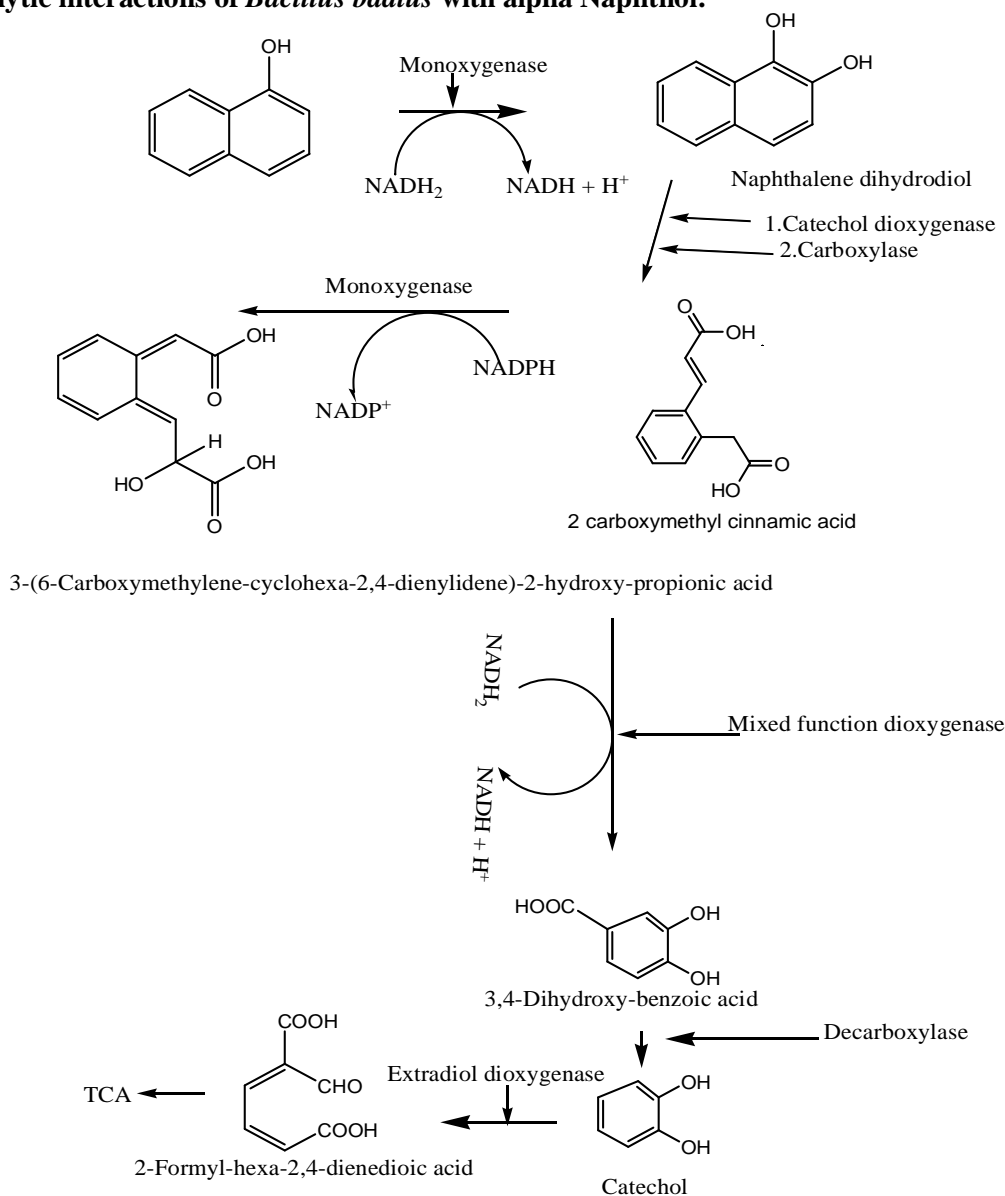
Fig4. Mechanism of alpha Naphthol bio-transformation by *Bacillus badius*.

4. DISCUSSION:

Environmental pollutants are the substances entering into the environment and are toxic to the living forms in a specific chemical form and at specific concentration. They can be solid, liquid and gaseous in nature. When they enter the environment in excess quantities, they lead to toxicity for various life-forms. Thus environmental wastes have to be treated as and when they are introduced into the environment. Alkaliphilic strains thrives in harsh alkaline condition and hence can be used for contaminants removal. Thus employing an Alkaliphiles for biodegradation of toxic compounds in industrial effluents would be of great help. The phenolic compounds are major pollutants of industrial waste. Many industries like oil refining, coke conversion, pharmaceutical and resin manufacturing plants are involved in it. The degradation of phenol under saline conditions has been well documented. Mucosal biotransformation of alpha naphthol had been well reported in the small and large intestine of animals and humans. Even it is also reported that gastric mucosa also plays a role in detoxifying ingested material in human gastric epithelial cells which exert an important conjugative effect on the phenolic compound alpha-Naphthol[16]. Similalry under saline conditions phenol degradation was also studied. The phenolic compounds are major pollutants of industrial waste waters due to use in many industries like oil refining, coke conversion, pharmaceutical and resin manufacturing plants. The degradation of phenol under

saline conditions has been well documented. Metabolites such as Gentisic acid, Salicylaldehyde, Salicylic acid, etc. had been identified by other researchers in their biotransformation study [17]. 2-naphthoic acid, Decahydro-2-naphthoic acid, octahydro-2-naphthoic acid, 5, 6,7,8-tetrahydro-2-naphthoic acid were identified as metabolites in case of anaerobic sulphate reducing culture in which carboxylation was initial step of polarization of naphthalene[18]. Microbial degradation pathway was analysed and some intermediates were reported [19]. One more previous report mentioned 2-naphthol, 1, 2-naphthalene-diol and 1,2-naphthoquinone as metabolites detected by HPLC in coupled degradation[20]. Oxygenases are oxidoreductases class of enzymes that have great potential and versatility for catalyzing reactions those are generally not easily possible by chemical routes. These enzymes are important due to high regio, stereo, and enantio selectivity. These enzymes introduce either one or two atoms of molecular oxygen into xenobiotic molecules using NADH or NADPH as a cofactor or coenzyme. To eliminate the external addition of a costly cofactor, whole cells expressing oxygenase enzymes are generally used [21]. Oxidoreductases, are not stable under certain conditions due to hydrostatic and osmotic pressure, temperature or pH. Isolation and characterization of naphthalene-degrading strains named *Pseudomonas* sp. CZ2 and CZ5 were reported for following catechol pathway by forming 1, 2 dihydroxy naphthalene[22]. Another Strain of *Pseudomonas* sp. Y2 showed a high ability to degrade 1-naphthol. 95.3% of it was degraded within 24 h incubation which made it very attractive for application in the environmental remediation [23]. Similarly *Bacillus badius* also shown high potential for biodegradation and biotransformation by the experimental data **[Fig.1].** The decreasing absorption at 288 nm wavelength suggest it is being degraded and or bio-transformed into other metabolites. The [**Fig.2**] is supportive to biodegradation of alpha Naphthol. It indicates 100 % alpha Naphthol has removed from the medium within 24 hr. even at 30 mg/L concentration was used.

Sometimes formation of free radical takes place by the cells to minimize the toxicity or damage created due to the xenobiotic material. This can be done by the enzymes peroxidase or catalase. The [**Fig.3**] gives the idea about the active participation in bio-catalytic interactions of alpha Naphthol, All the enzymes such as CYP450, catalase, peroxidase, SOD, Cat.2, 3 dioxygenase hiked comparative to standard. This shows that the experimental strain is actively involved in biotransformation. By the he residual sample obtained after solvent extraction and purified by column chromatography characterized after IR, NMR, GCMS. It confirmed the metabolites as Naphthalenedihidrodiol ,catechol, 3,4 Dihydroxybenzoic acid, 2-Formyl-hexa-2,4-dienedioic acid. This helped to propose a pathway of biotransformation of alpha Naphthol [**Fig.4.**] The splitting of Naphthalene dihidrodiol ring might be as of the thermophile forming caboxy cinnamic acid or carboxy cinnamic ester leading further fragmentation[24]

. It might involve catechol and dihydroxy benzoic acid or further broken products into carboxy muconic acid semialdehyde. This made easy to propose probable mechanism of biotransformation and enzyme activity [**Fig.4**]. Mostly the Naphthalene biotransformation reports were found regarding mesophiles or neutrophiles. Present article is one of the representative of alpha Naphthol biotransformation in alkaline condition. In natural ecosystems, many polycyclic aromatic hydrocarbons undergoes to rapid degradation, sometimes by hydroxylated metabolites, which might be higher toxic than the parent compound due to higher solubility in water. As oxygen being incorporated in the molecule, the polarity increases and the dose of ingestion becomes heavy.

5. CONCLUSION:

Bio-remediation is the best practice to remove the toxicants from nature. One can employ the Alkaliphiles to clean the environment when toxicants are added to the surroundings. Despite of this one can isolate various metabolites if the heavy load of toxicants is known. As *Bacillus badius* is nonpathogenic Strain it can be used on commercial level.

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CHALLENGES AND BARRIERS OF GST: A STUDY OF PERCEPTIONS OF TAX PROFESSIONALS

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ABSTRACT:
GST is one of the most crucial tax reforms in India that is likely to change the whole scenario of present inefficient indirect tax system. The present research paper is done to study and analyse the perceptions of tax professionals, practicing GST and earlier VAT as well, while GST implementation and after impact. For this, researcher had framed a structured questionnaire to find which challenges the professionals are facing and what may help them to reduce such barriers. The researcher found that to overcome such barriers and challenges some steps should have been taken up by the Government are more standardization of systems and procedures, uniform dispute settlement mechanism, adequate training for both tax payers and tax enforcers, re-organization of administrative machinery for GST implementation, building information technology backbone – the single most important initiative for GST implementation to resolve technical barriers faced mostly by all the professionals while working with GST.

Keywords: Goods and Service Tax, Perception, Tax Professionals, Challenges and Barriers

INTRODUCTION:
Goods and Services Tax, authoritatively known as the "Constitution (One Hundred and First Amendment) Bill, 2017 (Customs and Central Excise, 2019) was Implemented on 1 July, 2017 by the NDA Government. It is applicable in the entire of the country including the Territory of Jammu and Kashmir. It is charged and collected at each and every phase of purchase or sale of goods or services based on the instrument of tax credit. The different focal and state charges are subsumed in GST. Products and Services Tax is an objective based utilization tax collection which implies that the assessment is required at the place of utilization. The GST is imposing on the "Supply" of goods and services, too.

The GST is administered by the GST council which is the top-most decision-making authority of the GST. The GST council is headed by the Finance Minister of India (presently Mr. Arun Jaitley) with the Minister of State (Revenue) and the State Finance Ministers as members. The GST Council is planned to settle on the rules and provisions pertaining to GST & to make amendments and corrections from time to time.

The GST is levied in the form of i.e., State Goods & Services Tax (SGST) , Union Territory Goods & Services Tax (UTGST) and Central Goods & Services Tax (CGST) in case of supply of goods and services within the state and Integrated Goods & Services Tax (IGST) in case of supply of goods and services outside the state with a common tax base.

Goods & Services Tax Network (GSTN) is a non-profit and non-governmental organization which deals with the IT framework of the GST portal. As of now the share of 51% holding is of private sector and 49% shareholding of the Government i.e., Central Government and State Government. The registrations, invoices, various returns, payments & refunds are all done by the GST portal.

The Input Tax Credit (ITC) is the Main pillar of GST. It is core reason for the implementation of GST as it removes the cascading effect meaning tax on tax. All the registered persons under GST are allotted a Unique Goods & Services Tax Identification Number (GSTIN) which is 15-digit state wise PAN based number. GSTIN helps to claim ITC and should be mentioned on every invoice.

According to the unique Indian socio-economic system, four rates namely 5%, 12%, 18% and 28% are adopted. Besides this some goods and services are exempted. The rates for precious metals and affordable houses are an exception to the four-tax slab-rule, and the same has been fixed at 3% and 1% respectively. In addition, unworked diamonds and precious stones attract a rate of 0.25%. A cess over the peak rate of 28% on certain specified luxury and demerit goods, like tobacco and tobacco products, pan masala, aerated water, motor vehicles is imposed to compensate states for any revenue loss on account of the implementation of GST. The list of goods and services in case of which reverse charge is applicable has also been notified. If the supplier of the goods & services is unregistered and the receiver is registered then the Reverse Charge Mechanism is applicable on it.

REVIEW OF LITERATURE:

Dr. P. Paramashivaiah, Puttaswamy and Dr. B.K. Suresh (2016) Conducted the study on "GST IN INDIA: A STUDY ON BENEFITS AND CHALLENGES". The objective of the study is to know the perceptions of the respondents towards GST. They have highlighted the expectations of the tax payers, and professional's view on the benefits and challenges of implementing GST in India. For analysis they have used primary data-based questionnaire and collected the data from 50 business persons and 50 professionals. Researchers have used a Non-Parametric Test Mann-whitney's U-Test for testing hypothesis and concluded that perceptions of two different population groups insignificantly differ regarding challenges of GST Model.

Sana Moid (2018) Entitled the study as "CHALLENGES AND OPPORTUNITIES IN IMPLEMENTATION OF GST BILL FOR INSURANCE SECTR IN INDIA." Objectives of the study are to understand the basics, implementation-advantages challenges of GST in India focusing on Insurance industry. To highlight the importance of insurance sector is one of the objectives and also offer policy recommendations needed. After that the author review all the opportunities and advantages and impact of GST discussed the effect of GST on insurance sector which is to be costlier after GST reform. She also revealed the fact that service tax is expected to increase from 15% to 18%, all the polices becomes dearer. Because of that insurance industry has been gradually moving down. The GST regime is likely to throw up interesting opportunities and challenges for insurers. They need to consider GST as a business transformation to strengthen their present business processes and identify opportunities available.

OBJECTIVES OF THE STUDY:

- To understand the concept of GST and its impacts on Indian Taxation System.

- To Study and analyse the perceptions of tax-professionals regarding structural implementation of GST.

- Evaluation of structural loopholes and ambiguities which would be faced by practising professionals of GST.

- To make suggestions for better understanding of barriers and challenges in implementation of GST.

RESEARCH METHODOLOGY:

Title of the Study:

"Challenges and Barriers of GST: A study of Perceptions of Tax Professionals"

Population and Sample size:

Researcher wanted to focus on Tax professionals of Gujarat Region. So, The population of the study will consist of well-known all the Tax Professionals such as Chartered accountants. Cost accountants, tax experts of Gujarat State, actively practising with this new tax system of GST. The small sample size due to time constraint for this research work is fifty respondents.

METHODS OF DATA COLLECTION:

The present study is both exploratory and descriptive. The researcher has used an intensive literature available on the present problem to understand the concepts. Primary data collected by distributing the well-structured questionnaires to tax professionals. Questions are designed on the basis of the available literature and the preliminary interaction with the professionals. Snowball sampling technique was adopted to collect the data. Online Structured questionnaire using Google Forms were distributed to each category and the researcher was able to receive 50 responses in a very short period of time.

Tools and Techniques:

The primary data so collected has been analysed using simple statistical techniques such as frequency distribution and frequency percentages and charts to achieve the objectives of the study. As the limitation of the length of the paper was to be taken care, the researcher has directly summarized the results in the table.

Limitation of Present Research Paper:

Small sample and limited category of Tax Professionals included as respondents are the limitations due to time and resource constraints.

Analysis and Interpretation:

Table-1: Tax Professionals agreement on Lack of Preparedness of clients

Lack of GST preparedness among clients		
Opinion	Frequency Percent	Frequency Count
Strongly Agree	48%	24
Agree	50%	25
Neither Agree nor Disagree	2%	1
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey

The clients will take some time to understand the changes in tax laws. However, it is a big challenge for a professional to educate a taxpayer about how a new GST return system works. In this connection, the opinion was gathered from the professionals. Table - 1 reveals that, 48% of the respondents strongly agreed and 50% of the respondents agreed that, "Lack of GST preparedness among clients". While, 2% of the respondents were undecided, and 0% of the respondents were disagreed and strongly disagreed, with the statement made. In general, most of the respondents opine that client are still not prepared mentally for this new System or not so comfortable with it so that professionals might not be able to explain their clients some practical issues which they have been facing in this new system. Client's understanding of GST provisions and its impact on their business is still at a rising stage and many are still identifying the locations and places, they need to be registered in.

Table-2: Tax Professionals agreement on Issues with GSTN

Issues with Goods and Services Tax Network Portal		
Opinion	Frequency Percent	Frequency Count
Strongly Agree	68%	34
Agree	30%	15
Neither Agree nor Disagree	2%	1
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

The government has already incorporated a Goods and Services Tax Network (GSTN), which has to develop a GST portal – front-end system for trade and industry and back-end system for all government agencies. GSTN will ensure technology support for registration, return filing, tax payment, IGST settlement, MIS and other dashboards on GST portal to all the stakeholders. But here data from Table-2 reveals that Expectation does not meet Reality. As 68% and 30% of the total Respondents Strongly agreed and Agreed , respectively that they faces much difficulty with the GSTN portal. Not even 1% professionals satisfied with the GSTN.

Table-3: Tax Professionals agreement on clarity of Provisions

Lack of clarity on GST provisions		
Opinion	Frequency Percent	Frequency Count
Strongly Agree	50%	25
Agree	46%	23
Neither Agree nor Disagree	4%	2
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

Various provisions of GST are still ambiguous. Categorisation of goods and services in various cases is still unclear. Table-3 shows that, 50% of the respondents strongly agreed and 46% of the respondents agreed that, "Lack of clarity on GST provisions are still there exists". While, 4% of the respondents were neutral on this view. 0% of the respondents in each group belonged to disagreed and strongly disagreed groups with the above statement. Almost half of the respondents strongly believes that they face this barrier prominently.

Table-4: Tax Professionals agreement on compliance issue

Increased compliance issue for clients		
Opinion	Frequency Percent	Frequency Count
Strongly Agree	60%	30
Agree	38%	19
Neither Agree nor Disagree	2%	1
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

It is a fact that only a tax person who are fully familiar with IT will be able to comply with complex requirements of 'tax invoice matching', filing returns, etc. Data from Table-4 shows that 60% of respondents strongly believes and 38% Agreed that with the new system of GST there is "Increased compliance issue for clients" and 2% respondents were undecided in the issue. So, it indicates that GST training must begin for personnel of the revenue department with state and union govt.

Table-5: Tax Professionals agreement on IT system Barrier

Lack of infrastructure in the IT system		
Opinion	Frequency Percent	Frequency Count
Strongly Agree	68%	34
Agree	30%	15
Neither Agree nor Disagree	2%	1
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

Another factor that will impact the success of GST is the robust IT support connecting all state governments, trade and industry, banks and other stakeholders on a real-time basis. But the data reveals the finding that Various businesses yet to find the accounting software and IT systems in line with the new tax provisions, to create GST invoices and required reports. In Table-5 in total 98% out of 100% respondents Believes that there is a "Lack of infrastructure in the IT system".

Table-6: Tax Professionals agreement on Lack of awareness

Lack of awareness among common citizens		
Opinion	Frequency Percent	Frequency Count
Strongly Agree	38%	19
Agree	56%	28
Neither Agree nor Disagree	2%	1
Disagree	4%	2
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

Statistics of Table-6 clearly indicates that 38% and 56% of total respondents strongly agreed and agreed, respectively that there should be a need for creating more awareness among citizens of the country about this new GST reform as it is very much helpful them to be ready for the upcoming challenges and opportunities as well. 4% people disagreed is totally supports the statement that there must be a "Lack of awareness regarding GST reform among common citizens".

Table-7: Tax Professionals agreement on frequent Matching of invoices

Under new GST return system, the recipient has to frequently match the invoices uploaded by the supplier with the books to claim ITC instead of at the time of filing his return, otherwise leads to inaccurate or incorrect ITC.		
Opinion	**Frequency Percent**	**Frequency Count**
Strongly Agree	50%	25
Agree	44%	22
Neither Agree nor Disagree	6%	3
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

The respondents have expressed their view on constant matching of invoices in Table-7 reveals clearly that in total 94% respondent tax professionals out of 100% supports the statement that "Under new GST return system, the recipient has to frequently match the invoices uploaded by the supplier with the books to claim ITC instead of at the time of filing his return, otherwise leads to inaccurate or incorrect ITC". Only 3 respondents in percent is 6% were remain neutral in this case, which clearly indicates that if constant matching of invoice is not possible then ITC is not refunded or gets delayed, however.

Table-8: Tax Professionals agreement on Frequent changes in GST rates

Frequent changes to GST rates upset calculations and revenue collection.		
Opinion	**Frequency Percent**	**Frequency Count**
Strongly Agree	60%	30
Agree	38%	19
Neither Agree nor Disagree	2%	1
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

The respondents have expressed their view on the frequent changes in GST rate structure which also is the opinion of Finance Minister of India. Table-8 shows that 60% and 38% respondents would have strongly give their consent to the statement "frequent changes to GST rates upset calculations and revenue collection". The finance minister also told the GST council to fix the rates at least for 12 months to predict the course.

Table-9: Tax Professionals agreement on Cumbersome procedures and Documentation

Cumbersome procedures and Documentation		
Opinion	**Frequency Percent**	**Frequency Count**
Strongly Agree	36%	18
Agree	62%	31

Neither Agree nor Disagree	2%	1
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

Data from Table-9 shows that 36% of respondents strongly believes and 62% Agreed that with the new system of GST there is "Inceased compliance issue for clients" and 2% respondents were undecided in the issue. Where the main challenge lies in the administration of procedures and documentation becomes complex, like be it a businessman or a professional because a tax payer required to furnish 3 returns on monthly basis and 1 on annual basis, so total of 37 Return needs to be filed for respective States as well.

Table-10: Tax Professionals agreement on opportunities for professionals increased

After GST implementation the opportunities for professional accounting services would have increased significantly.		
Opinion	**Frequency Percent**	**Frequency Count**
Strongly Agree	52%	26
Agree	40%	20
Neither Agree nor Disagree	4%	2
Disagree	4%	2
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

Table- 10 data statistics, 52% and 40 % respondents would have given strong support to the statement that "After GST implementation the opportunities for professional accounting services would have increased significantly". And 4% respondents were still undecided in this matter but only 4% people disagreed on this statement clearly shows the increased opportunities for professionals which means also the increased work load, timely submissions of returns and expanded client profiles and database.

Table-11: Tax Professionals agreement on Impact on economy of India

Initial mismanagement of the Department in GST implementation has brought slowdown in the economy of the country		
Opinion	**Frequency Percent**	**Frequency Count**
Strongly Agree	72%	36
Agree	26%	13
Neither Agree nor Disagree	2%	1
Disagree	0%	0
Strongly Disagree	0%	0
Total	100%	50

Source: Field Survey.

From the available statistics in Table -11 reveals that 72% respondents strongly agreed and 26% were also agreed with the statement that "Initial mismanagement of the Department in GST implementation has brought slowdown in the economy of the country". Due to frequent changes in rate structure and also exempted some products out of the purview of GST leads to high prices of goods and services and also some loopholes in administration and weak technical support in the starting phase GST affects negatively for the economy of the country and also has a slowdown in rate GDP of the economy as well.

CONCLUSION:

From the present research, the researcher conclude that Since the Implementation of GST with online registrations and e-filing of returns of GST to among frequent amendments in GST , Tax Professionals coming across various structural barriers as well various challenges on daily basis. The authoritative work of

professional has likewise expanded due to compulsorily documenting of a few returns, as he has to manually furnish details & enter all invoices & bills into different tools or company's software or spreadsheet to adhere to the GST mechanism, followed by the creation of GST reports, cross-verification of company's purchases, sales & ITC details, correction of mismatches and finally upload of information to Government's GST portal. Suggestions to overcome these challenges are as follows:

The finance ministry, as well as the GST council, needs to take care of the GST return filing issues and forms related consequences that have to be faced by the taxpayers alike. It is both for tax and accounting professionals because a knowledge of cloud, big data, analytics and business applications along with financial knowledge is the need of an hour. Government has already incorporated Goods and service tax network (GSTN). GSTN has to develop GST portal which ensure technology support for registration, return filing, tax payments, IGST settlements etc. Thus, there should be a robust IT backbone. With the GST rates and their complexities only recently becoming a part of our policy framework, skilled staff with updated GST subject knowledge and training are not easily available. Among regular amendments & digitalization of tax-related tasks, Chartered Accountants are constantly coming across various challenges that vary from using the online GST mechanism to the alignment of their books & records to meet the new GST requirements.

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COGNITIVE FUNCTIONS, DEPRESSION, ANXIETY, AND STRESS: A COMPARATIVE STUDY AMONG COVID-19 OLDER ADULTS AND THE ELDERLY SURVIVORS

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ABSTRACT

Since March 2020, the coronavirus disease (COVID-19) has captured national attention in India for its rapid and sudden diffusion. The cognitive outcomes and psychological impacts of COVID-19 infected survivors are unknown. Early identification of neuropsychological manifestations and their associated psychological factors could help to modify the risk of subsequent neurocognitive impairment. The present study aimed to evaluate the cognitive functions, depression, anxiety, and stress, as well as their interrelationships. The sample of the study were 32 COVID-19 survivors (21 older adult and 11 elderly people), comprising of 16 each hospitalized and home quarantined. Socio-demographic data were collected from caretakers/family members. The Tamil version of Montreal Cognitive Assessment (MoCA-T) was applied to screen the cognitive function, while the 21-item Depression Anxiety Stress Scale (DASS-21) was used to measure depression, anxiety, and stress. The Jamovi Software (version 1.8.4) was used for statistical analyses viz., descriptive statistics, t-test, ANOVA, and Pearson correlation coefficient. The average age of the COVID-19 survivors was 59.8 years (SD = 8.14); 56.25% (18) were female and the rest are male. 56.25% of the survivors were found to be with mild cognitive impairment (MCI) and 62.50% are with extreme depression, 65.60% are with extreme anxiety, and 28.12% are with mild stress. The cognitive function, depression, anxiety, and stress scores showed no significant difference based on demographic variables (older adult and elderly; gender, age cohort (50-59 year, 60-69 year, 70 years and above), locality, and education. However, there is a significant difference between groups viz., hospitalized and home quarantine COVID-19 survivors on anxiety (p<0.01). The MoCA-T total score was correlated with cognitive domains, whereas, did not correlate with depression, anxiety, and stress. The findings of this study suggest the need for screening cognitive functions and mental health status of COVID-19 elderly survivors at national wide. Also, suggests developing optimal interventional strategies to come out of survivors post COVID-19 pandemic situation.

Keywords: COVID-19, cognitive function, depression, anxiety, stress, cognitive impairment

INTRODUCTION

In the last two years, the world population has been collapsed both physically and psychologically due to facing a dramatic pandemic condition of a new deadly disease called Coronavirus 2019 (COVID-19; WHO, 2020). COVID-19 was first reported in Wuhan in December 2019, and it was quickly spread to the rest of China and then worldwide. The World Health Organization (WHO) declared the situation as a pandemic on March 11, 2020 (Huang et al., 2020). Followed by which most of the governments in the World, including India, adopted lockdown of cities and banned people from gathering in public places. Also, instructed the infected people to self-isolate (home quarantine) at home and separation from family. On the psychological side, such social exclusion leads to severe depression, anxiety, and panic among the infected people (Barbisch et al., 2015). Biologically, the most common symptoms of COVID-19 include fever, dry cough, fatigue, headache, dizziness, dysentery, myalgias or loss of smell, and confusion (Mao et al., 2020). Respiratory failure and subsequent pneumonia are the severe sides of COVID-19. Some of the symptoms can be direct-effect of the virus on the central nervous system (CNS) and further leads to neurological complications or permanent cognitive impairment (Helms et al., 2020; Li et al., 2020). As a result of cognitive impairment, individuals suffer more on the performance of attention, executive functions, processing speed, and performing day-to-day activities (Almeria et al., 2020). Therefore, understanding the nature and scope of the neuropsychological deficits experienced by the COVID-19 survivors remained unexplored in the scientific literature.

Although COVID-19 affects irrespective of all age groups nowadays, it was identified in the beginning that older adults and the elderly have higher cases, particularly individuals with comorbidities (Rout, 2020; Wang et al., 2019). There are many additional issues for the older adults and the elderly COVID-19 survivors related to the changing social and family support level. The isolated condition during the home confinement or hospitalized in an intensive care unit (ICU) affects the elderly and older adults. Due to this condition and various other reasons viz., viral infection, fear of death, death of known or family persons by COVID-19, the uncertainty of the future, inadequate care and support, and traumatic COVID related memories experienced during the COVID-19 are significant stressors that may be the causes of depression, anxiety, stress and other

psychopathological outcomes (Brooks et al., 2020; Carvalho et al., 2020). Thus, the present study aims to assess the cognitive functions and some psychopathological outcome measures, viz., stress, depression, and anxiety, with COVID-19 survivors and investigate its relationship. The study also considered the effect of possible socio-demographic factors with the outcome measures.

MATERIALS AND METHODS

Participants

The participants who were 50 years and above and were affected by COVID-19 at any time after March 2020 and recovered from the COVID-19 symptoms were selected for this study. The study sample was selected from the source of PRFI Counseling Centre, Coimbatore, who helps the infected participants by providing counselling services. Participation in the study was voluntary and enrolled after obtained informed consent from the participants or caretakers/family members. Finally, a total of 32 participants, comprising 14 male and 18 female have included in the study. Various demographic characteristics were included in the study viz., gender (male, female), locality (rural, urban), age cohort (50-59, 60-69, 70-79), education, health status, and Activities of Daily Living (ADL). Education included two categorical levels (0, 1) indicating the highest educational qualification achieved by the participant ($\leq$ 12 years of education, > 12 years of education). The ADL status of the participants included four levels (feeding, bathing, dressing, and toileting), respectively. Also, the study participants were grouped into two ways viz., older adult versus the elderly, and hospitalized versus home quarantined participants.

Instruments

The administration of instruments were in a form of a structured interview that comprised 30 questions in the Tamil version of Montreal Cognitive Assessment (MoCA-T) and 21 items in the Depression Anxiety Stress Scale (DASS-21).

The Tamil (India) version of the MoCA (MoCA-T) was used in this study with permission obtained from its developer (www.mocatest.org; Nasreddine et al., 2005). Also, the primary author who completed the training provided by the MoCA team to use the MoCA test. The MoCA consists of 30 items categorised into 12 viz., trail-making, cube copy, clock drawing, naming, digit span, sustained attention, serial subtraction, sentence repetition, verbal fluency, abstract reasoning, memory, and orientation. The total score obtained from adding all points of 12 items in the MoCA test, with a maximum of 30 points. A higher score represents better cognitive functioning. 24 points taken as cutoff points to identify the mild cognitive impairment (Coonghe et al., 2020; Karim & Venkatachalam, 2021). The scale obtained high test-retest reliability through the intra correlation coefficient (ICC) value of 0.92 and had high internal consistency of 0.83 (Karim & Venkatachalam, 2021).

The 21-item shorten form of depression anxiety stress scale (DASS-21; Basha & Kaya, 2016; Lovibond & Lovibond, 1995; Osman et al., 2012) is a validated tool for measuring depression, anxiety, and stress. This tool consists of 3 scales, each containing 7 questions. The final scores obtained through sum of the scores. Each question varies from zero ("it doesn't apply to me at all") to 3 ("it applies to me completely"). Since this questionnaire is a shortened form of the main scale (42 questions), the final score of each subscale must be doubled. Each of the subscales is divided into 5 categories based on the score obtained: normal, mild, moderate, severe, and very severe. The tool has high internal consistency reliability ranges from 0.82 to 0.97 (Henry & Crawford, 2005; Lovibond & Lovibond, 1995; Singh et al., 2013).

Statistical analysis

All the statistical analyses were performed with a freely available Jamovi Software package (The Jamovi Project, 2021). Inferential tests were performed to compare cognitive function scores according to the other characteristics of the sample. Comparisons were analyzed using the t-student test and age cohort comparisons were analyzed using ANOVA. Pearson correlation coefficient was used to find out the relationship between cognitive functions, MoCA Cognitive domains, depression, anxiety, and stress.

RESULTS

The average age of the participants was 59.8 years (SD=8.14) and contains 56.25% (n=18) were female and 43.75% (n=14) were male. The results revealed 56.25% of COVID-19 survivors were with mild cognitive impairment (MCI). Also, the proportion of COVID-19 survivors with psychopathic outcomes were 62.50% for extreme depression, 65.60% for extreme anxiety, and 28.12% for mild stress, respectively.

Socio demographic characteristics

The demographic and psychopathic characteristics of the 32 participants were outlined in Table 1. The total 32 participants comprising 21 older adults (mean MoCA-T score of 22.4±4.38, depression mean score of 27.6±4.08, anxiety mean score of 22.1±5.04, and stress 14.0±3.79) and 11 elderly (mean MoCA-T score of

20.8±5.44, depression mean score of 28.1±5.75, anxiety mean score of 22.3±5.27, and stress 14.9±3.83). There were no significant differences with regard to gender, locality, education, and group (older adult versus elderly). In another group (hospitalized versus home quarantined) comparison, there was a significant difference in anxiety between hospitalized and home quarantined (13.6±3.59 versus 15.0±3.93, $p<0.01$).

Neurocognitive testing results and cognitive domain based comparison

The cognitive functions of the participants were compared with various demographic characteristics viz., gender, locality, education, and groups (older adult versus elderly; hospitalized versus home quarantined) in Table 2 and Table 3. The cognitive domains were categorized as six factors by MoCA developers (Nasreddine et al., 2005), comprising executive functions (EF), visuospatial abilities (VSA), language (LAN), attention concentration, and working memory (ACWM), delayed memory (DM), and orientation(ORI).

Table 1. *Demographic characteristics, MoCA mean score, and DASS mean score with t-value*

Age/cohort	50-59 years	60-69 years	70 years and above	Total	t-value
N	21	7	4	32	-
MoCA Total Mean (SD)	22.4 (4.38)	20.9 (5.90)	20.8 (5.38)	21.9 (4.74)	-
DASS-21					
Depression	27.6 (4.08)	26.3 (6.26)	31.5 (3.00)	27.8 (4.64)	-
Anxiety	22.1 (5.04)	22.3 (6.47)	22.5 (3.00)	22.2 (5.04)	-
Stress	14.0 (3.79)	14.9 (4.30)	15.0 (3.46)	14.3 (3.77)	-
Group	**Older Adult**	**Elderly**	**-**	**Total**	**-**
N	21	11	-	32	
MoCA Mean (SD)	22.4 (4.38)	20.8 (5.44)	-	21.9 (4.74)	0.91[NS]
Depression	27.6 (4.08)	28.1 (5.75)	-	27.8 (4.64)	0.32[NS]
Anxiety	22.1 (5.04)	22.3 (5.27)	-	22.2 (5.04)	0.14[NS]
Stress	14.0 (3.79)	14.9 (3.83)	-	14.3 (3.77)	0.64[NS]
Gender	**Male**	**Female**	**-**	**Total**	
N	14	18	-	32	
MoCA Mean (SD)	22.6 (4.22)	21.3 (5.17)	-	21.9 (4.74)	0.72[NS]
Depression	27.7 (4.36)	27.9 (4.97)	-	27.8 (4.64)	0.10[NS]
Anxiety	22.6 (4.26)	21.9 (5.68)	-	22.2 (5.04)	0.37[NS]
Stress	13.9 (3.63)	14.7 (3.94)	-	14.3 (3.77)	0.59[NS]
Locality	**Urban**	**Rural**	**-**	**Total**	
N	15	17	-	32	
MoCA Mean (SD)	22.3 (5.29)	21.5 (4.33)	-	21.9 (4.74)	0.50[NS]
Depression	28.0 (3.46)	27.6 (5.58)	-	27.8 (4.64)	0.21[NS]
Anxiety	22.3 (5.85)	22.1 (4.39)	-	22.2 (5.04)	0.08[NS]
Stress	13.3 (3.68)	15.2 (3.75)	-	14.3 (3.77)	1.40[NS]
Education	**≤ 12 Years**	**> 12 Years**	**-**	**Total**	
N	14	18	-	32	
MoCA Mean (SD)	20.6 (5.68)	22.9 (3.72)	-	21.9 (4.74)	1.39[NS]
Depression	28.7 (4.48)	27.1 (4.76)	-	27.8 (4.64)	0.96[NS]
Anxiety	23.7 (4.63)	21.0 (5.14)	-	22.2 (5.04)	1.54[NS]
Stress	13.1 (3.82)	15.2 (3.57)	-	14.3 (3.77)	1.58[NS]
COVID-19 Treatment Groups	**Hospitalized**	**Home Quarantine**	**-**	**Total**	
N	16	16	-	32	
MoCA Mean (SD)	20.4 (4.56)	23.4 (4.57)	-	21.9 (4.74)	1.85[NS]
Depression	28.9 (4.62)	26.8 (4.55)	-	27.8 (4.64)	1.31[NS]
Anxiety	24.5 (4.93)	19.9 (4.10)	-	22.2 (5.04)	2.88[*]
Stress	13.6 (3.59)	15.0 (3.93)	-	14.3 (3.77)	1.03[NS]

Note. NS-Not Significant; *$p <.01$

Table 2. *t-value of MoCA cognitive domains based on gender, locality, and education*

	Gender	Mean (SD)	t-value	Locality	Mean (SD)	t-value	Education	Mean (SD)	t-value
MoCA Cognitive Domains									
Executive Functions	Male	2.36 (1.15)	0.70^{NS}	Urban	2.73 (1.22)	0.87^{NS}	≤ 12 Years	2.36 (1.27)	0.70^{NS}
	Female	2.67 (1.28)		Rural	2.35 (1.22)		> 12 Years	2.67 (1.18)	
Visuo Spatial Abilities	Male	2.93 (0.91)	0.45^{NS}	Urban	2.80 (0.94)	0.24^{NS}	≤ 12 Years	2.79 (0.97)	0.31^{NS}
	Female	2.78 (0.94)		Rural	2.88 (0.92)		> 12 Years	2.89 (0.90)	
Attention, Concentration, and Working Memory	Male	4.57 (1.34)	0.94^{NS}	Urban	4.27 (1.66)	0.04^{NS}	≤ 12 Years	4.00 (1.79)	0.91^{NS}
	Female	4.06 (1.66)		Rural	4.29 (1.44)		> 12 Years	4.50 (1.29)	
Language	Male	4.29 (0.82)	1.24^{NS}	Urban	4.07 (0.79)	0.18^{NS}	≤ 12 Years	3.93 (0.91)	1.06^{NS}
	Female	3.94 (0.72)		Rural	4.12 (0.78)		> 12 Years	4.22 (0.64)	
Delayed Memory	Male	2.36 (1.27)	0.06^{NS}	Urban	2.87 (1.30)	2.19^{*}	≤ 12 Years	2.43 (1.39)	0.20^{NS}
	Female	2.39 (1.29)		Rural	1.94 (1.08)		> 12 Years	2.33 (1.18)	
Orientation	Male	5.50 (0.65)	1.83^{NS}	Urban	5.07 (0.79)	1.02^{NS}	≤ 12 Years	4.86 (0.86)	2.45^{*}
	Female	5.00 (0.84)		Rural	5.35 (0.78)		> 12 Years	5.50 (0.61)	

Note. NS-Not Significant; *p <.05 There were no significant differences between cognitive domains and gender. Also, no significant difference between domains and locality and education, except delayed memory domain and locality (2.87±1.30 versus 1.94±1.08, p<0.05) and orientation and education (4.86±0.86 versus 5.50±0.61, p<0.05). Further, as compared with hospitalized and home quarantine participants, there was a significant difference in executive functions (2.06±1.28 versus 3.00±0.96, p<0.05). However, there is no significant difference in other cognitive domains as compared with the group.

Table 3. *t-value of MoCA cognitive domains based on COVID-19 treatment groups*

	Treatment Group		t-value
	Hospitalized	**Home Quarantine**	
MoCA Cognitive Domains	Mean (SD)	Mean (SD)	
Executive Functions	2.06 (1.28)	3.00 (0.96)	2.32^{*}
Visuo Spatial Abilities	2.69 (0.87)	3.00 (0.96)	0.96^{NS}
Attention, Concentration, and Working Memory	3.81 (1.72)	4.75 (1.18)	1.79^{NS}
Language	4.06 (0.77)	4.13 (0.80)	0.22^{NS}
Delayed Memory	2.06 (1.06)	2.69 (1.40)	1.42^{NS}
Orientation	5.06 (0.85)	5.38 (0.71)	1.12^{NS}

Note. NS-Not Significant; *p <.05

Relationship between cognitive domains and psychopathic outcomes

From the table 4, it was observed that there is positive significant relationship found between cognitive functions and their sub-domains viz., executive functions (r = 0.777, p <.001), visuo spatial abilities (r = 0.757, p <.001), attention concentration and working memory (r = 0.868, p <.001), language (r = 0.642, p <.001), delayed memory (r = 0.659, p <.001), and orientation (r = 0.574, p <.001). Also, found that there is positive significant relationship between depression and anxiety (r = 0.449, p <.01), and negative relationship between anxiety and stress (r = -0.465, p <.01).

Table 4. *Correlation coefficients of Total MoCA Score, Cognitive domains, Depression, Anxiety, and Stress*

Item	MoCA-TS	EF	VSA	ACWM	LAN	DM	OR	DEP	ANX	STR
MoCA-TS	-									
EF	0.777***	-								
VSA	0.757***	0.537**	-							
ACWM	0.868***	0.558***	0.583***	-						
LAN	0.642***	0.423*	0.518**	0.493**	-					
DM	0.659***	0.537**	0.357*	0.411*	0.357*	-				
OR	0.574***	0.210	0.358*	0.666***	0.175	0.109	-			
DEP	0.016	0.155	-0.234	-0.056	0.166	0.266	-0.287	-		
ANX	-0.177	-0.143	-0.258	-0.116	-0.136	-0.052	-0.108	0.449**	-	
STR	0.262	0.131	0.126	0.242	0.210	0.124	0.300	0.114	-0.465**	-

Note. MoCA-TS – Montreal Cognitive Assessment-Total Score; EF – Executive Function; VSA – Visuo Spatial Abilities; ACWM – Attention, Concentration, and Working Memory; LAN – Language; DM – Delayed Memory; OR – Orientation; DEP – Depression; ANX – Anxiety; STR – Stress.

*p <.05, **p <.01, ***p <.001

DISCUSSION

The study investigates the psychopathological outcomes and neurocognitive impairment of COVID-19 survivors, especially older adults and the elderly. The main findings in this study were that COVID-19 survivors exhibited mild cognitive impairment as revealed by the Tamil version of Montreal cognitive assessment (MoCA-T). 56.25% of COVID-19 survivors in this study were mild cognitive impairment (MCI). Due to the presence of home or family isolation and various other factors, depressive symptomology was also exhibited even after recovered from COVID-19 infection. 62.50% of participants were reported that depressive symptomology and 65.60% of survivors were severe anxiety. Even though stress was decreasing over time, depression and anxiety were observed long-lasting. Moreover, hospitalized COVID-19 survivors have more anxious than home quarantined survivors. This difference was also noticed in the overall depression score, the MoCA score, and stress. Also, a positive correlation between depression and anxiety was reported.

Neurocognitive impairment has been commonly reported in older adults with a viral infection. The dysexecutive syndrome was also described by COVID-19 survivors (Helms et al., 2020). Irrespective of hospitalized and home quarantine COVID-19 survivors, a high rate of cognitive deficits were observed from all the older adult and the elderly participants. Executive functions were the most involved domain being impaired and significant difference observed between groups (hospitalized and home quarantined). However, there is no significant relationship between psychopathic outcomes and cognitive abilities.

Some helpful recommendations might be extracted from this study, such as the majority of the COVID-19 older adults and the elderly were affected by cognitive impairments, especially, executive functions. Further, a positive correlation between depression and anxiety is exhibited with COVID-19 survivors. Early screening of cognitive abilities, depression, anxiety, and stress would help to initiate treatment before more impaired.

LIMITATIONS

This study has several limitations. Only 32 COVID-19 survivors were included. It would be better to include more COVID-19 survivors specifically in the elderly, to assess the potential cognitive differences associated with depression, anxiety, and stress. It is also important to differentiate age-related cognitive impairment with COVID-19 survivors. Also, it is unaware that the older adults or the elderly may have already had premorbid cognitive decline or maybe experiencing new.

CONCLUSIONS

The present study observed that COVID-19 adults and elderly survivors remain depressed after recovered from COVID-19 infection. Also noticed mild cognitive impairment with the majority of the survivors. Other psychopathic symptoms also observed are more probably related to acute psychological stressors such as anxiety and stress. Psychopathic outcomes and neurocognitive dysfunction would investigate in long-term longitudinal studies with better individualized interventional options that are inevitable to this pandemic condition.

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COGNITIVE RADIO – VERSATILE, INTELLIGENT AND ORGANIZATION INNOVATION: A SURVEY

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ABSTRACT

Cognitive radio CR is a software Defined Radio (SDR) that consequently distinguishes the encompassing RF, impetuses and cleverly obliges its working parameters to the framework of the system and changes its conduct as needs be. In this article we proposed a new integration approach to sensor nodes with cognitive radio (CR) nodes to route sensor data to sink using licensed channels opportunistically. In many investigations the researchers found inefficient utilizations of spectrum. To solve it, a cognitive radio network is introduced in order to access the dynamic spectrum. The spectrum sensing issue is one of the most challenging problems in CR systems to get information of the available frequency bands. In this paper we will study various researches which have been carried out for efficient spectrum management such as spectrum sensing, dynamic spectrum access, channel access and allocation. Moreover, energy harvesting, resource management and energy aware routing schemes are also presented.

Keywords: Cognitive Radio, spectrum sensing, Clustering techniques, Wireless sensor network routing

INTRODUCTION

Recently, the wireless sensor network (WSNs) are widely adopted and studied in the field of real-time applications, industries, and academia. The applications of WSNs include several compelling operations such as disaster management, environment monitoring, battlefield surveillance, health care systems, underwater surveillance and many more. Generally, the WSNs follow an event-driven mechanism to communicate with other nodes. There may exist a few heterogeneous sensor systems which may attempt to get to the activated occasion which can cause delay and inappropriate data collection. In addition, these systems are typically sent in the blocked off area; in this manner, self-organizing capability and network lifetime are pivotal parts of WSN. According to the WSN architecture, it may consist of hundreds of sensor nodes which are deployed randomly in the monitoring sensor field. Source node and base station are the two components of WSNs for data collection. The source nodes transmit the data to the base station with the help of a single or multi-hop data transmission scheme. Then, the sink node transmits the data to the desired location with the help of the communication channel to accomplish the monitoring application task. Figure 1
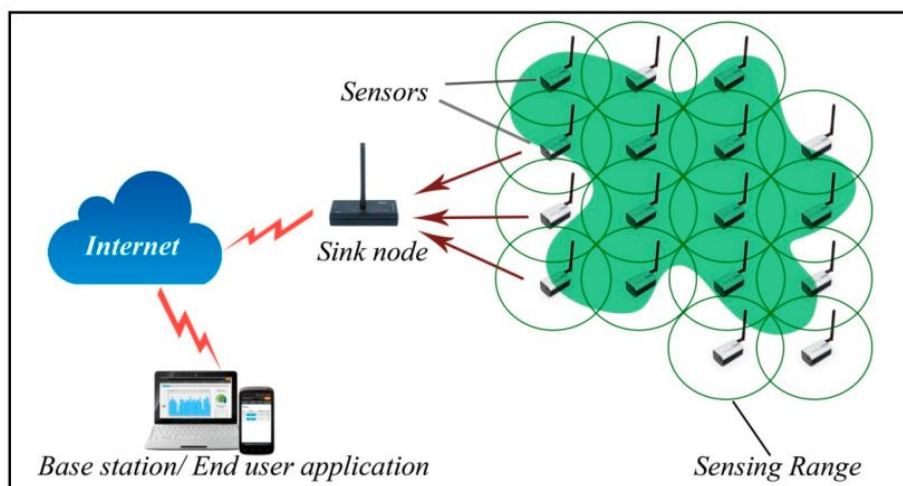
Figure 1 WSN Architecture

Generally, the WSNs maneuver in industrial scientific and medical (ISM) frequency band whose frequency is assigned as 2.4GHz by Federal Communications (FCC) regulations. However, the ISM bands are unlicensed bands which are also accessible by IEEE 802.11 systems, IEEE 802.15.4 WPAN, wireless microphones, and Bluetooth applications. Immense growth and proliferation of wireless communication have led towards the smooth and reliable communication among multiple devices. Hence, the demand for wireless devices is increasing rapidly with a rate of 30-40% every year [1]. The expanded number of wireless devices operating in the ISM band produces interference in all among unrelated applications in wireless communication. which are using this band. Moreover, the increased number of wireless devices promotes the spectrum scarcity issues

because of the availability of limited resources. Additionally, system throughput depends on the use of the channel [3]. Thus, interference, channel utilization, and spectrum management remain challenging issues in wireless communication.

Cognitive radio: a breakthrough in WSN

Recently, the cognitive radio (CR) scheme has emerged as a promising solution to mitigate the issues of spectrum resource scarcity by improving the utilization of available resources. Cognitive radio network (CRN) architecture comprises primary and secondary users. Whenever the PU spectrum is underutilized, the secondary users can access it. This process helps to improve spectrum utilization and mitigate the issue of overcrowding of unlicensed bands [4]. In CRNs, SUs are not allowed to create any interference to PUs. Once PU initializes any communication on the same channel where SUs is communicating, SUs must evacuate the channel to maintain the no-interference paradigm. The cognitive radio communication techniques are adopted in various types of existing technologies such as machine to machine networks, WBANs, WSN, etc. The cognitive radio networks enable PHY and MAC layers to dynamically detect the available spectrum and change their parameters to achieve the concurrent wireless communication in the given spectrum band. In this work, we consider cognitive radio sensor network (CRSN) as a specific technique due to its huge applications in IoT paradigms.

Unlike the conventional WSNs, the CRSNs operate on licensed band and opportunistically sense the spectrum to achieve the channel state information. Similar to CRN, PUs have direct access to the spectrum whereas SUs are allowed to access the spectrum opportunistically. On the other hand, CRSN adopts the general limitations of conventional WSNs such as energy consumption, and network lifetime. Moreover, the spectrum sensing is also considered as a crucial aspect in implementation of CRSNs. The SS has an impact on energy consumption because more SUs for sensing will require more energy. Hence, current research progresses are focused on efficient approaches for spectrum sensing. Similarly, routing and resource allocation is a challenging task in CRSNs. By taking advantage of the spectrum utilization rule of FCC and advancements of networking technology, the combined wireless sensor network and CR can mitigate the challenging issues such as spectrum utilization, resource allocation, and routing to improve the network efficiency.

Contribution of work

This section presents a brief discussion about recent trends and techniques in the field of WSN, CR, and CRSNs. Spectrum sensing is a most important task of CR which has a significant impact on network lifetime when combined with WSN. Various researches have been carried out for efficient spectrum management such as spectrum sensing, dynamic spectrum access, channel access and allocation. Moreover, energy harvesting, resource management and energy aware routing schemes are also presented.

As discussed in previous section, the greater number of sensing node require more energy which can lead towards the degraded network lifetime. Moreover, CSRNs are vulnerable to spectrum sensing data falsification (SSDF) attacks which can degrade the sensing accuracy. In order to overcome these issues, Ren et al. [6] developed decision rule for collaborative spectrum sensing. Later, FastDtec scheme is presented to determine the suitable threshold. Further, the compromised nodes are discarded to maintain the security and energy efficiency of the network.

Game theory-based schemes are also adopted for spectrum allocation and management. Zeng et al. [7] used Bertrand game theory model for spectrum sharing in CRSNs. According to this process, the secondary BS obtains the communication condition of secondary network and charges for the required spectrum from primary base stations using Bertrand model. Later, spectrum allocation problem is formulated as non-linear programming puzzle which can be solved using Nash bargaining. Similar to this, Abdalzaher et al. [12] used Stackelberg game approach to improve the security in CRSNs.

Byun et al. [8] introduced dynamic spectrum allocation using game theory approach. The main aim of this work is to address the following issues such as maximizing the spectrum utilization, spectrum allocation,. Due to the cooperative nature of cognitive radio enabled WSN, Wu et al. [9] adopted multi-agent reinforcement learning scheme to maximize the network performance. The reinforcement learning analyzes past choices of sensor nodes and creates a learning model for power and spectrum selection. This approach follows reward mechanism to maximize the throughput by providing reward for each successful transmission. Similarly, the energy cost reward assignment is incorporated to penalize the high energy consumption.

Zhang et al. [10] focused on resource allocation and management in Energy Harvesting Cognitive Radio Sensor Networks (EHCRSNs). The energy harvesting helps to improve the sustainability of power-limited sensors and cognitive radio mitigates the spectrum scarcity issues in unlicensed bands. In this work, Lyapunov optimization problem scheme is applied to achieve power management, sensing and resource allocation.

Zhao et al. [11] presented cooperative spectrum sensing, channel access and resource allocation in overlay CRNs. In this work, imperfect reporting channels are considered and a multi-channel allocation framework is presented by introducing an access factor. The access factor presents a common matrix model to describe the multi-user multi-channel allocation in CRNs. In order to facilitate the spectrum to SUs, a non-convex optimization problem is for throughput maximization under the transmit power, interference and detection probability limitations for both single and multiple SUs. Later, alternating optimization problem are developed based on the hidden convexity of the considered optimization problem and optimal solutions are obtained.

Clustering is also known as an important part of routing in these networks. Zheng et al. [16] developed a novel routing approach named as NSAC (network stability-aware clustering) where spectrum dynamics and energy consumption are combined together to improve the system performance. Similar to this work, Wang et al. [17] focused on spectrum scarcity and introduced weighted clustering approach. In this scheme, cluster heads are selected based on temporal-spatial correlation, residual energy, and confidence level. Idoudi et al. [18] used clustering mechanism for scheduling purpose to improve the throughput and reduce the energy consumption. The first step is to assign channels to each node which helps to reduce the inter-cluster collision. Later cluster head and cluster member scheduling is performed.

The above discussion concludes that in cognitive radio sensor network and novel approach to improve the overall communication performance is mandatory A heterogeneous cognitive radio sensor network (HCRSN). A cognitive radio enabled sensor network is deployed where they defined various standard parameters such as node capacity, channel, bandwidth available, and bandwidth consumption by each node, power requirements, number of licensed and unlicensed users etc.

Clustering is an effective method to manage communications in cognitive radio sensor networks (CRSNs). In this phase, we perform cluster head and cluster member selection based on their bandwidth availability and channel information [23].
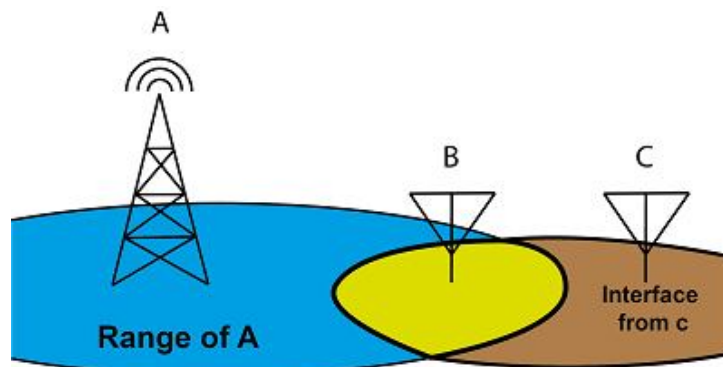
Figure 2 Two primary users A and B interference by C

Figure2 depicts the main transmitter which is notated by A , and the main receiver which is notated by B and the secondary transmitter which is C . the interference range of all above is shown by different colors.

Central places of CR in sensor frameworks
Honestly, a Remote sensor network included sensor centers outfitted with mental radio may benefit by the normal focal points of the outstanding features of dynamic reach access, for instance, :

• Astute channel use for bursty traffic: Upon the acknowledgment of an event in WSN, sensor center points produce a traffic of group impacts. At the same time, in thickly passed on sensor sorts out, countless center points inside the event district endeavor to acquire the channel. This forms probability of accidents, and hereafter, decreases the overall correspondence steady quality due to package hardships inciting over the top impact usage and group delay. Here, sensor center points with mental radio capacity may cunningly admittance to various elective channels to facilitate these probable challenges.

• Dynamic reach access: All things considered, the current WSN plans acknowledge fixed range portion. Nevertheless, Remote sensor organizations (WSN) ought to either be worked in unlicensed gatherings, or a reach lease for an approved band should be taken. Generally, huge costs are connected with a reach lease, which would, consequently, improve the as a rule cost of association. This is furthermore clashing with the essential arrangement guidelines of remote sensor organizations (WSN). Then again, unlicensed gatherings are moreover used by various contraptions, for instance, IEEE802.11 distant area organize remote neighborhood (WLAN) areas of interest, PDAs and Bluetooth devices. Along these lines, sensor frameworks experience amassed range

issue .In this manner, in order to increase the framework execution and have the choice to cooperate adequately with various types of customers, pioneering territory will plans should be utilized in WSN also.

• Utilizing adaptability to decrease influence usage: Time fluctuating nature of distant channel causes energy use due to package adversities and retransmissions. Scholarly radio or intellectual radio (CR)able sensor center points may be prepared to change their functioning limits to acclimate to channel conditions. This capacity can be used to augment transmission adequacy, and hence, assist with lessening power used for transmission and social occasion.

• Overlaid sending of various concurrent WSN: With the extended usage of sensor frameworks, one unequivocal locale may have a couple of sensor frameworks shipped off run after fulfilling express essentials of different applications. For the present circumstance, dynamic reach the board may through and through add to the capable combination of spatially covering sensor frameworks to the extent correspondence execution and resource use.

• Admittance to different channels to acclimate to different reach rules: Every country has its own range rule rules. A particular band available in one country may not be open in another. Standard WSN with a current working repeat may not be sent in circumstances where manufactured centers are to be sent in different districts. Nevertheless, if center points by one way or another figured out how to be equipped with mental radio capacity, they would overcome the reach openness issue by changing their correspondence repeat.

Employments of Psychological radio sensor frameworks:
CR-WSNs which is a psychological radio remote sensor organization may have a wide extent of use spaces. In actuality, CR-WSN can be passed on wherever rather than WSNs. A couple of cases of inevitable zones where CR-WSNs can be passed on are according to the accompanying: office the chiefs, machine perception and preventive upkeep, precision agriculture, prescription and prosperity, collaborations, object following, telemetries, sharp roadside, security, incitation and backing of complex structures, seeing of indoor and outside circumstances.

· Military and Public Security Applications
In the disaster area or in addressed regions, an adversary may give adhering signs to agitate radio correspondence channels. In such conditions, since CR-WSs can handoff frequencies over a wide reach, CR-WSNs can use assorted repeat gatherings, thus avoiding the repeat band with a staying sign. Likewise, some tactical applications require a gigantic exchange speed, least channel access and correspondence delays. For such applications, psychological radio sensor networks CR-WSNs can be a predominant other option.

· Social protection
Clinical data is essential, delay and mix-up sensitive. The QoS may not be cultivated at a decent level if the functioning reach band is pressed in supportive 'telemedicine with Boycott'. The usage of 'CR wearable body far off sensors' can direct these issues on account of bandwidth, staying and overall operability, in this way work on steadfast quality.

· Bandwidth heightened application
Bandwidth Concentrated Applications Interactive media applications, for instance, on-demand or live video spilling, sound, moreover, still pictures over resource obliged WSNs, are very trying an immediate aftereffect of their huge information transmission necessities. Other WSN applications, for instance, WSNs in a crisis facility condition, vehicular WSNs, following, perception, etc., have huge spatial and temporary assortments in data thickness associated with the center point thickness. These applications are information transmission hungry, delay despicable and bursty in nature. Since in CR-WSN, Sus(secondary clients) can get to various channels whenever available and fundamental, CR-WSN is totally fitting for such exchange speed hungry applications.

· Consistent Reconnaissance Applications
Nonstop perception applications, for instance, traffic checking, biodiversity arranging, living space checking, normal checking, biological conditions seeing that impact gathers and tamed creatures, water framework, lowered WSNs, vehicle following, stock after, calamity help exercises, expansions or entry checking, require least channel access and correspondence delay. Some continuous perception applications are particularly delay-sensitive and require high unfaltering quality. A delay on account of an association disillusionment can similarly occur in multihop WSNs if the channel condition isn't worthy. On the other hand, WS centers ricochet to another diverter if they find another inert channel with an unrivaled condition in CR-WSNs. Channel aggregation and the use of various directs all the while are possible in CR-WSNs to extend the channel information transmission

Above all, a mental radio enabled sensor framework will be sent where we describe distinctive standard limits, for instance, center point limit, channel, information move limit open, and bandwidth use by each center, power requirements, number of approved and unlicensed customers, etc. The all out system can be detached into following stages:

(a) Clustering: In this stage, we perform a bunch head which is called head of the cluster and gather part or people or part assurance reliant upon their information move limit availability like transmission capacity and channel information.

(b) In the accompanying stage, the improvement of steering convention which considers deterrent, energy use, and information transmission necessities.

(c) When the directing way is acquired , optimal resource task plot subject to as far as possible for example detecting limit of the center points.

(d) At last, a multi-bounce supportive game speculation model will be made to alleviate the impediment and to further develop the overall correspondence execution by working on the group or bundle movement or conveyance .

Clustering Protocol is divided into centralized clustering and decentralized clustering Clustering Protocol is divided into centralized clustering and decentralized clustering

Below Table 1 Depicts the summary of advantages and disadvantages of clustering scheme.

Types of clustering	Example	Advantages	Disadvantages
Centralized clustering	LEACH-C	Dispersion of CH is normally in the system	➢ Needed high start up energy ➢ High energy is required for nodes far from base station.
	PEGASIS [10]	Good energy management	➢ Network is in-scalable ➢ High communication delay ➢ SN die early ➢ Fluctuating topology
Decentralized Clustering	LEACH[14]	➢ High network lifetime ➢ Aggregation of data packets by CH and transmits to BS	➢ Random CH selection ➢ No intercluster communication ➢ High failure of CH
	DEEP[11]	➢ Low communication cost ➢ Good energy distributor	Good performance when nodes are distributed evenly
	HEED[12]	➢ Throughput improvise ➢ Energy consumption is less	CH selection is complicated
	EEHC[13]	Less energy consumption	Battery of CH dissipate very fast

Table 1: Summary of advantages and disadvantages of clustering scheme

CONCLUSION AND FUTURE WORK
The above comparison includes the throughput, postpone time , packet drop to enhance the general overall performance of cognitive radio . If the convention time is included at every step with proper acknowledgement, then the quality may be improved further. It is required to focus on the cognitive radio sensor network and introduce a novel approach to improve the overall communication performance. A novel useful resource allocation and spectrum sensing version with interference cancellation and cooperative routing scheme to

enhance the throughput must be evolved. Fault Tolerance is the maximum tough problem in CR-WSN. The protocols designed for cognitive radio do not have the capability to tolerate fault. This influences the overall performance of the wi-fi sensor community. CRN is excessive failure susceptible because of the node mobility and primary consumer (PU) interference. Therefore, a robust routing protocol to address failure at some point of data transmission in CRN is required with some hybrid technology. The result may further proceed to IOT technology.

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COMPARATIVE STUDY ON ACADEMIC ACHIEVEMENT AMONG PHYSICAL EDUCATION TRAINEES OF KARNATAKA STATE

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ABSTRUCT

Academic achievement of students is vital in producing a large number of alumnae who will become manpower and leaders in a given country, and it is thus accountable for the country's economic and social progress. Academic achievement refers to a student's academic outcomes, which demonstrate how far he or she has gone toward his or her learning goals. Academic achievement includes completing educational requirements such as a bachelor's degree. Exams or continual evaluations are commonly used to measure academic progress. The primary objective of the study was to compare the academic achievement among physical education trainees of Karnataka state. For achieve the primary objective of the study One Hundred and Eighty (N=180) physical education trainees were randomly selected. Thirty (N=30) each physical education trainees were selected from Six different Universities of Karnataka state namely Kuvempu University, Bangalore University, Mangalore University, Karnatak University, University of Mysore and Gulbarga University. The academic achievement of physical education trainees was assessed with the help of final results of their M.P.Ed degree (i.e. Cumulative Grade Average Point) declared by the respective Universities. One-way ANOVA statistical technique was used to compare the academic achievement among physical education trainees of Karnataka state at the 0.05 level of significance. The data analysis and findings revealed that there was a significant differences among academic achievement of physical education trainees of Karnataka state.

Keywords: Academic Achivement, Physical Education Trainees, ANOVA, CGPA

INTRODUCTION:

Academic achievement of students is vital in producing a large number of alumnae who will become manpower and leaders in a given country, and it is thus accountable for the country's economic and social progress. The Student's performance is influenced by economic, personal, psychological, and environmental factors.

The degree to which a teacher, student, or institution has achieved their long or short-term educational goals is referred to as performance or academic achievement. Students are a critical component of any nation in this century of globalisation. The performance of students is extremely significant in the growth of student quality. This boosts a country's financial growth. Academic success is taken into consideration as a first step in employing new graduates. As a result, it is linked to pupils in order to improve their production and quality of life.

Academic achievement refers to a student's academic outcomes, which demonstrate how far he or she has gone toward his or her learning goals. Academic achievement includes completing educational requirements such as a bachelor's degree. Exams or continual evaluations are commonly used to measure academic progress.

A standards-based education system fosters fairness by defining a baseline of knowledge and abilities that all students should acquire as part of their education, regardless of their background. Academic achievement assessment gives important information regarding a student's mastery of standards. Identifying schools where a large number of children are struggling to attain proficiency on state tests is a good place to start when looking for schools that could need some help. When combined with other data, academic achievement data can be used to assist priorities schools for support.

Academic achievement for all students is one of the primary aims of the public education system, and mastery of state standards equips pupils with valuable skills for a successful and meaningful life. While not all components of performance can be efficiently assessed and compared statewide, it is critical to incorporate some academic achievement assessment when reviewing and prioritising school funding.

Objective of the Study:

The primary objective of the study was to compare the academic achievement among physical education trainees of Karnataka state.

METHODOLOGY:

For achieve the primary objective of the study One Hundred and Eighty (N=180) physical education trainees were randomly selected. Thirty (N=30) Each physical education trainees were selected from the different Universities of Karnataka state namely Kuvempu University, Bangalore University, Mangalore University, Karnatak University, University of Mysore and Gulbarga University. The subjects were studied Master of Physical Education (M.P.Ed) degree during the academic year 2018-19 to 2019-20. The academic achievement of physical education trainees was assessed with the help of final results of their M.P.Ed degree (i.e. Cumulative Grade Average Point) declared by the respective Universities.

STATISTICAL TECHNIQUE:

To compare the academic achievement among physical education trainees of Karnataka state One-Way ANOVA statistical technique was applied at 0.05 level of significance with the help of SPSS 28th version.

RESULT AND DISCUSSIONS:

Table 1: Shows the Desceiptive Statistics of Academic Achievement of Physical Education Trainees of Karnatak State

Name of the Universities	N	Mean	Std. Deviation	Minimum	Maximum
Kuvempu University	30	6.91	0.35	6.01	7.50
Bangalore University	30	7.13	0.29	6.74	7.84
Mangalore University	30	6.61	0.35	5.75	7.20
Karnatak University	30	7.20	0.40	6.42	8.01
University of Mysore	30	6.83	0.35	5.91	7.40
Gulbarga University	30	7.95	0.34	7.01	8.50
Total	180	7.10	0.55	5.75	8.50

The above table highlights the mean, standard deviation, minimum and maximum of academic achivement of physical education tarines of Karnataka state. Mean, standard deviation, minimum and maximum of Kuvempu University was 6.91, 0.35, 6.01 and 7.50, Bangalore University was 7.13, 0.29, 6.74 and 7.84, Mangalore University was 6.61, 0.35, 5.75, and 7.20, Karnatak University 7.20, 0.40, 6.42 and 8.01, University of Mysore 6.83, 0.35, 5.91 and 7.40 and Gulbarga University 7.95, 0.34, 7.01 and 8.50 respectively.

Table 2: Shows the One-Way ANOVA of Academic Achievement of Physical Education Trainees of Karnatak State

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	32.329	5	6.466	**53.74***	<.001
Within Groups	20.937	174	.120		
Total	53.266	179			

*Significant at 0.01 level.

The above table describes the One-Way ANOVA of academic achievement of physical education trainees of Karnataka state. The table shows that the obtained F value is 53.74 which is greater than the table value 2.67. Hence it can be stated that null hypothesis is rejected and formulate the alternative hypothesis that is there was a significant differences in academic achievement among physical education trainees of Karnataka state.

As the F value found significant in the academic achievement, least significant difference (LSD) post-hoc test was carried out find the significant difference between the paried means and presented in the table below

Table 3: Shows the Post-Hoc Analysis of Academic Achievement of Physical Education Trainees of Karnatak State

(I) University	(J) University	Mean Difference (I-J)	Sig.
Kuvempu University	Bangalore University	0.226*	.012
	Mangalore University	0.297*	.001
	Karnatak University	0.294*	.001
	University of Mysore	0.082	.359
	Gulbarga University	1.037*	.001

Bangalore University	**Mangalore University**	0.524*	.001
	Karnatak University	0.068	.451
	University of Mysore	0.309*	.001
	Gulbarga University	0.811*	.001
Mangalore University	**Karnatak University**	0.591*	.001
	University of Mysore	0.215*	.017
	Gulbarga University	1.335*	.001
Karnatak University	**University of Mysore**	0.376*	.001
	Gulbarga University	0.743*	.001
University of Mysore	**Gulbarga University**	1.120*	.001

* The mean difference is significant at the 0.05 level

The above table shows the Post-hoc analysis of academic achievement of physical education trainees of karnatak state. The above table reveals that there was a significant difference between Kuvempu University and Bangalore University, Kuvempu University and Mangalore University, Kuvempu University and Karnatak University, Kuvempu University and Gulbarga University, Bangalore University and Mangalore University, Bangalore University and University of Mysore, Bangalore University and Gulbarga University, Mangalore University and Karnatak University, Mangalore University and University of Mysore, Mangalore University and Gulbarga University, Karnatak University and University of Mysore, Karnatak University and Gulbarga University and University of Mysore and Gulbarga University respectively. Mean values depict that there was a steady and a linear difference in the academic achievement of physical education trainees with respect to the students from Kuvempu University, Bangalore University, Mangalore University, Karnatak University, University of Mysore and Gulbarga University.

Graphical representation of comparision of mean value of academic achievement among the physical education trainees of Karnataka state is presented in figure-1.
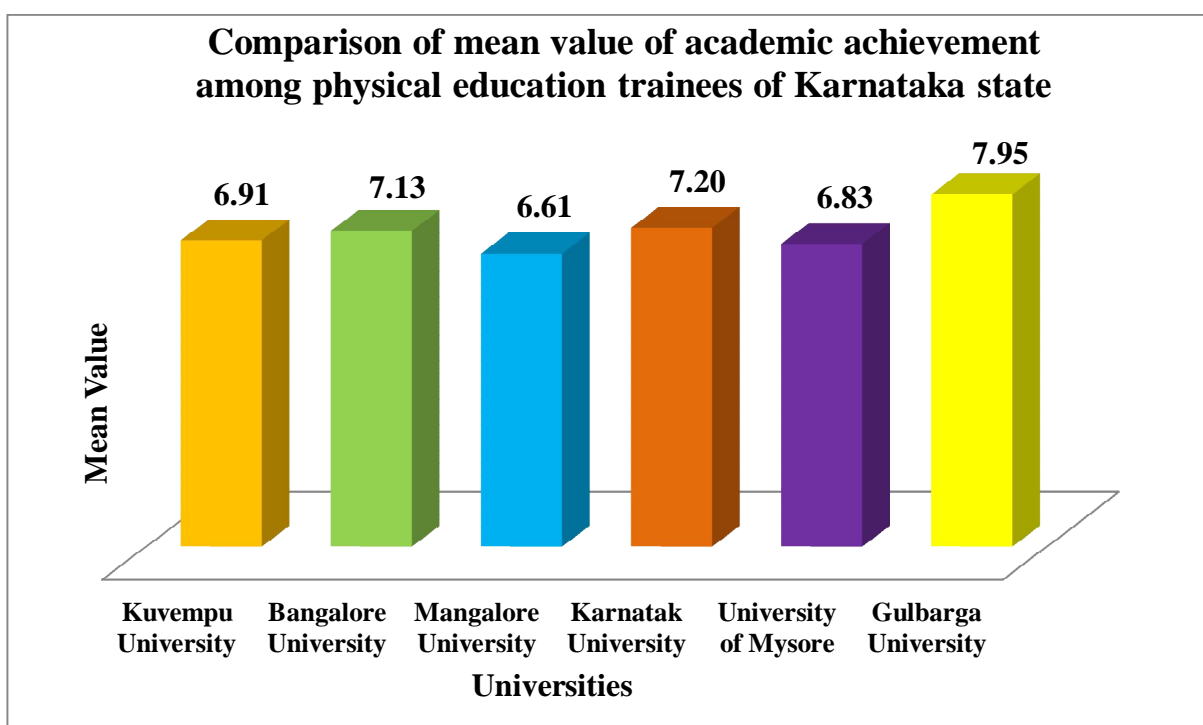
Figure-1: Graphical representation of comparision of mean value of academic achievement among the physical education trainees of Karnataka state.

CONCLUSSION:
In view of the findings and limitations of the study, the conclusions were drawn as there was a significant difference found in academic achievement among physical education tarinees of Karnata state. Mean values depict that there was a steady and a linear difference in the academic achievement of physical education trainees with respect to the students from Kuvempu University, Bangalore University, Mangalore University, Karnatak University, University of Mysore and Gulbarga University.

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COMPARISON OF CARDIOVASCULAR RISK BETWEEN SODIUM-GLUCOSE COTRANSPORTERS-2 INHIBITORS AND DIPEPTIDYL PEPTIDASE-4 INHIBITOR IN TYPE-II DIABETES MELLITUS

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ABSTRACT

Background: Diabetes mellitus is said to an increased risk of cardiovascular disorder (CVD). The risk of coronary heart disease and stroke were higher in patients with diabetes and lower in non-diabetes. Depending on the type of diabetes and their comorbidities by considering their age,gender, weight and personal habits , the type of therapy for Diabetes mellitus given. Several diabetes therapies are currently available; among them two new treatments were recently developed for T2DM: DPP-4 Inhibitors and sodium-glucose co-transporter-2 inhibitors (SGLT2-I). Sodium-glucose cotransporter-2 (SGLT-2) inhibitors are the newest class of anti-hyperglycemic agents with FDA approval. Dipeptidyl peptidase 4 inhibitors (DPP-4i) are one of the type of oral hypoglycemic agents (OHA) used in type 2 DM patients. This study aimed to evaluate the reduction in Type-II Diabetes mellitus complication of cardiovascular risk with the use of DPP-4 inhibitors or SGLT-2 inhibitors.

Materials and Methods: A Prospective Cross- Sectional Study was carried out in a General Medicine Department of a Tertiary Care Hospital with the Sample size of 90 which includes the Patients with Type-2 Diabetes Mellitus who are on DPP-4 inhibitors and SGLT-2 inhibitors. After Obtaining a proper consent from the Hospital Authorities, self Designed Patient Information Proforma / Data Entry Form is designed for a Data Collection.

Results: The Total Number of 90 Diabetic Patients were divided into two categories, Patient who were on SGLT-2i (Group-A), Patients who were on DPP-4i on (Group-B) and had a total of 37 Males & 53 Female Population. The Larger Proportion of Patients was under the age group of 41-50 Years. The Patients who were on SGLT-2i have shows the Significant reduction in Systolic & Diastolic Blood Pressure when compared to the Patients on DPP-4i drugs.

Conclusion: The Study concluded that reduction in cardiovascular risk with Type-II Diabetes mellitus patients taking SGLT-2 inhibitors than DPP-4 inhibitors. It was concluded that SGLT-2 inhibitors not only having oral hypoglycemic activity and also it has cardio-protective mechanism.

KEYWORDS: Diabetes Mellitus, Cardiovascular Diseases, Blood Pressure

INTRODUCTION

Diabetes mellitus is said to an increased risk of cardiovascular disorder (CVD). The risk of coronary heart disease and stroke were higher in patients with diabetes and lower in non-diabetes. CVD is that the major cause of morbidity and cardiovascular mortality in patients with type 2 diabetes .The factors that increases the risk of CVD include hypertension, dyslipidemia, hyperlipdemia, obesity, and smoking in patients with diabetes. Many hypotheses with supporting evidence exist, causative roles for hyperglycemia, vascular disease, hypoglycemia, insulin resistance, inflammatory cytokines, and oxidative stress. Depending on the type of diabetes and their co morbidities by considering their age, gender, weight and personal habits , the type of therapy for Diabetes mellitus given. Several diabetes therapies are currently available; among them two new treatments were recently developed for T2DM: DPP-4 Inhibitors and sodium-glucose co-transporter-2 inhibitors (SGLT2-I).

Sodium-glucose cotransporter-2 (SGLT-2) inhibitors are the newest class of anti-hyperglycemic agents with FDA approval. SGLT-2 inhibitor's mechanism of action in renal is by reducing renal tubular glucose reabsorption and producing a decreased in blood glucose level without stimulating insulin release. Other

benefits may include effects on vital signs and weight. SGLT-2 inhibitors having addition effect and it's going to be useful in obese and hypertensive patients due to their weight loss and antihypertensive effects. Patients who are at high risk for hypoglycemia may get a better effect on combination of metformin and an SGLT-2 inhibitor because of the risk of hypoglycemia with SGLT-2 inhibitors is low on comparing with insulin and sulfonylureas combinations. However, they will be very useful to diabetes duration because their action is independent of β-cell function and insulin secretion.

Dipeptidyl peptidase 4 inhibitors (DPP-4i) are one of the type of oral hypoglycemic agents (OHA) used in type 2 DM patients. The effects of DPP-4i are induced through the incretin hormones, glucagon-like peptide 1 (GLP-1) and gastric inhibitory peptide, by slowing the gastric emptying, stimulating glucose-dependent insulin release from the pancreatic islets, and inhibiting inappropriate post-meal glucagon release. During a randomized trial, DPP-4i were observed to possess a neutral effect on major adverse ischemic cardiovascular events and to possess increased in the rate of hospitalization for coronary failure in DM patients with ACS.

This study aimed to evaluate the reduction in Type-II Diabetes mellitus complication of cardiovascular risk with the use of DPP-4 inhibitors or SGLT-2 inhibitors.

MATERIALS AND METHODS

The department selected for the study was **GENERAL MEDICINE.** It was a custom the every project work carried out in the hospital by the PHARM.D has to be approved by the dean of the hospital and should be informed to all physicians, surgeons and other healthcare professionals of the hospital. So s protocol of the study which includes the objectives, methodology was submitted to the dean of the study hospital.

The study was conducted with the expert guidance of senior and junior physicians of the department selected for the study in the hospital. The author was permitted to utilize the hospital facilities to make a follow up prescription, in selected departments. All the healthcare professionals were well informed through dean's official circular.

A patient information for has been prepared to inform the patient of the care givers about the purpose and necessity of the study. The patient form assures that the confidentiality will be strictly maintained and also the study will help the betterment of patient health. The form includes the details like department address, name and signature of the investigator and supervisor, date, place and details about the study. This method involves prospective study of cardiovascular risk in TYPE-II DM. The study will be carried out by the collection and documentation of general information of the patient including personal history, family background, clinical findings, investigations and medical illness associated with Diabetes mellitus. The statistical analysis will be carried out using SPSS software. Results were expressed as the mean ± SD. Comparison between two independent mean groups was done using student's *t* test, where level of significance P< 0.005 is considered.

RESULTS

A total number of 90 patients have been selected, to find out the cardiovascular risk between SGLT-2i and DPP-4i in patients with Type-II Diabetes mellitus.

Table 1: DISTRIBUTION BASED ON AGE

AGE	SGLT-2i GROUP-A (No. of pts)	SGLT-2i GROUP-A (% of pts)	DPP-4i GROUP-B (No. of. pts)	DPP-4i GROUP-B (% of pts)
20-30	1	2%	2	4%
31-40	7	15%	5	11%
41-50	20	44%	22	48%
51-60	13	28%	16	35%

Table 2: DISTRIBUTION BASED ON GENDER

GENDER	SGLT-2i GROUP-A (No. of pts)	SGLT-2i GROUP-A (% of pts)	DPP-4i GROUP-B (No.of pts)	DPP-4i GROUP-B (% of pts)
MALE	17	37%	20	44%
FEMALE	28	62%	25	55%

DISTRIBUTION BASED ON BMI (TABLE-3, FIGURE-3)

BMI	SGLT-2i	SGLT-2i	DPP-4i	DPP-4i

	GROUP-A (No. of pts)	GROUP-A (% of pts)	GROUP-B (No. of pts)	GROUP-B (% of pts)
>18	3	6%	2	4%
18-25	25	55%	29	64%
<25	37	37%	14	31%

Comparison of systolic pressure between SGLT-2i and DPP-4i Table-4

STAGES	SGLT-2i GROUP-A	DPP-4i GROUP-B	P-VALUE
Baseline	11.8±7.96	118.8±6.11	0.076
3rd month	124.8±5.05	127.3±7.50	0.077
6th month	114.4±5.86	133.11±7.33	<0.0001

Comparison of diastolic pressure between SGLT-2i and DPP-4i Table-5

STAGES	SGLT-2i GROUP-A	DPP-4i GROUP-B	P VALUE
Baseline	70.8±6.68	74±4.95	0.0139
3rd month	72.2±7.35	82.2±7.94	<0.0001
6th month	71.1±5.72	84.4±6.92	<0.0001

Comparison of Total cholesterol between SGLT-2i and DPP-4i (Table-6)

STAGES	SGLT-2i GROUP-A	DPP-4i GROUP-B	P VALUE
Baseline	138.6±10.28	143.4±13.47	0.0585
3rd month	150.5±12.64	168.28±9.16	<0.0001
6th month	134.4±11.4	207±9.52	<0.0001

Comparison of HDL between SGLT-2i and DPP-4i   Table-7

STAGES	SGLT-2i GROUP-A	DPP-4i GROUP-B	P VALUE
Baseline	48.4±4.19	51.1±5.6	0.0129
3rd month	50.5±5.5	55.6±3.08	<0.0001
6th month	45±3.16	60.5±6.25	<0.0001

Comparison of LDL between SGLT-2i and DPP-4i   Table-8

STAGES	SGLT-2i GROUP-A	DPP-4i GROUP-B	P VALUE
Baseline	110.4±6.21	113±7.87	0.096
3rd month	117.06±8.23	120.3±6.12	0.0354
6th month	108.8±4.63	124.84±7.04	<0.0001

Comparison of FRS between SGLT-2i and DPP-4i   Table-9

STAGES	SGLT-2i GROUP-A	DPP-4i GROUP-B	P-VALUE
Baseline	0.91±0.70	0.622±0.747	0.0619
3rd month	0.35±0.48	7.13±3.35	0.0001
6th month	0.22±0.42	14±2.61	0.0001

DISTRIBUTION BASED ON AGE (TABLE-1)

A total of 90 patients were taken for the study. In this Group-A at age interval of 20-30 years 1(2%), at 31-40 years 7(15%), at 41-50 years 20(44%), at 51-60 years 13 (28%). In Group-B at age interval of 20-30 years 2(4%), at 31-40 years 5(11%), at 41-50 years 22 (48%), at 51-60 years 16 (35%).

DISTRIBUTION BASED ON GENDER (TABLE-2)

A total of 90 patients were taken for the study. In this Group-A 17(37%) were males and 28 (62%) were females. In Group-B 20(44%) were males and 25 (55%) were females.

DISTRIBUTION BASED ON BMI (TABLE-3)

A total of 90 patients were taken for the study. In this Group-A, BMI >18 -3 patients (6%), 18-25 = 25 patients (55%) and BMI <25 -17 patients (37%). In this Group-B, BMI>18- 2(4%), 18-25= 29 patients (64%) and BMI <25- 14 patients (3%).

COMPARISON OF SYSTOLIC PRESSURE BETWEEN SGLT-2i AND DPP-4i (TABLE-4)

Comparing the systolic pressure of SGLT-2i and DPP-4i at the intervals of baseline, 3rd month and 6th month. The systolic pressure of SGLT-2i at baseline 11.8±7.96, at 3rd month 124.8±5.05, at 6th month 114.4±5.86 and the systolic pressure of DPP-4i at baseline 118.8±6.11, at 3rd month 127.3±7.50, at 6th month 133.11±7.33 respectively.

COMPARISON OF DIASTOLIC PRESSURE BETWEEN SGLT-2i AND DPP-4i (TABLE-5)

Comparing the diastolic pressure of SGLT-2i and DPP-4i at the interval of baseline, 3rd month and 6th month. The diastolic pressure of SGLT-2i at baseline 70.8±6.68, at 3rd month 72.2±7.35, at 6th month 71.1±5.72 and the diastolic pressure of DPP-4i at baseline 74±4.95, at 3rd month 82.2±7.94, at 6th month 84.4±6.92 respectively.

COMPARISON OF TOTAL CHOLESTEROL BETWEEN SGLT-2i AND DPP-4i (TABLE-6)

On comparing the Total cholesterol between SGLT-2i and DPP-4i at the interval of baseline, 3rd month and 6th month. The Total cholesterol of SGLT-2i at baseline 138.6±10.28, at 3rd month 150.5±12.64, at 6th month 134.4±11.4 and the Total cholesterol of DPP-4i at baseline 143.4±13.47, at 3rd month 168.28±9.16, at 6th month 207±9.52 respectively.

COMPARISON OF HDL BETWEEN SGLT-2i AND DPP-4i (TABLE-7)

On comparing the HDL between SGLT-2i and DPP-4i at the interval of baseline, 3rd month and 6th month .The HDL of SGLT-2i at baseline 48.4±4.19, at 3rd month 50.5±5.5, at 6th month 45±3.16 and the HDL of DPP-4i at baseline 51.1±5.6, at 3rd month 55.6±3.08, at 6th month 60.5±6.25 respectively.

COMPARISON OF LDL BETWEEN SGLT-2i AND DPP-4i(TABLE-8)

On comparing the LDL of SGLT-2i and DPP-4i at the interval of baseline, 3rd month and 6th month. The LDL of SGLT-2i at baseline 110.4±6.21, at 3rd month 117.06±8.23, at 6th month 108.8±4.63 and the LDL of DPP-4i at baseline 113±7.87, at 3rd month 120.3±6.12, at 6th month 124.84±7.04 respectively.

COMPARISON OF FRAMINGHAM RISK SCORE BETWEEN SGLT-2i AND DPP-4i (TABLE-9)

On comparing the Framingham risk score between SGLT-2i and DPP-4i at the interval of baseline, at 3rd month and 6th month. The FRS of SGLT-2i at baseline 0.91±0.70, at 3rd month 0.35±0.48, at 6th month 0.22±0.42 and the FRS of DPP-4i at baseline 0.622±0.747, at 3rd month 7.13±3.35, at 6th month 14±2.61 respectively.

CONCLUSION

Cardiovascular risk occurs in patients with Type-II Diabetes mellitus, on comparing the two different category of drugs for Type-2 DM also which has the cardio-protective mechanism in reducing cardiovascular risk. Diabetes mellitus induce complications such as cardiovascular risk, nephropathy, neuropathy and retinopathy. In this study , it was compared with SGLT-2 inhibitors and DPP-4 inhibitors which reduces cardiovascular risk, and it was observed that patients with Type-II Diabetes mellitus and who had treatment with SGLT-2i has decrease in systolic and diastolic pressure, decreased lipid profile (TC, HDL, LDL) on comparing with DPP-4i taking patients. And also this study used Framingham risk score (FRS) to analyze the cardiovascular/cardio-protective between SGLT-2i and DPP-4i and it was observed FRS seems to be low in SGLT-2i patients and high in DPP-4i patients

In this study, it was observed that reduction in cardiovascular risk with Type-II Diabetes mellitus patients taking SGLT-2 inhibitors than DPP-4 inhibitors. It was concluded that SGLT-2 inhibitors not only having oral hypoglycemic activity and also it has cardio-protective mechanism

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CONSUMER ANALYSIS AND AWARENESS TO BUYING ORGANIC PRODUCTS IN SALEM DISTRICT – TAMIL NADU

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ABSTRACT
Natural items get significant spot inside the personalities of buyers. Most are worried about their wellbeing and accept the items that are delivered, put away and handled without utilizing any compound buildup and counterfeit manures. This investigation is a valuation has two fundamental goals for example to work out the association between very natural items clients purchase and benefit of utilizing Natural Items and also to work out the different connection between purposes behind choosing natural items and benefit of utilizing Natural Items. Information has been broke down with the help of a poll on a Likert scale beginning from 1= firmly conform to 5= Emphatically Clash. The information is broke down utilizing SPSS rendition 13.0. Discoveries of the investigation uncovered that clients were concurred that natural items add to their better wellbeing followed by nature of item and favoring the taste/surface/feeling and in this manner the comparing mean was 1.48, 1.92 and 1.92 separately. As to the natural item over non natural item, clients were consider that natural items were liked for wellbeing concern followed by leaning toward the taste/surface/feeling and nature of item and subsequently the relating mean was 1.48, 2.04 and 2.08 individually.

INTRODUCTION OF THE STUDY
Agribusiness is right now changing into modified into dynamic useful and beneficial area attributable to always expanding interest for food and food items. In order to adapt up to the food creation focus on, a ton of stress is more likely than not going to be to agrarian data sources. the work of synthetics as plant assurance rehearses goes about as partner degree protection against the risk of losing not exclusively the harvest anyway furthermore the money spent on cutting edge innovation utilized as contributions to accomplishing higher creation. Overcome With in the advancement of different agrochemicals and their boundless use at the ranch level so has assisted with spicing up the horticultural creation through and through nations.

OBJECTIVES OF THE STUDY
1.To analysis attitude of consumers buying and using of organic products.

2.To study the factors influencing to store for organic products among the consumers.

3.To assess consumer awareness about organic food products.

SCOPE OF THE STUDY
Natural food advances equilibrium of human, other living organic entities and accordingly the nature. It likewise advances no fake additives and best keep up with the innovation of food. This forestalls abundance utilize hurtful fixings and subsequently guarantees wellbeing. These investigations endeavored toward acknowledge information about buyer mindfulness towards natural food utilization and learn whether there's any potential this might require for changing their conduct. The reasoning for finishing this examination is that thought for the climate could come uniquely from all around educated residents who know, and completely dedicated to their privileges to a quality wellbeing and climate. Subsequently shopper's mindfulness and fulfillment towards natural food will be the most point of this examination.

REVIEW OF RELATED LITERATURE
Padiya and Vala (2012) mentioned in their study at Ahemdabad, exemplified the organic food buyers as less thoughtful about price, supporters of quality and knowledge, generally get information from magazine, newspaper and at the point of purchase.

Raghavan and Megeh (2013) analyzed the buying purpose towards organic products in Chennai city. The results of the study showed that insights related to organic food product had the sturdiest association with the consumers purpose to purchase organic food. Basha, etal. (2015) identified the intentions of people in purchasing organic products and found that consumers were concerned of their health, life style and environment while purchasing organic products.

Krishnakumare and Niranjan (2017) studied buying behavior of 240 consumers towards organic food products in Tirupur district of Tamil Nadu and found that consumers bought organic food products due to their concern for health but some some consumers did not

buy due to high price and inassurance of quality. Organic food consumers' perception for organic food products was better than non-organic food consumers. Sharma and Singhvi (2018) through their review study provided a complete overview of consumer perceptions for organic food products and revealed that in near future more demand there for organically grown food products will arise and thus suggested producer, traders, and government to focus over the niche market of organic.

Chiciudean (2019) studied 568 consumers from North-West Development Region of Romania to identify the main barriers in consumption and; factors influenced the increase in demand for organic food products. They found that price of product was main barrier in consumption followed by perishability and availability. Other influencing factors were mistrust, and lack of proper promotion for organic food.

RESEARCH METHODOLOGY

The validity of any research is predicated on the systematic method of information collection and analysis. Both primary and secondary data were used for this study. For collecting the primary data, 200 sample respondents were selected from six taluks of Salem District by using stratified random sampling method.

DATA ANALYSIS

Demographic Profile: The demographic characteristics of the respondents are summarized in Table 1. The table revealed that most of the respondents were male (58%) followed by female (42%). The sample customers are mostly in the age group of 18-25 (39%) followed by age group of 26-40 (28%). Further, a majority of the respondents (58%) were married. The respondents were predominantly graduates (37%) followed by post-graduates (35%) implying that sample comprises of high literate respondents. With regard to the employment status, service and professionals have (40%) share implying that respondents are well placed in their career. The sample had a majority of respondents (38%) earning to Rs50000 & more, followed by less than 10000(36%). Customers use to buy online most of the time (63%) mostly they buy once in month (70%). Majority of the customers by organic food once in a month i.e.70% followed by once in a week (17%) and once in a year (13%). Regarding the kind of products, customers generally buy food/drink (40%)

followed by cosmetics (35%) and clothes /fabric (25%). To know about the reason behind purchasing organic product are quality of the product (64%) considered by the majority of the customers followed by health concern (19%) and preferring thetaste/texture/feeling (17%).

TABLE 1: Demographic Profile of the Respondents

S. No.	Demographic Profile	Frequency	Percent
Gender	Male	116	58.0
	Female	84	42.0
Age	18-25 year	78	39.0
	26-40 year	56	28.0
	41-55 year	52	26.0
	56 & above	14	7.0
Marital Status	Married	116	58.0
	Unmarried	84	42.0
Education Level	Under graduate	50	25.0
	Graduate	74	37.0
	Post graduate	70	35.0
	Doctorate	6	3.0
Employment Status	In service	80	40.0
	Own Business	46	23.0
	Student	74	37.0
Monthly Income	Less than 10000	72	36.0
	10001-25000	22	11.0
	25001-50000	30	15.0
	50001 & more	76	38.0

Place for buying organic products	Retail shops	44	22.0
	Local shops	30	15.0
	Online	126	63.0
Frequency of buying organic products	Once a week	34	17.0
	Once a month	140	70.0

	Once a year	26	13.0
Kind of organic products customers buy	Food/drink	80	40.0
	Cosmetics	70	35.0
	Clothes/fabric	50	25.0
Reasons for choosing organic products	Prefer the taste/texture/feeling	34	17.0
	Quality of product	128	64.0
	Health concern	38	19.0

Reason for Choosing Organic Product: Table 2 reveals that the null hypothesis H0(1) is accepted as all the factors are significant reason being customers use organic food/ drinks which contribute to better health, they prefer organic products over inorganic in food and cosmetics. Moreover they find organic products more environments friendly, respondents reveals that they find similarity in organic food as well as inorganic food products. On the other hand organic products users were in favors of subsidizing the organic product so that it will be afford by majority.

Customers were agreed that organic products contribute to their better health followed by quality of product and preferring the taste/texture/feeling and the corresponding mean value was 1.48, 1.92 and 1.92 respectively. Regarding preferring the organic product over non organic product, customers were consider that organic products were preferred for health concern followed by preferring the taste/texture/feeling and quality of product and the corresponding mean value was 1.48, 2.04 and 2.08 respectively. Regarding the production of organic product that is totally environment friendly, customers were agreed that it is of concern of health, followed by quality and the corresponding mean value was 2.25 and 2.83, whereas customers were disagreed towards the taste/texture/feeling and the corresponding mean value was 4.29. Regarding the organic and inorganic products alike, customers were neutral for quality of product followed by health concern and taste/texture/feeling and the corresponding mean value was 3.12, 3.80 and 3.85 respectively. It will be affordable by more new customers. Regarding the sense of satisfaction from using organic products, customers were strongly agreed that organic products are of quality and gave satisfaction while using it and the corresponding mean value was 1.50, whereas customers were also agreed that organic products usage leads to good health or not harmful for health and the corresponding mean value was 2.22.

On the other hand, customers were strongly agreed to become a part of organic movement as it focuses on the taste/texture/feeling followed by quality of product and health concern and the corresponding mean value was 1.53, 1.58 and 1.98 respectively. Regarding paying extra money for environmental friendly product, customers were agreed to pay even extra money for the health concern and quality of product but customers were having neutral opinion regarding the taste/texture/feeling and the corresponding mean value was 2.35, 2.41 and 3.92 respectively.

FINDINGS
AWARENESS ABOUT ORGANIC FOOD PRODUCTS

Among the Consumers, 51.5 % of them are males, and the rest 48.5% are females. The overall mean agreeability score ranged from 1.80 to 1.81 and it's on par among gender group of Consumers.

• 46.0 % of them belong to 25 -40 years of age group, followed by 29.4 % belong to above 40 years of age group of Consumers. The overall mean agreeability score ranged from 1.70-1.84 and it's on par among age groups of Consumers.

• 51.8 % of them belong to rural area, and the rest 48.2% of them belong to urban area. The overall mean agreeability score ranged from 1.78 to 1.83 and it's on par among location groups of Consumers.

• 61.8 % of them are married, and the rest 38.2% are unmarried. The overall mean agreeability score ranged from 1.58 to 1.95 and it is higher among married group of Consumers.

• 36.2 % of them are graduates, followed by 31 % are professionals. The overall mean agreeability score ranged from 1.76 to 1.89 and it's on par among educational group of Consumers.

• 30.9 % of them belong to other occupational group, followed by 19.1 % are students group of Consumers. The overall mean agreeability score ranged from 1.64 to 1.93 and it's higher in agricultural group of Consumers.

• 55.6 % of them belong to joint family, and the rest of them belong to nuclear family. The overall mean agreeability score ranged from 1.79 to 1.83 and it is on par among nature of family group of Consumers.

• 56.9 % of them have up to 4 members in their family, and the rest 43.1% have above 4 members in their family. The overall mean agreeability score ranged from 1.78 to 1.82 and it's on par among the family size group of Consumers.

• 45.9 % of them belong to below Rs.25, 000 monthly family income group, followed by 38.1 % belong to between Rs.25, 000-Rs.50, 000 monthly family income groups of Consumers. The overall mean agreeability score ranged from 1.65 to 1.91 and it is higher in Rs.25,000-Rs.50,000 monthly family income group of Consumers.

• 38.8 % purchase organic products weekly, followed by 28.1 % purchase monthly, 14.7 purchase daily, and 5.6 % purchase every six months Thus the study revealed that most of the Consumers purchase organic products weekly.

• 87.9 % expressed that there is need for a system of verification of organic food products, where as the rest 12.1% have expressed 'no' to it. Thus the study revealed that majority of the Consumers has expressed that there is need a system of verification of organic food products.

• 50.1 % have said that the government is responsible for providing verification, followed by 17.6 % have said an independent certification company is needed. Thus the study revealed that majority have said that the government is responsible for providing verification.

SUGGESTIONS

1. Government support: Government is all so support to grow of organic farming and each one so farmer through good organic product market facilities, sustain then on organic products.

2. Infrastructure facilities: Give to sport to post-harvesting facilities for organic forming. Because possible to affected farmer.

3. Package of product: Provide honest filler facilities to specific product.

4. Development of selling to say no in yield during the conversion period, there's got to provide some sort of incentives

CONCLUSION

The present study aimed to provide the significant light into the awareness and

Satisfaction level of organic consumer regarding kind of organic product and reasons for choosing organic products with reference to Salem city. The study clearly reflects that the reasons behind choosing organic food for health concern, quality of product and the texture/taste /feeling. Consumers generally prefer organic product in the form of clothes/fabric, cosmetics and food/drink. Hence it can be concluded that customers were getting organic products in limited variety and very few stock was there, if it got subsidized than more companied would join and organic product become cheaper and more variety would be there. With the attempt of Government to rationalize regulatory mechanism like providing subsidies and grants for better progress of organic product and attentiveness among local consumers for household consumption will cover for quicker expansion of organic farming. Moreover the initial cost for starting organic farming is higher and in this direction government can help the farmer to grow the organic product.

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CURRENT TRENDS IN RURAL MARKETING

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ABSTRACT

Rural markets have become integral part of global market. The rural markets are growing at above two times faster pace than urban markets; not surprisingly. The marketers in recent years are thus facing an extremely difficult and challenging tasks of catering to the rural sector, which is now almost impossible to ignore because of its rising income, population growth rate and government thrust on primary sector growth in its current five years' plan. The paper describes the challenges and strategies of rural marketing in India and present scenario of rural market in India.

Key Words - Rural: Marketing: Challenges and strategies: emerging trend

I. INTRODUCTION

Rural India with its traditional perception has grown over the years, not only in terms of income, but also in terms of thinking. The rural markets are growing at above two times faster pace than urban markets; not surprisingly, Rural India accounts for 60% of the total national demand. Organizations need to sustain and grow in the market; therefore, they adopted newly marketing trends for retaining the existing customers and targeting new customers to increase the market share. Organizations need to sustain if effective network is available to adopt neo-marketing strategies to tap such markets available in rural and for flung areas where more than 65% population is residing with large untapped consumer potential. These recently developed trends also facilitate the organization to reach the target customers in minimum possible time. An organization selects new marketing trends on the basis of nature and usage of products. Such marketing is a process that involves carefully designing, implementing and controlling formulated strategies to facilitate the exchange of goods and services between organizations and customers. It helps an organization in identifying needs and wants of the customers and delivering products that satisfy those needs and wants.

Indian Rural economy emerging as biggest contributor to economic growth of India it is estimated that it will be around 45% of GDP by 2020. The rural economy has provided a cushion to the Indian economy. Indian economy is able to sustain in spite of all the crisis happened in other parts of the world is because of the backup of rural market. Rural consumers, who were on the receiving end so far, are now slowly getting into position to dictate the terms for the first time.

A. Objective

To study the needs of rural marketing in India.

To study the present scenario of rural market in India. To study the trends in rural marketing

To study the challenges and strategies in rural marketing.

II. METHODOLOGY

The Research design in this study is Descriptive research design. In order to achieve their search objectives, the study is based on secondary data. The data has been collected from various websites, newspapers and reputed journals.

A. Present Scenario in Rural Marketing

As we know Indian economy comprising of both urban sector as well as rural sector. And concept of rural marketing in Indian economy has always played an influential role in the lives of people. In India, leaving out a few metropolitan cities, all the districts and industrial townships are connected with rural markets. The rural market in India is not a separate entity in itself and it is highly influenced by the sociological and behavioral factors operating in the country. The Indian rural markets with its vast size and demand base offer great anveshanaindia@gmail.com, www.anveshanaindia.com 102 opportunities to marketers. About 68.84% of the consumers live in rural areas and more than half of the national income is generated from rural areas. Of the 121 crore Indians, 83.3 crore live in rural areas while

37.7 crore stay in urban areas, our nation is distributed approximately in 6,30,000 villages which can be sorted in different parameters such as literary levels, accessibility, income level, penetration, distance from nearest town etc. It is only natural that rural India occupies an important position in the marketing strategies

both in the narrower and broader spectrum. Rural marketing in Indian economy can be classified under two broad categories. These are

(a) the markets for consumer goods that comprise of both durable and non-durable goods, and

(b) the markets for agricultural inputs that include fertilizers, pesticides, seeds, and so on.

The concept of rural marketing in India is often been found to form ambiguity in the minds ofpeople who think rural marketing is all about agricultural marketing. However, rural marketing determines the carrying out of business activities bringing in the flow of goods from urban sectors to the rural regions of the country as well as the marketing of various products manufactured by the non-agricultural workers from rural to urban areas

B. Needs of Rural Marketing

There are many reasons that have urged the Indian companies to enter the rural India. Some of them are discussed below:

1. Rapid growth in service industries

2. Rise in demanding consumers: The purchasing power in rural India is on steady rise and it has resulted in the growth of the rural market 3. Increase of rural literacy: Literacy level among the rural mass is increasing day by day. Rural consumer can understand the message given by the producers in the advertisements.

4. Global integration: Global Research Company McKinsey had referred to India as the "Birdof Gold" in its report titled. The Bird of Gold: The Rise of India's Consumer Market. Consumer product makers and analysts now believe that this bird is ready to fly with wings wide spread in the global sky. Rural consumers increasing their appetite for better products and high-standard services.

5. Increase in rural population: Over the past few years rural India has witnessed an increase in the population with much more pace than of urban population and as far as total anveshanaindia@gmail.com, www.anveshanaindia.com 104 population size in concern rural population size is more than two times of urban population.

C. Trends in Rural Marketing

The companies should start selling the concept of quality with proper communication. Their main focus is to change the Indian customer outlook about quality. With their promotion, rural customer asks for value for money

1. Large population: The Indian rural market with its vast size and demand offers great opportunity to marketers. Our national is classified in around 450 districts & approx. 6, 30,000 villages. Indian rural market is huge in size because rural population accounts for almost 70% of Indian population as the recent Census 2011, 833 million live in rural India, 33% of rural population includes youth, number of households increased from 25 to 33 crore. The rural market is currently worth approximately USD$ 10 billion in consumer spending in the FMCG market annually. Food categories are currently driving the bulk of the additional USD$ 90 billion into the marketplace by 2025.

2. . Green revolution: The vision of Dr. Swami Nathan, the father of the green revolution to achieve self-sufficiency in food grain production in 1995, gave a major breakthrough in food grain production by the use of scientific methods in agriculture. At present, Rural India generates 299 million tons annually. The substantial attention accorded to agriculture during the successive five-year plans has helped in improving agricultural productivity. Adoption of new agronomic practices, selected mechanisation, multiple cropping, inclusion of cash crops and development of allied activities like dairy, fisheries and other commercial activities have helped in increasing disposable income of rural consumers. By observing this scenario, India's one of the biggest giant Hindustan Lever Ltd. has entered into rural market for more penetration through the operation „Bharat".

3. Smart phones penetrating into rural India: 320 million are rural mobile phone users

i.e. roughly 38 per cent of the rural population, which includes children and senior citizens. The actual benefit of technology positively impacting rural economy will be seen when data communication is used effectively.

4. Increased level of education and employability of rural youth: Villagers realized their children education is the first priority. Most of the rural youth especially teenagers are anveshanaindia@gmail.com,

www.anveshanaindia.com 105 well aware of products due to their school education and media exposure. Significant progress on literacy levels – 90% of the villages have a primary school within a 1 km walk. Private school enrolment in ruralIndia has enhanced by 5.5% points over past six years. The literacy rate has also gone up by 68.91% in rural India. This enhanced the employability of rural youth they are not sitting idle in villages they are motivated to go to nearby towns to find the jobs.

5. . Increased purchasing power: Rural purchasing power has grown faster than urban in the recent years. Rural Indian economy is highly supported by increasing disposable income, Government initiatives and schemes and favourable demographics. As a result, the rural segment of the Indian economy is growing at a pace of 8-10% per annum. Government spending in rural India has tripled over the last four years and is now translating into higher consumer spending. Therefore, rural consumers are consuming more premium andconvenience oriented categories that are typical of their urban counterparts. "Policy measures like the waiver of agricultural loans around US$ 13.9 billion and the National Rural Employment Guarantee Scheme, which guarantees 100 days of employment to one member of every rural household (NREGS), the Bharat Nirman program with an outlay of US$ 34.84 billion for improving rural infrastructure etc. helped the rural economy.

6. Government Incentives and polices: The government's stress on self-sufficiency resulted in various schemes like Operation Flood (White Revolution), Blue Revolution,Yellow Revolution, etc. resulted in the production of 15 million tons of milk per annum. The Indian Government launched a number of schemes like IRDP (Integrated Rural DevelopmentProgramme) and REP (Rural Electrification Programme) in the 1970"s, which gave a boost tothe agrarian economy. This resulted in changes in people's habits and social life. REP gave impetus to the development of consumer durable industry.

7. Media: Mass Media has created increased demand for goods and services in rural areas. Smart marketers are employing the right mix of conventional and non-conventional media to create increased demand for products. The role cable television has been noteworthyin bringing about the change in rural people's mind set and influencing their lifestyles.

8. IT penetration in rural India: Today's rural children and youth will grow up in an environment where they have 'information access' to education opportunities, exam results, career counselling, job opportunities, government schemes and services, health and legal advice and services, worldwide news and information, land records, mandi prices, weather forecasts, bank loans, livelihood options. If television could change the language of brand communication in rural India, affordable Web connectivity through various types of communication hubs will surely impact the currency of information exchange .As the electronic ethos and IT culture moves into rural India, the possibilities anveshanaindia@gmail.com, www.anveshanaindia.com 106 of change are becoming visible. Products developed for rural marketing are Philips develop a to "vardaan" and free power radio for rural markets, ICICI rural ATMS, Bhumiheen credit cards by bank of India, E- choupal by ITC.

9. Better credit facilities through banks: With co-operative banks taking the lead in the rural areas, every village has access to short, medium, long-term loans from these banks. The credit facilities extended by public sector banks through Kisan Credit Cards help the farmers to buy seeds, fertilizers and every consumer goods on instalments.

10. Brand conscious: The rural market in India is not separate entity in itself and it is highly influenced by the sociological and behavioral factors operating in the country. Spending on FMCG products especially in the rural areas is showing an increasing tendency.

D. Challenges and Strategies in Rural Market

Delivering to the rural markets is a real challenge to many marketers. In fact, the whole dynamics of rural markets are so unique that one has to look at beyond traditional marketing mix with advanced mix containing the 4A"s instead of the traditional 4P"s of marketing: Acceptability – develop what the consumer wants, Affordability – Make an affordable product, Availability – product made available at villages and Awareness - Don't promote thebrand, demonstrate the product. Most of the marketers look at rural market as an extension of existing urban market hence they simply dump their existing product which is outdated in urban market into rural market. Hence marketers fail to penetrate into rural market in big way. Though rural consumers attracted towards urban life styles their dynamics are differing from urban consumers. Similarly, rural marketing strategies are also significantly different from the marketing strategies aimed at an urban consumer.

Strategies for Rural Marketing

The past practices of treating rural markets as appendages of the urban market is not correct, since rural markets have their own independent existence, and if cultivated well could turn into a generator of profit for the marketers. But the rural markets can be exploited byrealizing them, rather than treating them as convenient extensions of the urban market.

a) Marketing Strategy: Marketers need to understand the psychology of the rural consumers and then act consequently. Rural marketing involves more exhaustive personal selling efforts compared to urban marketing. Firms should abstain from designing goods for the urban markets and subsequently pushing them in the rural areas. To effectively tap the rural market, a brand must associate it with the same things the rural folks do. This can be done by utilizingthe various rural folk media to reach them in their own language and in large numbers so that the brand can be associated with the myriad rituals, celebrations, festivals, "melas", and other activities where they assemble.

b) Distribution Strategy: One of the ways could be using company delivery van which can serve two purposes - it can take the products to the customers in every nook and corner of the market, and it also enables the firm to establish direct contact with them, and therebyfacilitate sales promotion. Annual "melas" organized are quite popular and provide a very good platform for distribution because people visit them to make several purchases. According to the Indian Market Research Bureau, around 8000 such melas are held in rural India every year. Rural markets have the practice of fixing specific days in a week as Market Days called "Haats' when exchange of goods and services are carried out. This is another potential low cost distribution channel available to the marketers. Also, every region consisting of several villages is generally served by one satellite town termed as "Mandis" where people prefer to go to buy their durable commodities. If marketing managers use these feeder towns, they will easily be able to cover a large section of the rural population.

c) Promotional Strategy: Marketers must be very careful while choosing the mediums to be used for communication. Only 16% of the rural population has access to a vernacular newspaper. So, the audio visuals must be planned to convey a right message to the rural folk. The rich, traditional media forms like folk dances, puppet shows, etc., with which the rural consumers are familiar and comfortable, can be used for high impact product campaigns. Radio is also very popular source of information and Entertainment, adds on radio can also be a helpful tool for marketers

III. CONCLUSION
India's rural market could have been stronger than the present position, if Indian policymakers have made adequate infrastructure for rural India. Rural markets, as part of any economy, have untapped potential. Thus looking at the challenges and the strategies which rural markets offer to the marketers it can be said that the future is very promising for those who can understand the dynamics of rural markets and exploit them to their best advantage.

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CURRICULUM TRANSACTION IN TECHNOLOGY ENHANCED LEARNING ENVIRONMENT TO DEVELOP COGNITIVE SKILLS OF SECONDARY SCHOOL STUDENTS

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ABSTRACT-

'Education means that process by which character is formed, strength of mind is increased, and intellect is sharpened, as a result of which one can stand on one's own feet'.

SWAMI VIVEKANANDA

In the true sense, the aim of education is to develop intellectual abilities of children. Curriculum transaction should not be for exchange of information only. This ability of intellect is called "cognitive skills" Benjamin Bloom has talked about the 6 levels of the learning process in his first domain of learning, which is the "cognitive domain". Which are like this- Knowledge, comprehension, application, analysis, synthesis, evaluation. After this, some changes were made in this hierarchy by David Krathwohl and Lorin Anderson which is as follows-Remember, understand, apply, analyse, evaluate and create. A teacher plays an important role in achievement of the higher level of learning among students by providing them proper and adequate opportunities to identify and utilize their abilities. In this process technology enhanced learning environment can help the educators and learners both. In the modern era, technology also has an important contribution in the field of education. It is crucial to understand how to use technology enhanced learning environment for curriculum transaction, so that it can develop the cognitive skills of school students. Data for the present article is collected from secondary sources of data collection like research papers, articles, studies, magazines and internet sources. with the help of technology enhanced environment, teaching content can be prepared and presented in such a way that it can prompt and promote the critical thinking ability of the children and by which they can attained the higher level of cognitive skills. The article explains how the cognitive skills of children can be enhanced by curriculum transaction with the help of technology enhanced learning environment.

1.   INTRODUCTION-
"Learning without reflection is a waste. Reflection without learning is dangerous."

Confucius

Learning is a lifelong process. All living beings whether they are humans or animals keep on learning something throughout their life. The process of learning begins as soon as a child is born. Due to the power of learning, man has completed the journey from living in caves to reaching Mars. Only by learning we can use our powers properly and fully. There is a hierarchy of learning process. First, we get the knowledge, then remember it, then understand it and as we move forward, we learn to apply that knowledge in our life. Moving forward in this hierarchy, when we reach the top, we analyse, reflect and evaluate the usefulness of the knowledge gained. And finally, on the basis of analysis, synthesis and evaluation of the previous knowledge, we create something new. This ability of intellect is called "cognitive skill" Benjamin Bloom has talked about the 6 levels of the learning process in his first domain of learning, which is the cognitive domain. Which are like this- Knowledge, comprehension, application, analysis, synthesis, evaluation. After this, some changes were made in this hierarchy by David Krathwohl and Lorin Anderson which is as follows-Remember, understand, apply, analyse, evaluate and create.

(Robinson, 2012)- "Cognitive abilities are aspects of mental functioning, such as memorizing and remembering; inhibiting and focusing attention; speed of information processing; and spatial and causal reasoning."

The ability to create something new is achieved only when we acquire critical knowledge about anything. That is why it is not enough to acquire knowledge, but it is also very important to measure it on the basis of critical thinking. Now the question arises that how to enhance the critical thinking to develop cognitive skills of children. A teacher plays an important role in achievement of the higher level of learning among students by providing them proper and adequate opportunities to identify and utilize their abilities. In this process technology enhanced learning environment can help the educators and learners both. In the modern era, technology also has an important contribution in the field of education.

2.   OPERATIONAL DEFINITION OF KEYWORDS-
Technology enhanced learning environment- Using of various technological platforms in teaching- learning

Curriculum transaction- A process of planning, execution and evaluation of the teaching content

Cognitive skills- Brain based intellectual skills which are as follows- Remember, understand, apply, analyse, evaluate and create. (Revised Bloom's taxonomy)

Secondary school students- Students of classes IX and X

3. LITERATURE REVIEW-

(Godat, 2012) "The findings of the study revealed the importance of the Achieving Motive dimension of a student's learning approach and how direct intervention and strategies can positively influence critical thinking performance. The findings also identified factors that can adversely affect critical thinking performance and include poor learning skills, frustration, stress and poor self-confidence, prioritisation of over learning; and inadequate appropriation of group role and tasks."

(Swart,2017) "A research study was undertaken, examining undergraduate nursing student engagement with critical thinking instruction. The findings from the students' perspectives were positive toward the inclusion of technology-enhanced learning, and use in supporting their development of critical thinking."

(Kopotun et al., 2020) "The objective of this study was to find out how effective the use of smart technologies is in the professional training of students of the law departments, in particular for the formation and development of their critical thinking. The study showed the efficiency of the use of smart technologies in the formation and development of critical thinking in future lawyers."

(Kwangmuang et al., 2021) "The findings indicate that analytical thinking, creative thinking, problem-solving thinking and critical thinking skill are developed by researchers, and experienced and practiced by learners in their lessons. Results show positive impact of learning innovations in learners' experiences."

(Gottschalk, 2019) "This paper explores some of the literature on the effects of technology use on children in terms of their brain, cognitive, socio-emotional and physical development, and summarises what is clearly demonstrated in the literature. Technology has both its effects and side effects. Proper guidelines are required to use technology properly."

(Swart, 2017) "The study was conducted for nursing students. The findings of the study revealed student perspective of the use of technology with the instructional approach of inquiry, and their demonstration of the desired learning outcome of critical thinking. Thus, identifying factors important to the designing of a course to appropriately use technology to support student learning."

(Alsaleh, 2020) "This review paper says that in order to develop successful critical thinkers, CT must be incorporated into the curriculum content and teaching approaches and sequenced at all grade levels. Overall, the study of actual practices indicates that teaching approaches tend to focus on subject content rather than CT development. The results indicate a gap in teaching CT skills in terms of innovative methods and particularly in the use of new technologies."

4. OBJECTIVE-

To understand how to use technology enhanced learning environment for curriculum transaction, so that it can develop the cognitive skills of school students.

5. DEFINING COGNITIVE SKILLS: REVISED TAXONOMY OF BLOOM

(Hoque, 2016)- "The domains of learning can be categorized as cognitive domain (knowledge), psychomotor domain (skills) and affective domain (attitudes). This categorization is best explained by the Taxonomy of Learning Domains formulated by a group of researchers led by Benjamin Bloom along with in 1956." The cognitive domain is a series of different links in an individual's intellectual development. The hierarchy of cognitive domain is as follows-

Remember- In achievement of the cognitive skills the first level is remembrance of facts and information.

Understand – In the second level of cognitive development students learn to differentiate, describe, classify and identify.

Apply-In the third level of cognitive skills achievement students can use their pre-knowledge in the new situations to find out solutions of the problems.

Analyse – In this level students learn to separate the parts of any idea or phenomenon, interpret them and find relationship between them.

Evaluate- In this level of cognition students learn to justify or measures the things with arguments, weightage, views and opinion. They can take their stand.

Create- This is the final and uppermost level of cognitive skills. By the reaching of this level students learn to make, formulate, discover, innovate, assemble and construct of a new idea or thing.

6. DEFINING TECHNOLOGY ENHANCED LEARNING ENVIRONMENT-

Technology enhanced learning environment is a learning environment driven by technology. At present, both teachers and students use technology in the process of teaching and learning. Both use digital tools and techniques to make teaching-learning process easier, Interesting and accessible.

Most used technologies of technologies and devices enhanced learning environment-

- Mobile devices and laptops
- Podcast and audio/videos
- LMS/VLS and flipped classrooms
- OER and other online materials
- Virtual reality and augmentation
- Digital games and apps
- Social networking

7. DEFINING CURRICULUM TRANSACTION IN TECHNOLOGY ENHANCED LEARNING ENVIRONMENT-

Planning of the teaching content-Planning is the most important part of the curriculum transaction. A meticulous planning can lead to brilliant outcomes. The teacher should prepare his lesson plan in such a way that it is not only for acquiring knowledge but also for higher intellectual achievements. With the help of technology, the teacher gets many resources, ideas, activities and materials for the preparation of his/her lesson plan.

Execution of the content-Execution of the teaching content is another important part of the curriculum transaction. The accomplishment of the stated objectives of planning depends on how much the students understood the concepts, and in order to understand the concepts of the students well, it is necessary for the teacher to execute the lesson plan in an appropriate manner. A teacher has to teach a heterogenous class, he/she knows every student has different intellectual abilities. Therefore, with the help of technology, he can teach children with different teaching methods and teaching aids so that higher levels of cognitive development can be achieved.

Evaluation and feedback- Evaluation is necessary to understand the reach of children's cognitive development and the growth expected in it. With the help of technology enhanced learning environment, the teacher can better evaluate the children by using new and innovative methods instead of traditional pen/ paper assessment methods. Because measuring a child's intellectual ability on the basis of only an exam conducted once or twice in a year is not sufficient. Every child has different intellectual ability, so evaluating their ability on a standard pen/ paper test can't bring actual outcomes. With the help of technology enhanced learning environment feedback can also be given to the children instantly so that they can immediately understand their mistakes and get them improved.

8. WAYS OF CURRICULUM TRANSACTION IN TECHNOLOGY ENHANCED LEARNING ENVIRONMENT FOR DEVELOPMENT OF COGNITIVE SKILLS-

(Riazi & Mosalanejad, 2010) "The intent was to ensure that learning outcomes were designed in such a manner that enables the teachers to gradually bring learners from acquiring subject information to its practical application in the real context and ultimately, create meaning of their own from the same."

Inquiry based learning method- (Ismail & Elias, 2006) "In inquiry learning learners are shown how knowledge is generated and transmitted and how they can acquire the knowledge and skills necessary to become life-long learners." In this method, with the help of technology enhanced learning environment, such tasks can be given to children by which their curiosity increases and they can satisfy their quest for the knowledge. They can use their higher order thinking.

Experiential learning method- (CBSE HANDBOOK EXPERIENTIAL LEARNING) "Experiential approach aims at making the educational environment student cantered. The students have control over their own learning – over the pace of learning, method of learning, and over the skills they need to utilize for this learning. They are able to evaluate, think critically, make decisions and master knowledge by constructing it." Let them learn by performing the tasks. With the help of 3D technique, virtual reality and other techniques teacher can provide them various opportunities of experiences. By this their all senses will be activated and they will learn to understand, analyse and evaluate.

Problem solving method- (Pallavi, n.d.)- "Educating your students about problem solving skills from an early age in school can be facilitated through classroom problem solving activities. Such endeavours encourage cognitive as well as social development." With the help of technology teacher can plan or execute the lesson in this manner that it can provide various situations to the students where they are prompted to find out the solution of the problem. Teacher can plan of explore some quizzes, puzzles and games etc.

Discussion method- (Abdulbaki et al., 2019)- "The discussion method improves students' ability to think and could be more tempting to learning than mere listening to a lecture. It may also assist in fostering intellectual growth, individual expression and character development." The more the children get exposure to discussion, the more their intellectual ability will increase. With the help of technology, children can be given the opportunity for discussion not only inside the classroom but across the world.

Project method- (Szállassy, 2008)- "The project method is a target-driven activity based on challenge, fostering success and efficient cooperation, during which the students' activity gains more weight than the communication of knowledge by the teacher." Students can be given a project to do and with the help of digital resources they can find the solution of the problems, apply their knowledge and skills and learn to create something new.

Demonstration method- (George, n.d.)-"In the demonstration method the teacher or an assigned student or group shows how a process is done while the students become observers." With the help of 3D model or audio/ visuals teacher can present demonstration Infront of the students so that students understand it very well. By this their understanding skill.

Universal Design Design (UDL) - (Dalton, 2017)- "Universal Design for Learning (UDL), a framework for designing instruction to address the wide range of learner variation in today's inclusive classrooms, can be applied effectively to broaden access, understanding, and engagement in digital and media literacy learning for ALL." Technology enhanced learning environment can help teacher to plan the lesson for the heterogenous class by providing a range of activities and teaching aid.

Self- regulated learning method-(Schraw et al., 2006)- "Self-regulated learning refers to learners' abilities to understand and control their learning environments. Self-regulated learning involves a combination of cognitive strategy use, meta-cognitive processing, and motivational beliefs." Provide some opportunities of self- learning to the students so that they can use their ability and skill. Let them analyse, interpret and evaluate by themselves. Technology plays a vital role here by generating their curiosity and enhance their motivation.

Digital Game based learning method - (Serrano, 2019)- "Digital game-based learning can be used by educators to support students in developing skills." Learning by digital games makes teaching- learning more interesting. This method can be used to enhance the cognitive skills of students. Through digital games, students' thinking power, problem solving power, and analysis power can be increased.

9. METHODOLOGY-
Data for the present article is collected from secondary sources of data collection like research papers, articles, studies, magazines and internet sources. On the basis of all the collected data, the researcher has told the usefulness of curriculum transaction in technology enhanced learning environment for the acquisition of cognitive skills.

10. IMPLICATION OF THE STUDY-
The article explains how the cognitive skills of children can be enhanced by curriculum transaction with the help of technology enhanced learning environment.

11. CONCLUSION-
The aim of education is not only to exchange of information but to develop the intellectual abilities of the children. A teacher can enhance cbe cognitive devepment of children through meaningful curriculum transactions. In the present time, the development of technology has formed such a learning environment in

which students can be taught to make proper use of their intellectual abilities. With the help of technology enhanced environment, teaching content can be prepared and presented in such a way that it can prompt and promote the critical thinking ability of the children and by which they can attained the higher level of cognitive skills.

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DESIGN AND ANALYSIS OF CRANK SHAFT USING ANSYS

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ABSTRACT
Crankshaft is one of the prime component of an IC Engine. It is a very much important fact that balancing and the life of crankshaft depends upon stress variation in crankshaft to a greater extend which in turn influences the performance and vibration of an IC Engine. So, it is very essential to maintain the uniform distribution of stresses as much as possible in the crank shaft using both structure analysis as well as thermal analysis so as to increase the life and balancing of crankshaft as well as improving the performance of engine. This paper deals with stress distribution, vibrational effect and temperature distribution in crankshaft. The design of Crank shaft was modelled using Solid works and later it was imported to Ansys Simulation software for analysis purpose using Finite element method. The results achieved after analysis can be used for conceptual understanding of stress distribution and temperature distribution in crankshaft.

Key words: Crankshaft, finite element analysis, solid work, ANSYS 16.0, thermal analysis, modal analysis, structural analysis.

INTRODUCTION:
Crankshaft is one of the essential moving component of IC engine which is located in the crankcase of IC engine. The connecting rod carrying piston is fixed over the crankpins of crankshaft. The crank shafts having complex structure and carrying one of the most crucial part (Piston) of IC Engine fetters it in the category of one of the quintessential component which influences the overall vibrational characteristics of IC engine and so performing the analysis of the same. The Purpose of using crankshaft is to convert reciprocating motion of piston into rotatory motion which further can be used for various applications like mobility of vehicles, Rotating prime mover for power generation etc. During the operation of crankshaft various stresses are induced like bending leading to tensile and compressive stresses in crank web which is like a cantilever beam and crank pin which is like a simply supported beam with distributed load of connecting rod and piston. Due to the rotation against friction which is reduced substantially using journals twisting occurs that setups shear stresses in crankshaft. Furthermore, as the temperature is quite high in crankcase causes restricted thermal expansion of crankshaft setting thermal stresses which make thermal analysis important. The material selected for the crankshaft must be able to withstand these and should have high fatigue strength. This paper describes the Model analysis, Structural analysis and Thermal Analysis of the crankshaft. Modal analysis played an important role to optimize the ergonomics and design of the crankshaft which helped to simulate a real-world model giving precise results. The structural analysis helps to visualize stress distribution in crankshaft influencing the vibrational characteristics of engine. The thermal analysis aims to figure out effects of temperature variation in crankcase due to leakage of gases in crankcase and the combustion taking place at very high temperature around 1200-1300 C inside engine cylinder leading to setting up stresses in crankshaft. The paper describes design of crankshaft and analysis using Ansys. The benefit of using Ansys is it helps to better visualize the component and deciding the boundary conditions so as to predict precise results. The model of crankshaft built using Solid works imported in Ansys software for the analysis purpose.

LITERATURE SURVEY:
Detailed literature survey was done of analytical analysis, model, thermal, structural analysis based on the past studies of which conclusion converges to aim of this paper.

R.J. deshbhartar(1) studied in their model analysis of a 4 cylinder crankshaft using finite element method analysis of vibration modal of crankshaft the maximum stress point and dangerous area were found by deformation analysis of crankshaft using Ansys software. The paper has successfully shown that maximum deformation occur at centre of crankshaft surface and maximum stress at fillet

Gu Yingkui (2) his study investigate in strength analysis of diesel engine crankshaft conducted Finite element analysis on crankshaft using Ansys software under extreme operating condition and the study of stress distribution was made the paper deduces that the maximum stress concentration occur at knuckles of crank arm and the main journal.

Farzin H. Montazersadgh (3) analyzed Dynamic Load and Stress Analysis of a Crankshaft conducted a dynamic simulation on crankshaft of single cylinder engine the dynamic analysis was done analytically and verified using simulation in ADAMS. The paper concludes that dynamic analysis converges to more realistic stresses than static analysis that provide overestimated results.

Amit Solanki et.al (4) investigate Design and Stress Analysis of Crankshaft for Single Cylinder 4-Stroke Diesel Engine conducted a static analysis use finite element method showing that maximum deformation find out at crankpin and maximum stress between crankshaft journal and crank cheeks.

Wei Li (5) has conducted experimental analysis of crankshaft, microscopic analysis of crankshaft and theoretical analysis of crankshaft and based on analysis it can be concluded that failure began at the fillet region on the lubricating hole which is consequent of high bending stress concentration.

F.S.Silva (6) in this paper conducted an investigation on two damaged crankshaft the cause of the damage was found Diesel van crankshaft is used. Originated small thermal fatigue cracks because of wrong grinding process at the centre of journals on both crankshafts.

Lusjan Witek (7) in this paper used both visual examination nonlinear finite element method was used to determine operational stresses in crankshaft at maximum engine power. The cause of the failure was conclude that bad surface hardening of crank pin area in which non uniform hardness was observed.

K Thriveni et.al(8) In this paper conducted a static analysis on crankshaft using CATIA software FEA was used to analyze variation of stress at various location of crank shaft using ansys software. The paper gives an idea that maximum deformation will be occur at Centre neck of crank pin and also confirms that the model analysis made was successful.

Methodology: The paper in this part of the project is divided into two steps. First design a crankshaft by assuming data and perform analysis. Part of the project is further divided into three steps; the model creation, mesh generation and ANSYS simulation. In ANSYS we perform three analysis first we perform static structural analysis then modal analysis and after that we perform steady state thermal analysis. The main focus of the analysis is the structural, vibrational and thermal behaviour of crankshaft under loading. A comparison between different types of material and conclude which one is better from structural, vibrational and thermal point of view.

Design of crank shaft:
The crank position is at Top Dead Centre:
Step I Bearing reactions
The force acting on the piston.

$$P_p = \left(\frac{\pi D^2}{4}\right) p_{\text{max.}}$$

Assumption 1: The centre to centre distance is twice of the piston diameter. Therefore,

b = 2 × piston diameter   It is further assumed that b1 = b2 Therefore,

$$b_1 = b_2 = \frac{b}{2}$$

By symmetry,

$$(R_1)_v = (R_2)_v = \left(\frac{P_p}{2}\right)$$

Assume c1 = c2

$$(R'_2)_v = (R'_3)_v = \left(\frac{W}{2}\right)$$

$$(R'_2)_h = (R'_3)_h = \left(\frac{P_1 + P_2}{2}\right)$$

Step II Design of crank pin
Suppose,

d_c = diameter of crank pin (mm)

l_c = length of crank pin (mm)

The bending moment is given by,

$$(M_b)_c = (R_1)_v b_1$$

$$(M_b)_c = \left(\frac{\pi d_c^3}{32}\right)\sigma_b$$

$$\left(\frac{l_c}{d_c}\right) = 1$$

$$p_b = \frac{P_p}{d_c l_c}$$

Step III Design of left hand crank

w = width of crank web (mm)

t = thickness of crank web (mm)

Empirical relationships are used to calculate dimension:

w = width of crank web = 1.14 dc

t = thickness of crank web = 0.7 dc

There are two types of stresses at left hand crank web,

$$\sigma_c = \frac{(R_1)_v}{wt}$$

$$\sigma_b = \frac{6(R_1)_v \left[b_1 - \frac{l_c}{2} - \frac{t}{2}\right]}{wt^2}$$

The total compressive stress is given by,

$$(\sigma_c)_t = \sigma_c + \sigma_b$$

Step IV Design of right-hand crank web the thickness and width of the right-hand crank web are similar to left hand crank web because left- hand crank web and right-hand crank web are identical.

Step V Design of shaft under flywheel

We will assume,

c = distance between two bearings 2 and 3

Suppose,

ds = diameter of shaft (flywheel)

The bending moment due to force applied to flywheel is given by,

$$(M_b)_v = (R_3')_v c_2$$

The bending moment due to belt tension is given by,

$$(M_b)_h = (R_3')_h c_2$$

The resultant bending moment is given by,

$$M_b = \sqrt{(M_b)_v^2 + (M_b)_h^2}$$

$$M_b = \left(\frac{\pi d_s^3}{32}\right)\sigma_b$$

When the crank is at max twisting moment angle:
Step I forces act on crank pin
The gas pressure on the piston top for maximum torque condition is

$$P_p = \left(\frac{\pi D^2}{4}\right) p'$$

$$\sin \varphi = \frac{\sin \theta}{(L/r)} = \frac{\sin (25)}{(4.5)}$$

The thrust on the connecting rod (P_q) is given by,

$$P_q = \frac{P_p}{\cos \varphi}$$

p_t And p_r are the tangential and radial components of p_q at the crank pin. Therefore,

$$P_t = P_q \sin(\theta + \varphi)$$

$$P_r = P_q \cos (\theta + \varphi)$$

Step II Bearing reactions
The forces acting at an angle of maximum torque of crank shaft,

$$b_1 = b_2 = \frac{b}{2}$$

$$c_1 = c_2 = \frac{c}{2}$$

$$(R_1)_v = (R_2)_v = \left(\frac{P_r}{2}\right)$$

$$(R_1)_h = (R_2)_h = \left(\frac{P_t}{2}\right)$$

$$(R_2')_v = (R_3')_v = \left(\frac{W}{2}\right)$$

$$(R_2')_h = (R_3')_h = \left(\frac{P_1 + P_2}{2}\right)$$

Step III Design of crank pin
The crank pin diameter (dc) is,

$$d_c^3 = \frac{16}{\pi \tau}\sqrt{(M_b)^2 + (M_t)^2}$$

Step IV Design of shaft under flywheel
The maximum bending moment of shaft is,

$$M_b = R_3 \times c_1$$

It is also subjected to torsional moment

$$M_t = p_t \times r$$

$$R_3 = \sqrt{[(R_3')_v]^2 + [(R_3')_h]^2}$$

The diameter of the shaft (d_s) is calculated by:

$$d_s^3 = \frac{16}{\pi \tau}\sqrt{(M_b)^2 + (M_t)^2}$$

Step V Right-hand crank web shaft design at juncture
Suppose,

d_{s1} = diameter of the shaft (juncture)

$$(M_b)_v = (R_1)_v \left[b_1 + \frac{l_c}{2} + \frac{t}{2} \right] - P_r \left[\frac{l_c}{2} + \frac{t}{2} \right]$$

$$(M_b)_h = (R_1)_h \left[b_1 + \frac{l_c}{2} + \frac{t}{2} \right] - P_t \left[\frac{l_c}{2} + \frac{t}{2} \right]$$

The resultant bending moment is

$$M_b = \sqrt{(M_b)_v^2 + (M_b)_h^2}$$

$$M_t = p_t \times r$$

The diameter of the shaft ds1 is

$$d_{s1}^3 = \frac{16}{\pi\tau} \sqrt{(M_b)^2 + (M_t)^2}$$

Step VI Design of right-hand crank web
The bending moment is,

$(M_b)_r = (R_2)_v \left[b_2 - \frac{l_c}{2} - \frac{t}{2} \right]$ Also,

$$(M_b)_r = (\sigma_b)_r \left[\frac{1}{6} wt^2 \right]$$

The bending moment due to tangential component:

$$(M_b)_t = P_t \left[r - \frac{d_{s1}}{2} \right]$$

$$(M_b)_r = (\sigma_b)_r \left[\frac{1}{6} tw^2 \right]$$

The direct compressive stress is

$$(\sigma_c)_d = \frac{P_r}{2wt}$$

The maximum compressive stress (σ_c) is

$$\sigma_c = (\sigma_b)_r + (\sigma_b)_t + (\sigma_c)_d$$

The torsional moment is

$$M_t = (R_2)_h \left[b_2 - \frac{l_c}{2} \right]$$

$$\tau = \frac{M_t}{Z_p}$$

The maximum compressive stress is $(\sigma_c)_{max.} = \frac{1}{2} \left[\sigma_c + \sqrt{(\sigma_c)^2 + 4\tau^2} \right]$

Step VII Design of left-hand crank web
The thickness and width of the right-hand crank web are similar to left hand crank web because left- hand crank web and right-hand crank web are identical.

Step VIII Design of crankshaft bearing
Bearing 2 is subjected to maximum stress

$$R_2 = \sqrt{[(R_2)_v + (R_2')_v]^2 + [(R_2)_h + (R_2')_h]^2}$$

The bearing pressure is

$$p_b = \frac{R_2}{d_{s1} l_2}$$

Diameter of crankpin = 65 mm

Length of crankpin = 65 mm

Diameter of shaft = 55 mm

Web thickness = t = 46 mm

Web width = w = 75 mm

Methodology of ANSYS simulation of crank shaft:
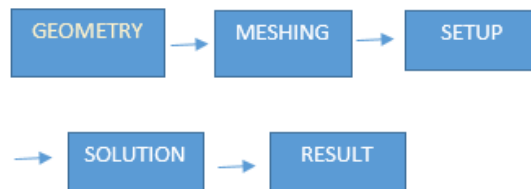
Figure 1. Represent methodology of analysis of crankshaft

Geometry:

Figure below shows geometry of centre crank shaft which is design by using software solid works.
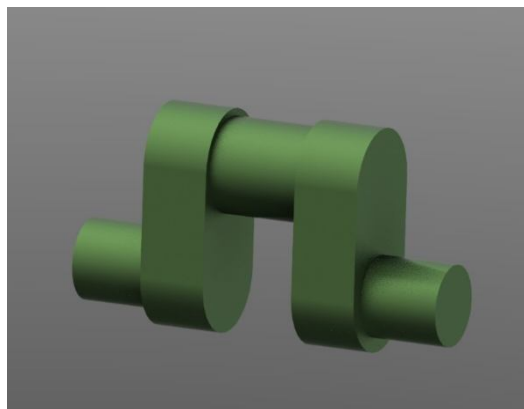
Figure 2. Represent geometry of crankshaft

Meshing:

In meshing crankshaft is discretized as FEM for analysis. Sizing of meshing is done fine mesh is selected.
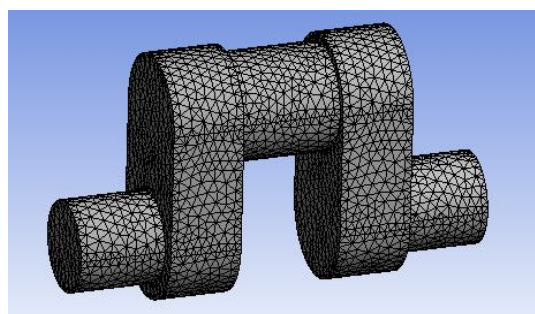
Figure 3. Represent meshing

Setup:

In setup, Material properties for analysis is selected as well as inlet boundary condition are applied.

Figure 4. Represent material properties of aluminum alloy

Figure 5. Represent material properties of forged steel

Figure 6. Represent material properties of titanium alloy

Input parameter:

Parameter	Quantity
Maximum pressure	2.5 Mpa
Bending stress	75 Mpa
Tangential force	12471.38N
Applied Temp	21265.46 N
Ambient Temp	180^0c
HTC	22^0c

Table 1. Represent input parameter of analysis

Boundary condition:
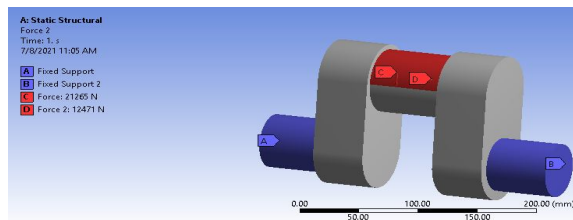
Figure 7. Represents boundary condition applied on crankshaft for static structural and modal analysis
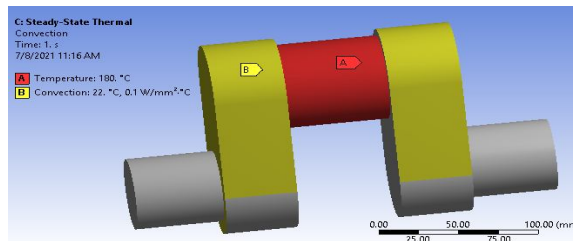
Figure 8. Represents boundary condition applied on crankshaft for static thermal analysis

SOLUTION:
Initializations of parameters that are to be worked out for analysis.

RESULT AND DISCUSSION:
It shown that from static structural analysis point of view crankshaft with titanium alloy material is having less stress (67.54 Mpa) as compared to aluminum alloy(70.04Mpa) as well as forged steel(73.14Mpa) which is represent by stress contour. The maximum stress occurred at crank pin, while the minimum stress occur at side crank web which having farthest distance from the high stress generated place. Deformation contour represent with titanium alloy material is having less deformation (0.013mm) as compared to aluminum alloy (0.039mm) as well as forged steel (0.029mm). The maximum deformation occurred at crank pin, while the minimum deformation occur at side crank web which having farthest distance from the high deformation generated place.

From modal analysis point of view crankshaft with titanium alloy (2332.2 & 6906.4 HZ) have less minimum & maximum frequency as compare to aluminum alloy (2672.4 & 7829.2 HZ) and forged steel (2606.8 &7676.5 HZ).

From steady state thermal analysis point of view crankshaft with titanium alloy (21.872^0c) having less minimum temperature as compared to aluminum alloy (21.991^0c) and forged steel (21.879^0c) which is represented by temperature contour. The maximum temperature occurred at crank pin, while the minimum temperature occur at side crank web which having farthest distance from the high temperature generated place.
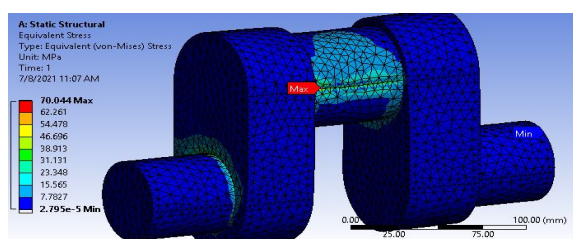
Figure 9. Represents stress contour of crank shaft (aluminum alloy)
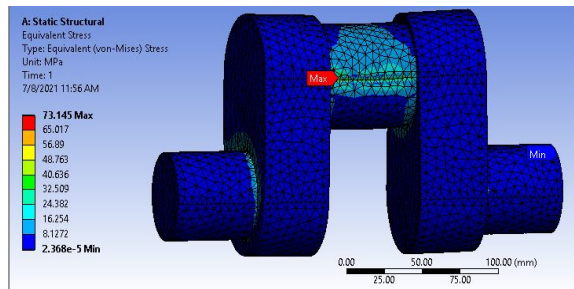
Figure 10. Represents stress contour of crank shaft (forged steel)
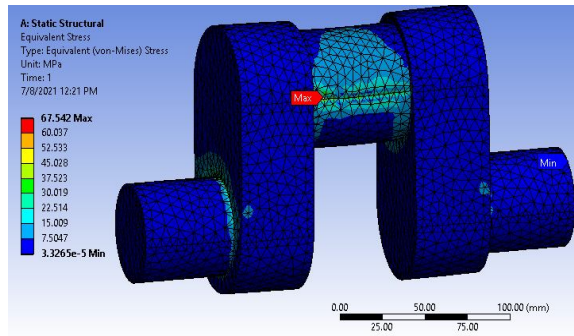
Figure 11. Represents stress contour of crank shaft (titanium alloy)
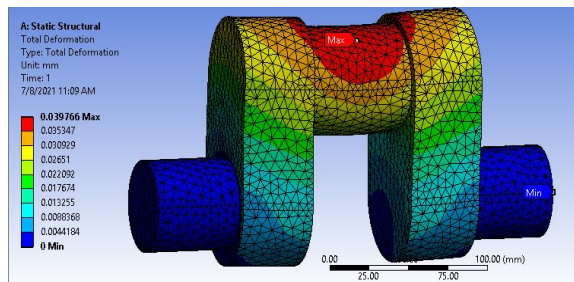
Figure 12. Represents deformation contour of crank shaft (aluminum alloy)
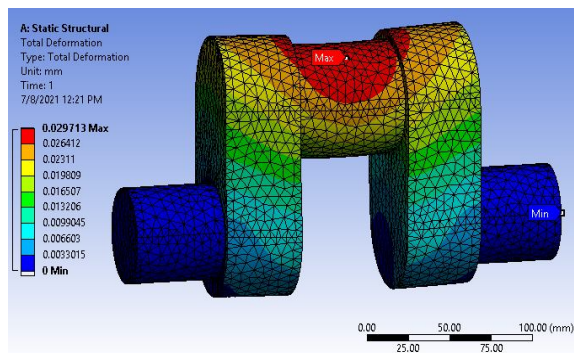
Figure 13. Represents deformation contour of crank shaft (forged steel)
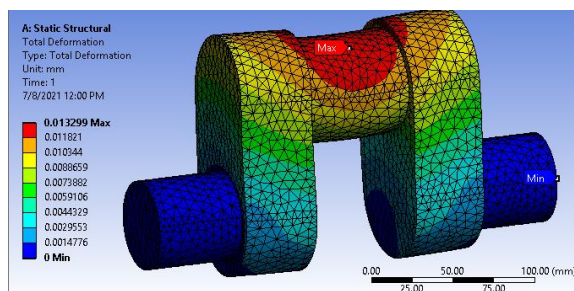
Figure 14. Represents deformation contour of crank shaft (titanium alloy)
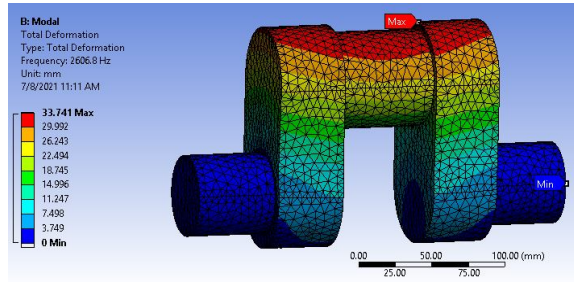
Figure 15. Represents deformation contour of modal analysis of crank shaft (aluminum alloy)
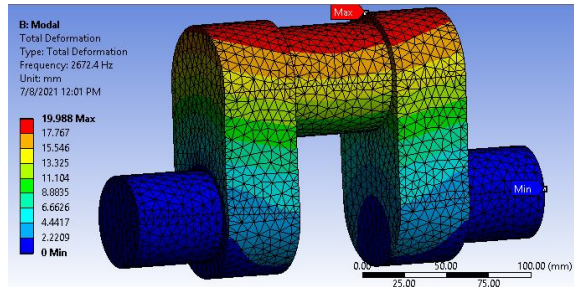
Figure 16. Represents deformation contour of modal analysis of crank shaft (forged steel)
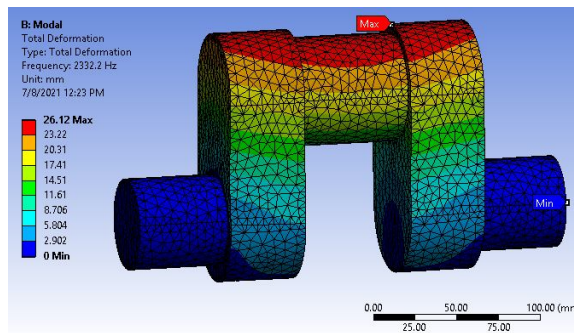
Figure 17. Represents deformation contour of modal analysis of crank shaft (titanium alloy)
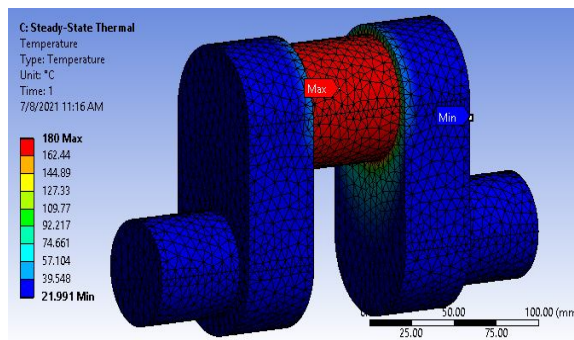
Figure 18. Represents temperature contour of crank shaft (aluminum alloy)
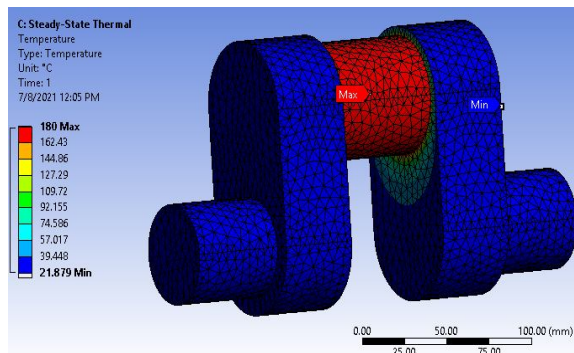
Figure 19. Represents temperature contour of crank shaft (forged steel)
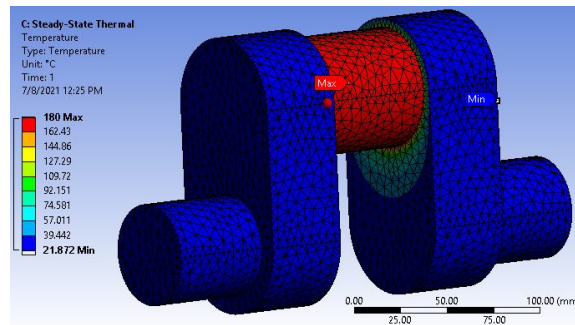
Figure 20. Represent temperature contour of crank shaft (titanium alloy)

CONCLUSION:

From the above discussion this research is conducted to study the relationship of the geometry of crank shaft towards the better performance in term of strength, vibrational effect and heat dissipation to surrounding. From the results, it shows that crank shaft with titanium alloy is giving better performance as compared with aluminum alloy and forged steel.

	Aluminum alloy	Forged steel	Titanium alloy
Equivalent stress	70.044 Mpa	73.145 Mpa	67.542 Mpa
Total deformation	0.039766 mm	0.029713mm	0.013299mm
Mode 1	2606.8Hz	2672.4 Hz	2332.2 Hz
Mode 2	4635.1 Hz	4765.8 Hz	4134.8 Hz
Mode 3	4715.7 Hz	4785.7 Hz	4264.3 Hz
Mode 4	6692.4 Hz	6821.1 Hz	6024.8 Hz
Mode 5	7630.6 Hz	7766.2 Hz	6879.3 Hz
Mode 6	7676.5 Hz	7829.2 Hz	6906.4 Hz
Temperature (max)	180^0C	180^0C	180^0C
Temperature (min)	21.991^0C	21.879^0C	21.872^0C

Table 2. Represent combined result of all analysis

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DESIGN AND VERIFICATION OF LTSSM IN USB 3.1

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ABSTRACT

The Link Training and Status State Machine (LTSSM) of USB3.1 consist of 12 main states which are characterized based on their functionalities and they are further divided into 29 sub states. The transitions between these sub states have been designed and verified using Verilog language. The simulations are done using cadence Xcelium 20.09 version tool. LTSSM is a state machine defined for link connectivity and the power management of link. It is used to manage the link between two ports.

Keywords: LTSSM, USB3.1, Verilog, port, simulation

I. INTRODUCTION

USB was designed in order to provide the standardize connection for both to communicate and to supply the electric power between computers & its peripherals such as keyboard, mouse, video players, printers, mobiles, etc [1]. USB is a fast, bi-directional, low cost, dynamically attachable serial interface [2]. In order to replace various serial and parallel port interfaces, Ajay Bhatt who was a lead of the team formed by various companies such as Intel, Compaq, and IBM etc developed the USB [4]. The USB 1.0 version specifications were released in 1996

Initially USB provided two speeds 1.5 Mbps and 12 Mbps for the peripherals to use. But with advancement in technology the PCs became powerful as they can able to process large amount of data so the user has to get more data in and out of PCs. This leads to development of USB 2.0 with the third transfer rate of 480 Mbps while maintaining the backward compatibility [1]. When disk drives transfer rates exceeds 100 MBps which out strapped the USB 2.0 speed this leads to development of USB 3.0 which has a ability to move the date with a rate up to 450MBps while retaining the backward compatibility of earlier versions [2]. With the larger and faster storage solution's came into picture to meet their requirements USB 3.1 specifications was released which can able to transfer data at rates of 5Gbps and 10Gbps.

II. Link Layer

Link is a physical and logical connection of two ports (which are called as link partners). A port features a physical part and a logical part. The logical portion of a port and the communications between link partners are defined by link layer [3].
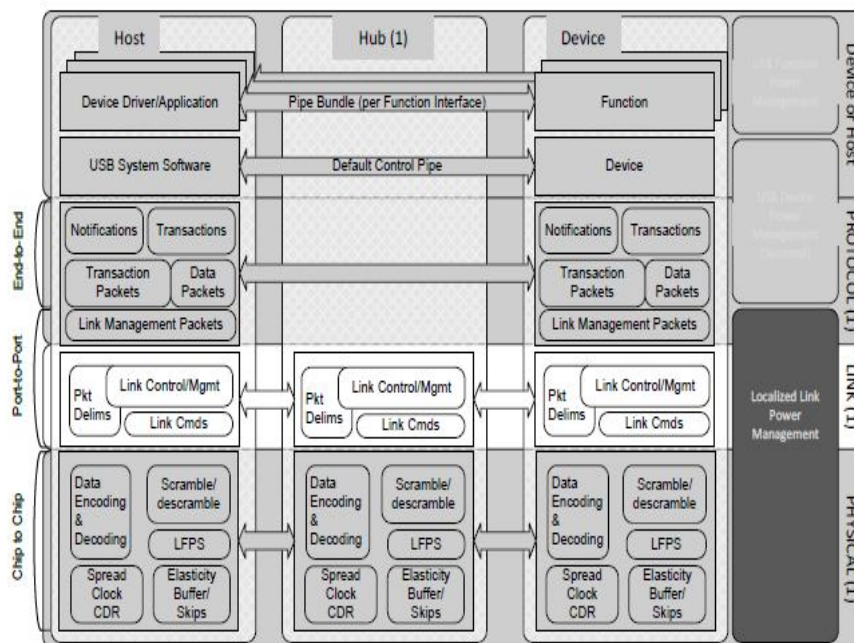
Fig 1: USB Layout Diagram [3]

It has the responsibility of maintaining the link connectivity so that successful data transfers between the two link partners are ensured. It also facilitates link training, link testing, and link power management.

III. LTSSM

The link training, testing and power management were accomplished by the Link Training and Status State Machine(LTSSM). It consists of 12 link states which are further sub divided into 27 sub states based upon their functionality. The state diagram of LTSSM is shown in Fig 2.
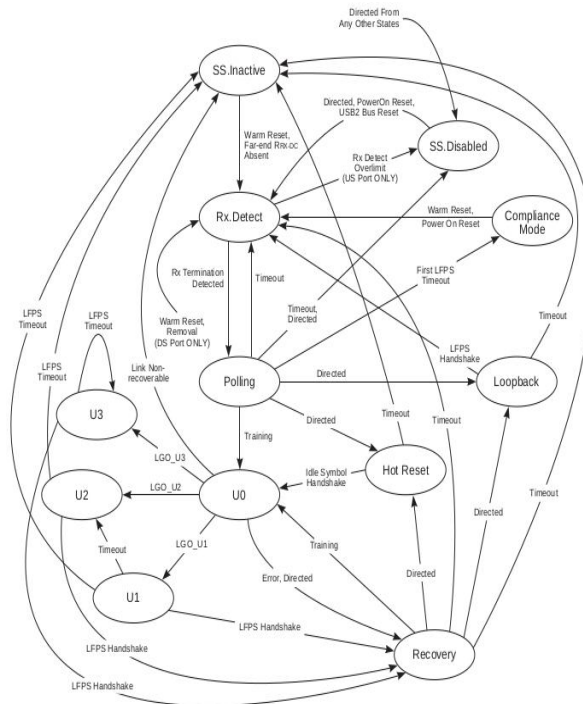
Fig 2: LTSSM State Diagram [3]

The link states Polling, Rx.Detect, Hot Reset and Recovery are introduced for the link training and initialization. The Compliance Mode and Loopback states are introduced for transmitter compliance test and bit error test. Here the U0, U1, U2, U3   are operational link states.

These states are explained below

1) *eSS Disabled*: It is a state where a port's low-impedance receiver termination remove-d. eSS.Disabled of a peripheral device has two sub states and state machine is as shown in Fig 3.
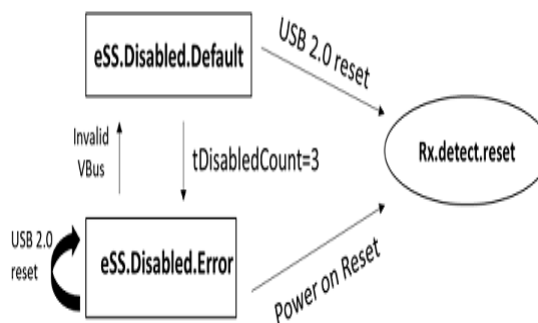
Fig 3: eSS.Disabled Sub-State machine

- *eSS.Disabled.Default*: It is a logical power-off state for a self-powered peripheral device.

- *eSS.Disabled.Error:* Transitions to this takes place when VBUS is invalid

2) *2) eSS.Inactive:* It is a state where the link has failed super speed operation.

eSS.Inactive has two types of sub states and state machine is as shown in the Fig 4.

- eSS.Inactive.Disconnect.Detect

- eSS.Inactive.Quiet
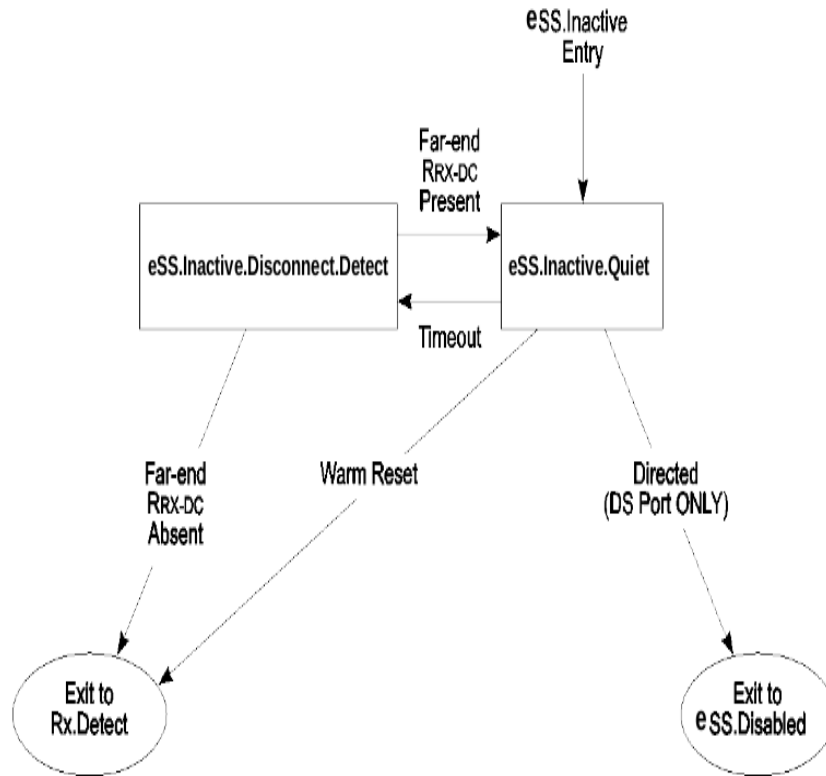
Fig 4: eSS.Inactive sub-state machine[3]

3) *Rx.Detect:* It is the power on state of the LTSSM for both a downstream port and an upstream port. The port will perform the   far end receiver termination detection periodically during Rx.Detect. It has 3 sub states and state machine is as shown in Fig 5.

- Rx.Detect.Reset

- Rx.Detect.Active

- Rx.Detect.Quiet
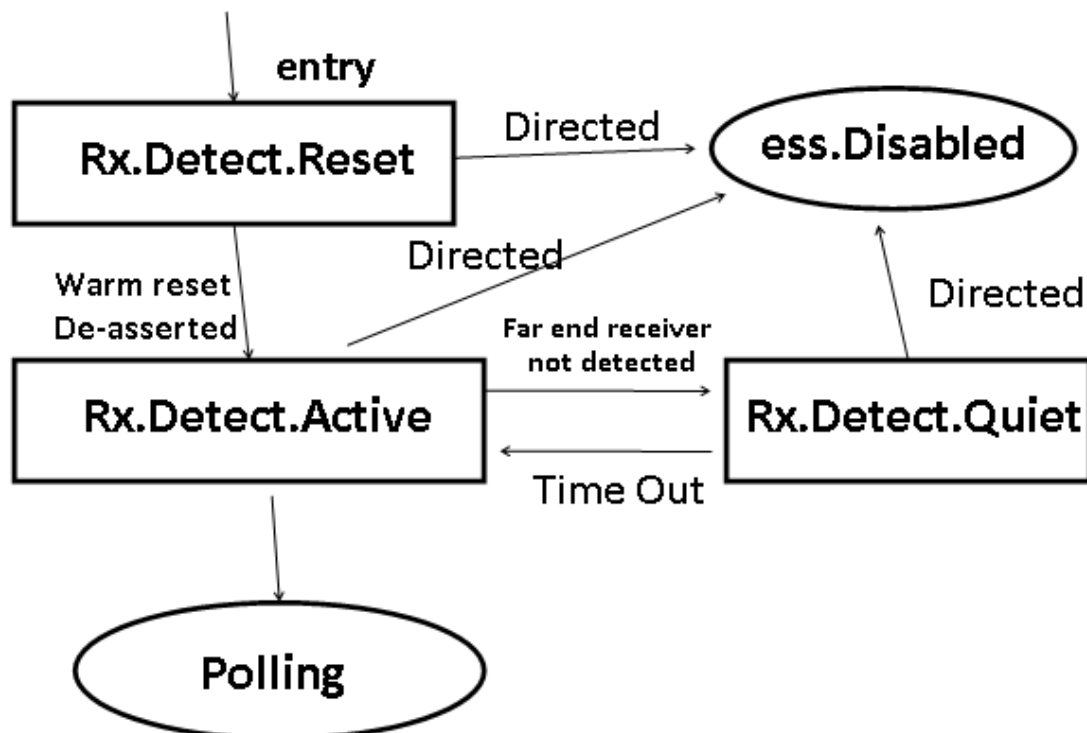
Fig 5: Rx.Detect sub-state machine

4) *Polling:* It is a state for port capability negotiation and link training.
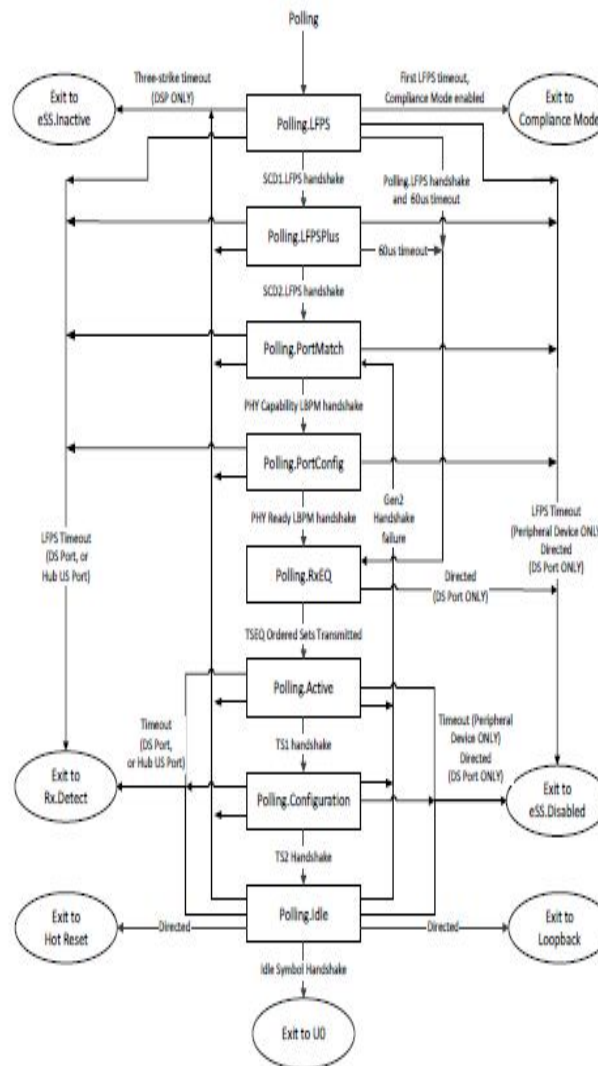
Fig 6: Polling sub-state machine [3]

During Polling, a Polling.LFPS handshake shall take place between the two ports in Super Speed operation before the link training is started.

Polling contains an eight sub states and state machine is as shown in Fig 6 with the following sub states:

- Polling.LFPS

- Polling.LFPSPlus

- Polling.PortMatch

- Polling.PortConfig

- Polling.RxEQ

- Polling.Active

- Polling.Configuration

- Polling.Idle

5) *Compliance Mode*: It is used to test the transmitter for compliance to voltage and timing specifications. It does not contain any sub states.

6) *U0:* It is the normal operational state where packets can be transmitted and received. It does not contain any sub states. The transitions from U0 to other states are as shown in Fig 7.
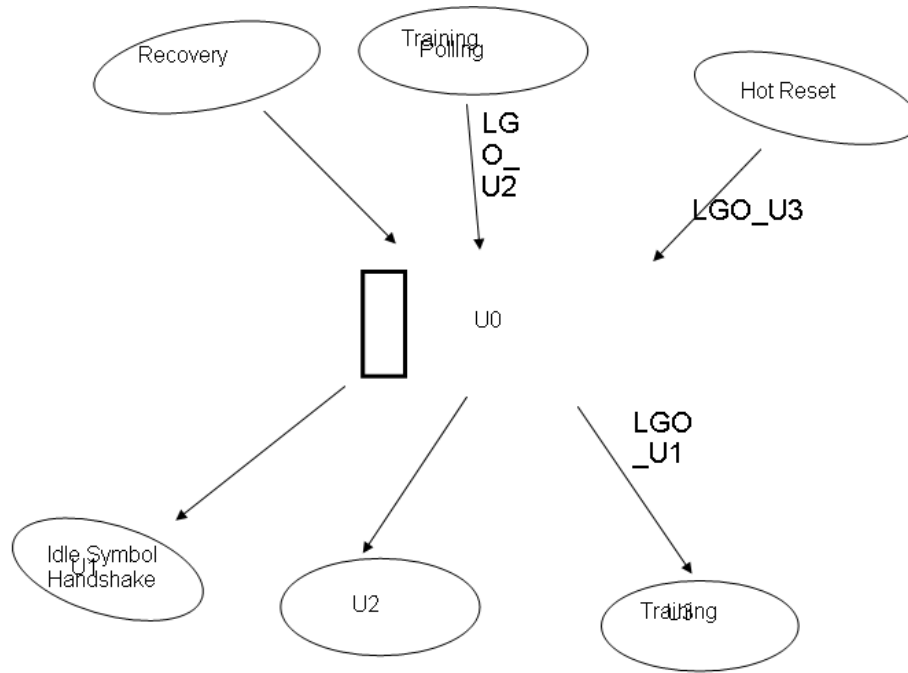
Fig 7: Transitions to other states from U0

7) U1: It is a low power state where no packet transmission took place.
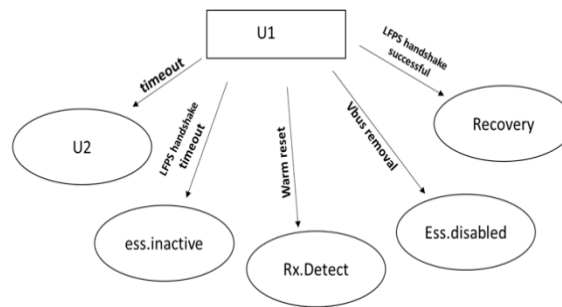
Fig 8: Transitions to other states from U1

In this state in order to save power, super speed link connectivity can be disabled. It does not contain any sub states. The transitions from U1 to other states are as shown in Fig 8.

8) U2: It is a link state where more power saving opportunities are allowed compare to U1, but with an increased exit latency. It does not contain any sub states. The transitions from U2 to other states are as shown in Fig 9.
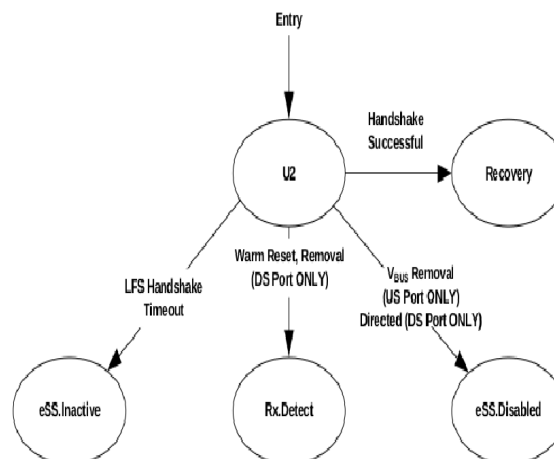
Fig 9: Transitions to other states from U2 [3]

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9) ***U3:*** It is a link state where a more power saving is done by putting device into a suspend state. The transitions from U2 to other states are as shown in Fig 10.
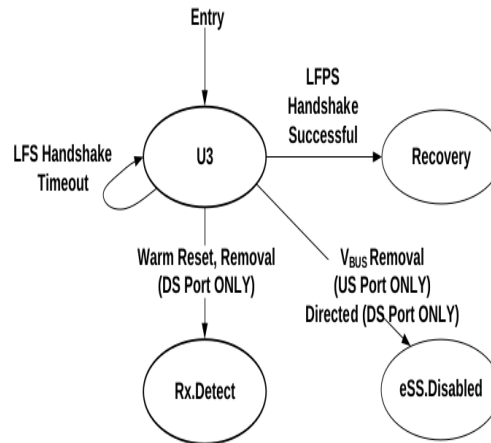
Fig 10: Transitions to other states from U3[3]

10) ***Recovery:*** It is a state used to retrain the link, or to perform Hot Reset, or to switch to Loopback mode. In order to retain, the link partners will not train the receiver equalizers, it will maintain last receiver configuration. Recovery has 3 sub states and state machine is as shown in the below Fig 11.

- Recovery.Active
- Recovery.Configuration
- Recovery.Idle
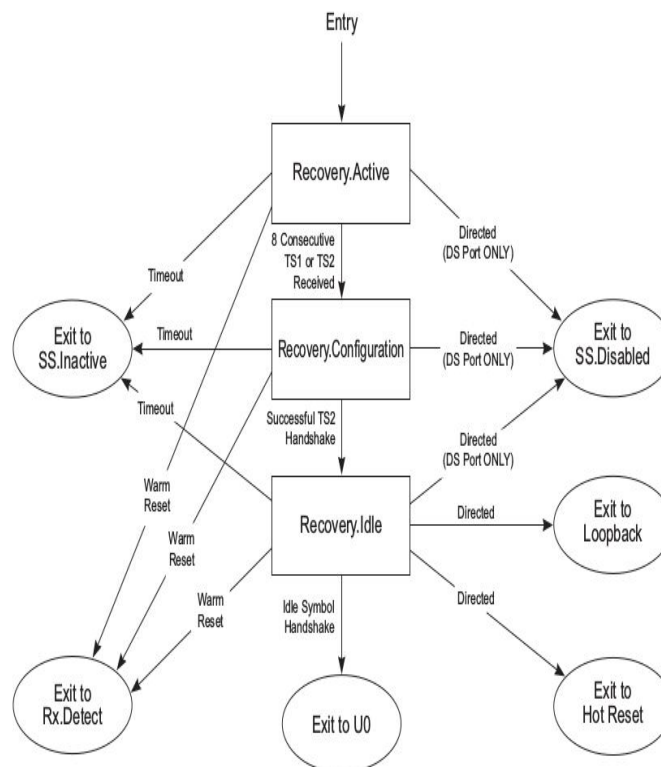
Fig 11: Recovery Sub-State Machine [3]

11) ***Loopback***: It is used for test and fault isolation. The port which will request loopback is called as loopback master. Symbols that are received from loopback master will be retransmitted by the loopback slave. Loopback has two sub states and its state machine is as shown in the below Fig 12.

- Loopback.Active
- Loopback.Exit
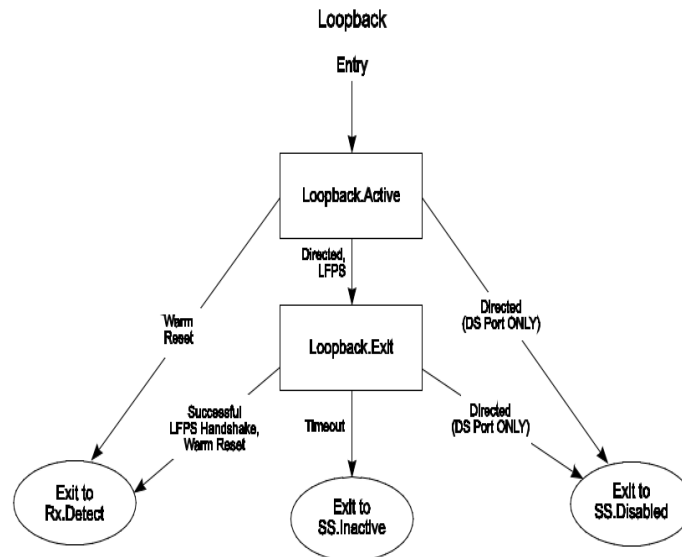
Fig 12: Loopback Sub-State Machine [3]

12) ***Hot Reset:*** Only downstream port is used to initiate a Hot Reset.TS2 ordered sets will be transmitted when downstream port initiates reset. The upstream port will respond by sending the TS2 ordered sets. It has two sub states and its state machine is as shown in the below Fig 13.

- Hot Reset Active

- Hot Reset Exit
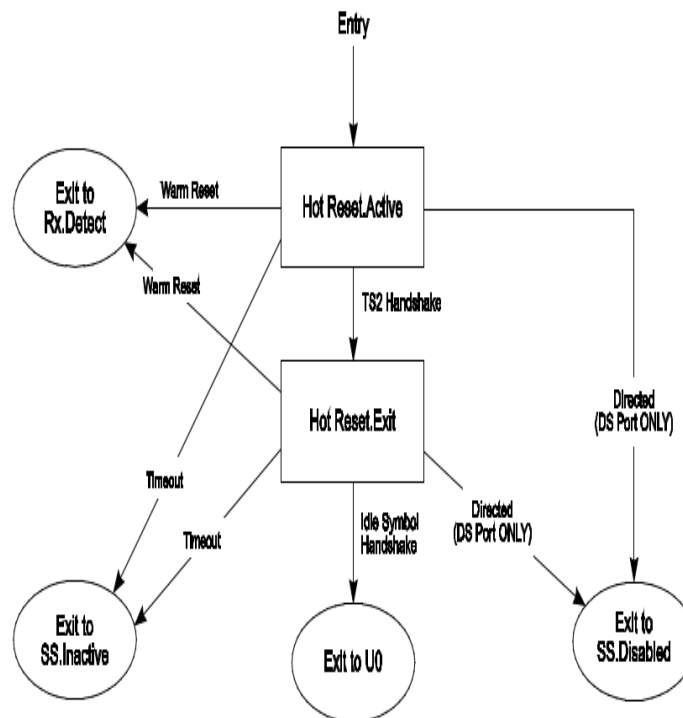
Fig 13: Hot Reset Sub-State Machine [3]

IV. SIMULATION AND RESULTS

In order to write the design code of LTSSM in Verilog, FSM approach is used and the transitions between each states are verified.

The LTSSM states Rx.Detect, eSS.Inactive, eSS.Disable, U0, U1, U2, U3, Recovery, Loopback, Polling, compliance mode, Hot Reset are occurred based upon the inputs such as Warm Reset, LFPS Handshake, Error, LGO_U1, LGO_U2, LGO_U3, LowImpedance, Rx_Termination, Idle, Timeout, Loop Back and VBUS. The wave forms obtained after simulation are shown in fig 14.
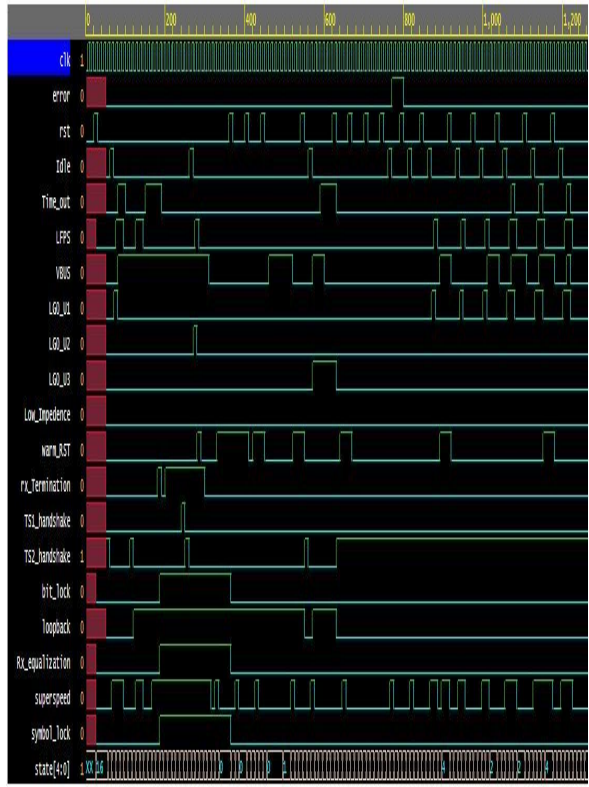
Fig 14: Simulation results for LTSSM

Some cases of various transitions are explained below:

Fig 15 shows the result after applying reset signal, upon applying the FSM enters into hot_reset_active state.
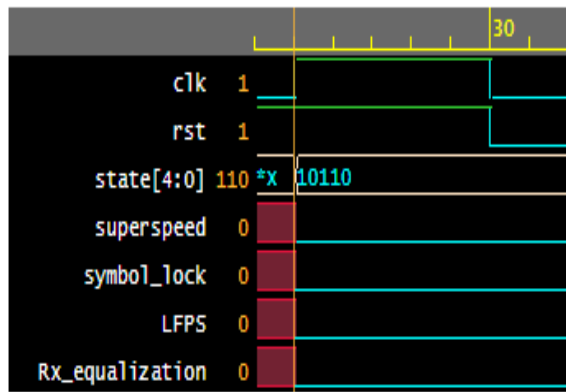
Fig 15: simulation results during reset

Fig 16 shows FSM state transition to Rx_Detect_Reset state upon applying the warm reset signal.
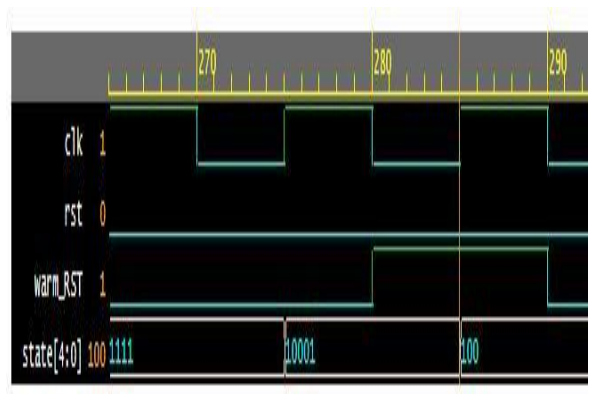
Fig 16: State transition during Warm Reset

Fig 17 shows FSM state transition to power saving state U1 from normal operating state U0 upon applying the LG0_U1 input signal.
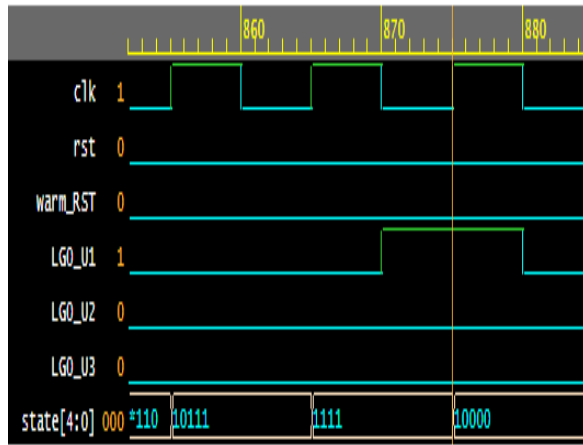
Fig 17: State transition during LG0_U1

Fig 18 shows FSM state transition to power saving state U2 from normal operating state U0 upon applying the LG0_U2 input signal.
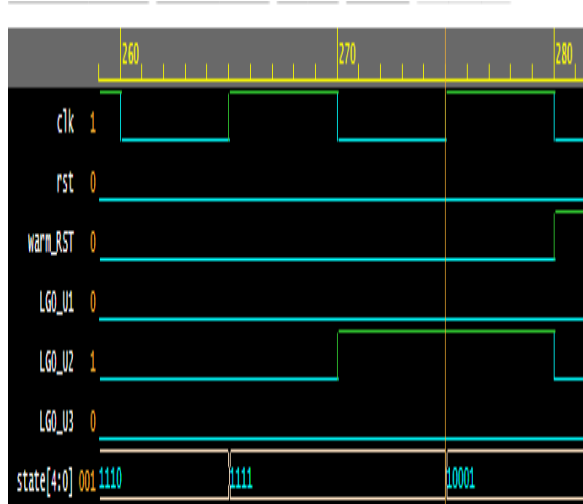
Fig 18: State transition during LG0_U2

Fig 19 shows FSM state transition to suspend state U3 from normal operating state U0 upon applying the LG0_U3 input signal.
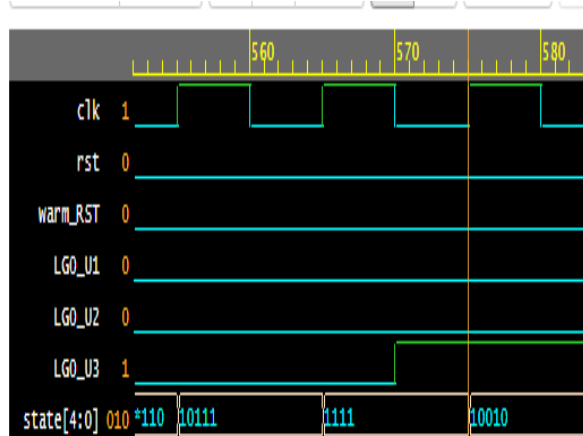
Fig 19: State transition during LG0_U3

Fig 20 shows FSM state transition to suspend state U3 from power saving state U1 after timeout happened.
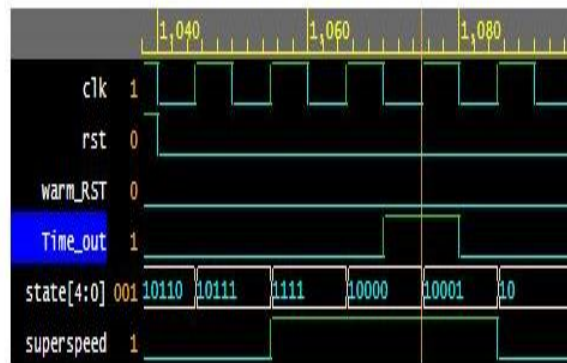
Fig 20 : state transition from U1 to U3

Fig 21 shows FSM state transition to SS_Disabled_Default state when invalid VBus is detected in this state super speed link got disabled we can observe it via super speed signal in those waveforms
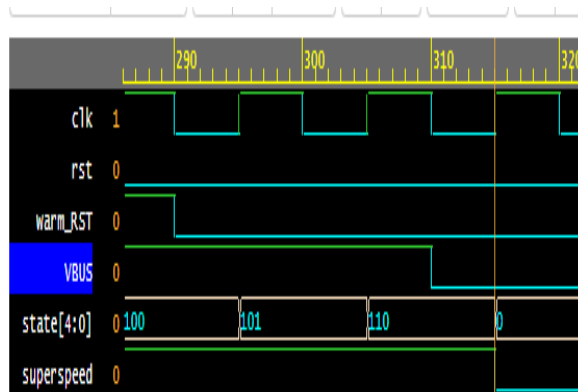
Fig 21: State transition during invalid VBUS

From Fig 22 we can observe FSM state transition to recovery state when error is encountered during normal operating state
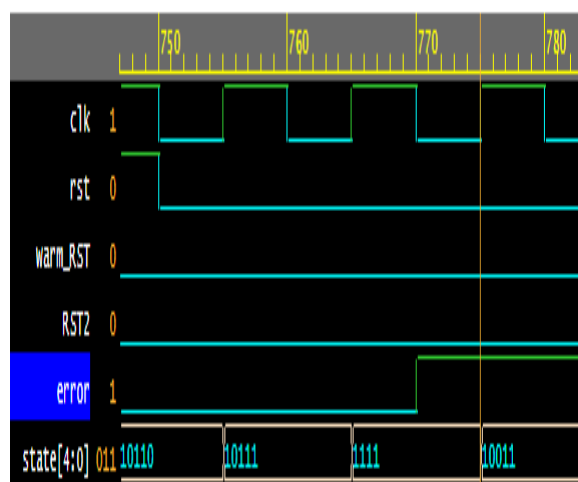
Fig 22: State transition during error signal

V.   CONCLUSION

The LTSSM for USB 3.1 was successfully designed using Verilog FSM approach and simulated using cadence Xcelium 20.09 version. The transitions between the each FSM states were verified by varying the necessary input signals. This LTSSM can be used as an input to the link layer of USB3.1

VI.   REFERENCES

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DESIGN OF A BEACH CLEANING ROBOT MODEL WITH 2 DOF MANIPULATOR

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ABSTRACT

This paper presents the modelling of a robot for the purpose of cleaning the beaches. The robot is modelled in a way that a microcontroller can be used to perform the tasks. The design is kept simple yet robust so that it can maneuver efficiently on sand. The picking and collecting the garbage is done using a robotic arm, The robotic arm design is done considering the forward and inverse kinematics. The robotic arm has 2 degrees of freedom so that it can carry out the task of picking up the garbage and moving it to the desired location easily. The design of both main body and the robot arm is done in SolidWorks considering all the aspects to make a stable design. The main purpose of this paper is to make such a design that the robot can be make with parts that are readily available and are not expensive. Also, the use of lower power device like a microcontroller is made with an attempt to make the robot work with low power needs and can be compact as much as possible.

Keywords: Robot, Robotic arm, microcontroller, SolidWorks, design, garbage, picking.

INTRODUCTION

Robots can be described as a machine made up of various components to carry out repetitive tasks, explore the places that are humanly not possible due to the dangers or due to the harsh environmental conditions. Making a self-operating machine has always been a fantasy of people from different civilizations. Attempts to make a self-working device has been traced to civilizations as old Egyptian. Now a days we see the implementation of robotics in every field be is manufacturing, designing, navigating, households, constructions and even for entertainment. With increase in technology and luxury that it provides, we as human beings have forgotten the cost at which it is made available. Even after such advancements in technology, the garbage that gets disposed in the sea as well as land has now become a huge concern. It not only harms us in many ways, but it also endangers many land and sea creatures.

We have attempted to make a design of robot so as to use it for the purpose of cleaning beaches. The attempt was to make the design robust yet small and able to complete the following task. A 2 DOF of freedom robot arm is placed on the main body so as to pick up the garbage and place it in a container provided nearby or a carriage that would tag along with the robot. The robot could have been added with a more complex robot arm but it would kill the purpose of the design being simple and easy to recreate. A microcontroller is used for controlling the various sensors and actuators. Microcontrollers are low power devices with high computational power. This adds to the design being more cost friendly and less resource consuming.

LITERATURE REVIEW

In this paper the author has worked on modelling and designing of a 2 DOF of freedom robot arm. The inverse and forward kinematics calculations are done using Denavit-Hartenberg parameters. The model is made using SolidWorks and the mathematical model is made on MATLAB. (Nasr M. Ghaleb, 2018)

This paper discusses the modelling of a beach cleaning robot called "Hirottaro". The two main aspects discussed are sweep cleaning mechanism so as to separate the sand for the litter and autonomous navigation. Though the experiments were done on a straight path, it resulted to be very efficient. (Tomoyasu Ichimura, 2010)

This paper discusses about a modular beach cleaning robot model which uses computer vision for obstacle avoidance and sensing the cans and picking them up using a crane like gripper. The paper also discusses autonomous navigation of robot on the beach and finding the cans. (Felippe Schmoeller da Roza, 2016)

This paper talks about the hazards of litter. It emphasizes on how the littering has harmed the environment right from the year 1997 to current. It speaks about the health hazards that both humans and seas creatures face due to garbage disposal and accumulation on beaches. (A.T. Williams, 2011)

This paper talks about the design of 5 DOF robotic arm using servomotor and Arduino Uno microcontroller. The movement of each servomotor is controlled using potentiometer. (Ankur Bhargava, 2017)

This paper discusses wireless controlled robot with object detection. The robot uses Arduino Uno for sending and receiving data from the controller to the bot. The robot is fitted with ultrasonic sensor so as to detect any object or obstacle and give the warning to the controller. (VISHWANATHRADDI A, 2017)

The authors of the paper the face tracking and recognition using MATLAB and Arduino. Many tools like OpenCV were used for this purpose. Though it needs computer to compute data received from the Arduino, this process can be tuned to detect garbage pieces is the similar way it detects objects and use the information to detect and pick the garbage up (Maneesh Ayi, 2017)

In this paper the author has made a 2 DOF robotic manipulator. There is no use of any physical model here but the whole designing and mathematical model is made with the help of MATLAB. The authors have also referred forward and inverse kinematics for the purpose of arm manipulation. PID controller is used to control the arm. (Okubanjo, 2017)

MODEL

I) **Components Used**

1) **Microcontroller**

Arduino Uno

A microcontroller is a compact integrated circuit used to control a specific task in an embedded system. A microcontroller usually performs input and output operations. It usually contains a processor, a memory chip and input and output peripherals. The microcontroller used in this design is Arduino Uno. This is a widely used microcontroller as it has many benefits like easy to code, cheap, high performance efficiency and is easily available in the market. Uno has 14 digital pins which can pass High or Low signals out of which 6 are analog pins which can pass variable signals. Uno works across 5V output voltage and 12V input voltage which allows to control a number of sensing and actuating tasks simultaneously. It can be powered by connecting directly to the computer, using batteries or power banks. The main advantage of Uno is that it is open source, so it can be modified as per requirements.

2) **Servo motor**

Servomotor

A servomotor is rotary or linear actuator that enable precise control of angular or linear position, velocity and acceleration. The servomotor used in this design is Tower Pro MG995 which has the following specifications.

Weight	55 gms
Stall Torque @ 4.8V / 6,6V	10/12 kg-cm
Gear Type	Semi-Metal
Rotational Degree	180
Length	40.5 mm
Width	20 mm
Height	44 mm

3) DC motor

DC motor

DC motor is a class of mechanical component which converts the electrical work to mechanical work by exploiting electromagnetic induction. This DC Motor – 45RPM – 12Volts can be used in all-terrain robots and a variety of robotic applications. These motors have a 3 mm threaded drill hole in the middle of the shaft thus making it simple to connect it to the wheels or any other mechanical assembly.

4) Power Supply

Power Bank

The power supply used in this design is a power bank. Though a lot of power options are available, but they are either non- chargeable or heavy or both.

II) Materials Used

1) Aluminum Sheet

Though many options are available in the market, aluminum sheets are used for the main moving body. Aluminum sheet is easily available, it is pocket friendly. These sheets can be easily shaped and welding and are light in weight

2) Plastic

For the main connecting links and gripper, a lot of ready-mades, 3-D printed and even metal options are available. But as we making this design of the robot for the cleaning of beaches, we had an idea of utilizing the plastic from plastic containers for this purpose. This if used on a larger level can help reusing the plastic.

III) Design

1) Main Body

The main body of the robot consist of a area to hold the Arduino Uno, the power bank, servo motor and the DC motors for maneuvering. All the actuators are connected to the microcontroller. The dimensions of the main body are:

Length	244 mm
Width	199 mm
Height	41.7 mm
Tire Diameter	65 mm
Tire Width	40 mm
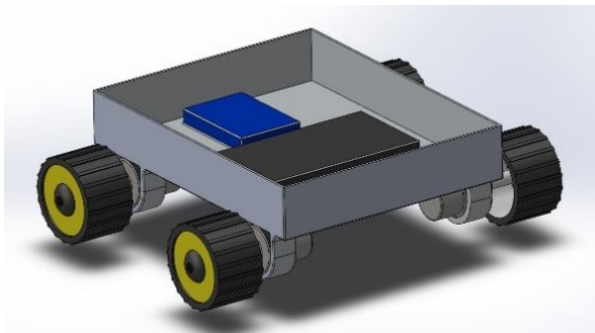
Main body - Inside
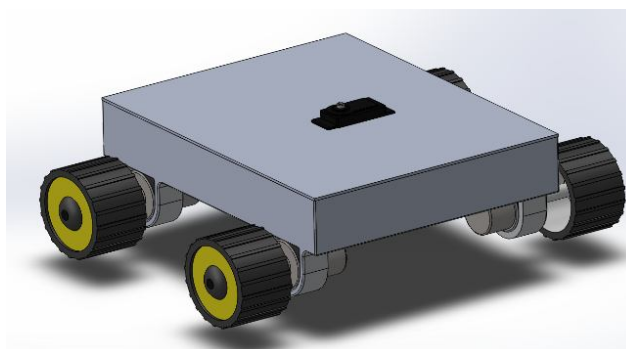
Main body – With top cover

2) 2 DOF arm

The arm is mounted on the main body such the base link can only perform rotational motion from 0 to 180 degrees. Here 0 degrees faces the front of the robot and 180 to the rear. This is done so as to move the picked garbage to the back carriage of the robot.

The link on the base arm serves the purpose of connecting the gripper to the base arm. Along with that the link also rotates so that gripper is kept on the ground and moved back up while maneuvering and also transporting the picked object. The dimensions are:

Base arm: L x W x H	185 x 2 x 25 mm
Link: L x W x H	72.5 x 2 x 25 mm
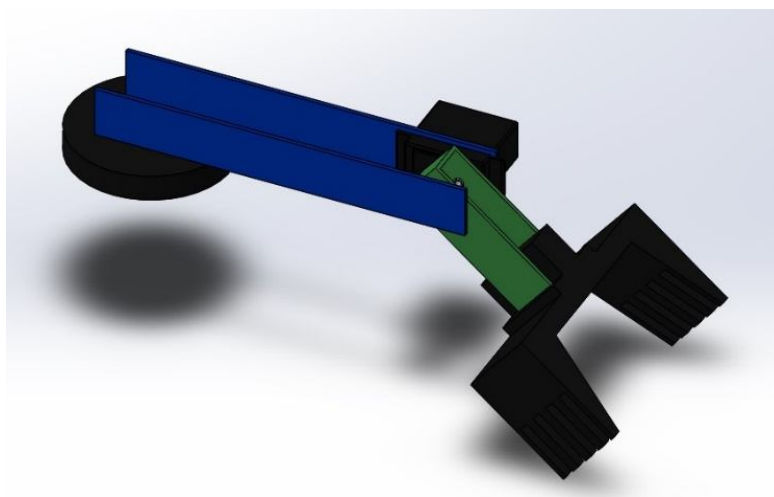
Robotic arm with 2- DOF
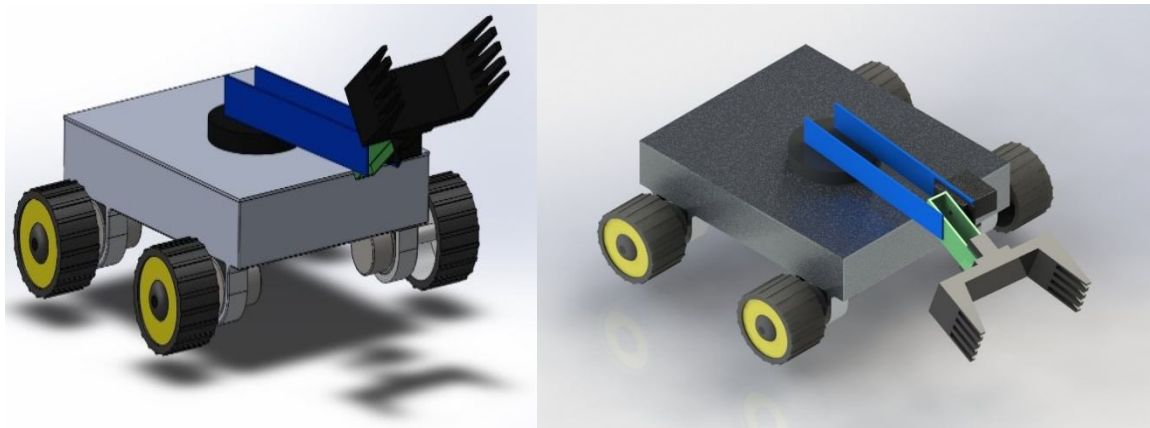
Full Assembly

CONCLUSION

Hence we have designed the mechanical model of a robot for the purpose of cleaning garbage on the beach with the use of robotic manipulator.

FUTURE STUDIES

A lot of developments can be done in this model. Though our sole purpose is to make this autonomous, it can be normally controlled with the usual controller based wireless communication. Another upgrade would be the use of computer vision to make it object detecting and for that Raspberry pi ; a more powerful embedded system can be used instead of Arduino Uno.

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DIGITAL COMPETENCE AND JOB SATISFACTION OF TEACHERS IN ONLINE CLASSES

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ABSTRACT

Teaching is a very noble profession that shapes the character, calibre, and future of an individual. If people remember me as a good teacher, that will be the biggest honour for me- Dr APJ Abdul Kalam. A teacher is a person who helps students to acquire knowledge, competence or virtue. job satisfaction is one of the prime movers for excellent classroom interactions enhancing significantly the student learning and their learning outcomes. Digital competence consists of variety of skills and competencies, and its scope is wide, covering media and communication, technology and computing, literacy, and information science. Today's social condition demands teachers as well as students to connect digitally in a virtual learning environment. So, the present study aims to find out digital competence and job satisfaction of school teachers in online classes. The participants of the study include 60 school teachers, 15 from government sector and 15 from private sector. The study used purposive sampling method for collecting data they were administered using "Job Satisfaction Scale (JSST-DM)" developed by Dr. Meera Dixit in 2011 and "Teachers' Digital Competence Scale" developed by DR Ramakrishna in 2017. Obtained results were analysed using independent sample t-test and Karl Pearson's Product Moment Correlation. The result indicates that there is no significant difference between Digital competence among school teachers. . But while coming to the job satisfaction, there is a significant difference in the level of job satisfaction among government and private school teachers. Also, there is a significant positive correlation between the digital competence and job satisfaction among school teachers. The positive correlation indicates that when the digital competence increase, the job satisfaction also increases. The present study reveals the importance of digital competence is relevant in the job satisfaction of school teachers especially in online mode.

Keywords: School teachers, Digital competence, Job satisfaction, Online class.

INTRODUCTION

The achievement of any educational program mainly and that of the education system as an entire relies upon on a number of things just like the exceptional and Infrastructure of educational institutions; sincerity, dedication and purpose orientation of the teachers in addition to students; imaginative and prescient and management of the executive and control employees in addition to the remarks and help from the society etc. The concept of oneself that a teacher has, is a large contributor to the purpose she or he units for himself or herself and his students in context of significant getting to know in addition to ambitions in life.

Teachers are a unique blessing from God to us. They are those who construct a very good state and make the arena a higher place. A teacher teaches us the significance of a pen over that of a sword. They are tons esteemed in society as they raise the dwelling requirements of human beings. They are just like the constructing blocks of society who educate human beings and cause them to higher human beings (Swach Bharat Abhiyan,2017). Nowadays our conditions are modified because of such a lot of reasons. It additionally had a power on manner of teaching and mode of teaching. Due to the COVID-19 complete global are closed for a protracted duration of time. Thereby, everybody needed to speak via online or virtual mode. In many locations teaching additionally passed off via online mode with the usage of many apps like google meet, zoom class, WhatsApp etc. The interplay among kids and instructors had been though those mediums. . So, it additionally modified the fashion of coaching. Children in addition to teachers needed to research new capabilities for the usage of virtual devices effectively. The significance of virtual competence multiplied throughout this duration.

Digital Competence

Digital competence includes quite a few talents and competencies, and its scope is huge, overlaying media and communication, technology and computing, literacy, and information science. Digital competence includes 1) technical talents to apply virtual technology, 2) capabilities to apply virtual technology significantly for working, reading and for ordinary existence in trendy in diverse activities, 3) capabilities to severely compare the virtual technology, and 4) motivation to take part with inside the virtual tradition. Digital Competence is each a demand and a proper of residents, if they're to be practical in state-of-the-art society. Developing teachers' digital competence so as for them that allows you to use contemporary-day technology in teaching getting to know strategies, and on the equal time, harnessing the opportunities of digital technology poses control associated and organizational demanding situations for schools (cf. Sahito, 2019). The flow has to be

from digitally ready teachers to digitally ready schools, which can be termed as smart schools nowadays (Erstad & Hauge, 2011).

Job Satisfaction

Job satisfaction is a personal attribute and a mindset, which ends up from a balanced interaction of many positive and negative experiences in reference to the task one performs. It expresses the quantity or diploma of healthy among worker's expectancies of the task and rewards that the job affords in phrases of actual in addition to intangible elements. Anand (1972) asserts that tendency of students having liking for his or her teachers and teachers for students are undoubtedly associated with the task delight of teachers, while Lavingia (1974) argued that job efficiency changed into undoubtedly correlated with job satisfaction. In this manner, the greater happy a worker is in his or her task, the higher could be his/her performance. Job satisfaction is critical in teaching due to the fact an annoyed soul in a teacher is able to generating many annoyed souls in kids. These kids ought to occupy locations of importance in society and management the following day and teachers ought to be very aware of the repercussions of his wrong acts and unwilling performance. So, a teacher who is not satisfied in his task, now no longer the handiest mars the prevailing of the kid however additionally the future.

Teaching is supposed to be the noblest profession, job satisfaction is one of the prime movers for excellent classroom interactions enhancing significantly the student learning and their learning outcomes. At the same time, today's social condition demands teachers as well as students to connect digitally in a virtual learning environment. So, it is helpful to know the digital competence and job satisfaction of school teachers who conducting classes through online.

REVIEW OF LITERATURE

Kay (2006) in his influential review of sixty-eight studies of student teachers' technology training in teacher education found ten key strategies commonly used where the two most common programme strategies were either a fully integrated approach or a single technology course. His review revealed that the vast majority of studies suffered from methodological flaws, and concluded that "more rigorous and comprehensive research is needed to fully under Johannes Konig, Daniela J. Jagaer-Biela and Nina Glutsch (2020) published an article on 'Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany'. This paper presents the results of a survey of early career teachers conducted in May and June 2020. They analysed the extent to which they maintained social contact with students and mastered core teaching challenges and analysed potential factors (school computer technology, teacher competence such as their technological pedagogical knowledge, and teacher education learning opportunities pertaining to digital teaching and learning). Findings from regression analysis show that information and communication technologies tools, particularly digital teacher competence and teacher education opportunities to learn digital competence, are instrumental in adapting to online teaching during covid-19 school closures.

Job satisfaction of college and higher secondary teachers was investigated by Das and Panda (1995) in terms of their gender and work experience on a sample of 100 male and female teachers selected from colleges and higher secondary schools of Kamrup district of Assam. The results showed that "no significant difference was found in the degree of job satisfaction of college and higher secondary teachers. There was no significant difference in the degree of job satisfaction of male and female college teachers". Anna Toropova (2020) conducted study on the topic 'Teacher job satisfaction: the importance of school working conditions and teacher characteristics' investigated the relations between teacher job satisfaction, school working conditions and teacher characteristics for eighth grade mathematics teachers. This study uses confirmatory factor analysis and structural equation modelling. Results demonstrates a substantial association between school working conditions and teacher job satisfaction. It was found that the relationship between the extent of teacher cooperation and job satisfaction wad more pronounced for male teachers, while student discipline was more important for job satisfaction of teachers with low self-efficacy beliefs.

These are some of the research studies that conducted on digital competence and job satisfaction among teachers in worldwide. In these studies, we clearly understand that there are some influences of digital competence and job satisfaction in teachers in various ways. It also shows the importance of digital competence among teachers, how it helps them in various ways etc. In the studies from the very early to the recent, it shows that the aspects that influences job satisfaction varies according to the scenario and other factors also.

METHOD

This chapter deals with the methodology part of this study. It gives in detail the methods and procedures that were followed in order to meet the objectives of this research and arrive at a concluding point in context of the

specific research questions raised in this study. Under this broad heading, the main points discussed are aim of the study, hypothesis, variables, operational definition, design of the study, sampling and the sample, inclusion and exclusion criteria, research tools used for this study, methods for collecting data and administering the tools, procedure as well as the statistical techniques used.

Aim

To study digital competence and job satisfaction of school teachers in online classes.

Hypothesis

- Ho1: There is no significant difference in the level of digital competence among government and private school teachers.

- Ho2: There is no significant difference in the level of job satisfaction among government and private school teachers.

- Ho3: There is no significant relationship between the digital competence and job satisfaction among government and private school teachers.

Variables

- Independent variable: Sectors – Government and Private

- Dependent variable: Digital competence, job satisfaction

Design Of the Study

The study deals with digital competence and job satisfaction of school teachers in online classes. It is a sample survey research, the main purpose of which is to throw light on the present situation in context of the chosen variables and help develop a feasible solution to contemporary related educational problems. A goal in the design of sample surveys is to obtain a sample that is representative of the population so that precise inferences can be made. Purposive sampling method is used here for collecting data. In this study, the researcher wanted to know the digital competence and job satisfaction of school teachers in online classes.

Sampling And Sample

Purposive sampling method is used for this study for collecting data since the sample of this study is school teachers. In purposive sampling method, homogeneous sampling is used since the sample members are similar. The present study had the population consisting of teachers from government and private school teachers of Kerala. For the present research, purposive sampling method is used to obtain total 60 samples from the population, 30 teachers from government school and 30 teachers from private school. All the teachers selected for this study have a minimum work experience of 10 years and who started taking online classes only during the time of lockdown.

Inclusion Criteria

- School teachers from both government and private schools who have minimum ten year of experience.

- School teachers who started teaching through online only in lockdown period.

Exclusion Criteria

- Tutors who work in online teaching platforms rather than traditional schools.

- Teachers who work in coaching centers.

- Part time/ Guest teachers.

Research Tools

Research tools act as instruments to fulfil the objectives of research. The following tools were used in this study:

1. "Job Satisfaction Scale (JSST-DM)" developed by Dr. Meera Dixit (2011).

2. "Teachers' Digital Competence Scale" developed by DR Ramakrishna (2017).

The population of this study is school teachers, so the sample was collected by contacting the teachers, mailing the questionnaires through online. The sample selected for the study was personally contacted and the objectives of the study was explained to them and only after getting their consent, data was collected. After collecting the data, scoring was done according to the norms. After getting the scores, data analysis was done by using independent sample t-test and Pearson's product moment correlation.

Data Analysis

Inferential statistics:

- Independent sample t-test

- Pearson's product moment correlation.

Descriptive statistics:

- Mean.

- Standard deviation.

RESULT AND DISCUSSION

The results obtained were analyzed using independent sample t-test and Pearson's product moment correlation. The independent sample t-test were used to understand the significant difference in level of digital competence and level of job satisfaction among government and private school teachers. The relationship between the digital competence and job satisfaction among the government and private school teachers were found out using Pearson's product moment correlation.

Table 4.01: *Mean, Standard Deviation and t value for the digital competence among government and private school teachers.*

Groups	N	df	Mean	SD	*t* value	Sig
Government	30	58	192.93	30.611	0.744	0.416
Private	30		187.47	26.092		

When the digital competence is taken into consideration, in the present study, the results show that the sig value is 0.416 which is not significant at the level of 0.05. Therefore, the obtained results show that there is no significant difference in the level of digital competence among government and private school teachers. Hence, the null hypothesis stating that there is no significant difference in the level of digital competence among government and private school teachers is accepted. The findings are similar to the study of Francisco David Guillen-Gamez and Maria Jose Mayorga-Fernandez states that there is no significant difference in the gender in the digital competence of the pre-service education teachers (Francisco David Guillen-Gamez and Maria Jose Mayorga-Fernandez, 2020). Also, another study that is similar to the finding was conducted by Jesús Sánchez Prieto, Juan Manuel Trujillo Torres, Melchor Gómez García and Gerardo Gómez García states that there are no significant gender differences between teachers with respect to the application of e-skills by teaching professionals (by Jesús Sánchez Prieto, Juan Manuel Trujillo Torres, Melchor Gómez García and Gerardo Gómez García, 2018).

Table 4.02: *Mean, Standard Deviation and t value for the job satisfaction among government and private school teachers.*

Groups	N	df	Mean	SD	t value	Sig
Government	30	58	0.205.07	14.360	0.170	0.007
Private	30		204.23	22.714		

When the job satisfaction is taken into consideration, in the present study, the results show that the sig value is .007 which is significant at the level of 0.05. Therefore, the obtained results show that there is a significant difference in the level of job satisfaction among government and private school teachers. Hence, the null hypothesis stating that there is no significant difference in the level of job satisfaction among government and private school teachers is rejected. The findings are similar to the study effect conducted by Chandraiah states that there is no significant difference between middle aged and older aged teachers in their scores on job satisfaction (Chandraiah,1994). Also, another study which is similar to the finding was conducted by Kulsum states that there was no significant difference in the levels of job satisfaction of the teachers working in open climate type schools and familiar climate type schools. (Kulsum,1998).

Table 4.05: *Coefficient of correlation between digital competence and job satisfaction among government and private school teachers.*

Factors		Digital competence		Job satisfaction	
r value	p value	r value	p value		

Digital competence	1	.293*	0.023
Job satisfaction	.293*	0.023 1	

The hypothesis stating that there is no significant relationship between digital competence and job satisfaction was tested using Karl Pearson's Co-efficient of Correlation. The findings of the analysis indicates that there is a significant positive correlation between the digital competence and job satisfaction among school teachers. The positive correlation indicates that when the digital competence increase, the job satisfaction also increases. Hence, the null hypothesis states the there is no significant relationship between digital competence and job satisfaction among school teachers is rejected. The research findings are similar to what Zafarullah Sahito and Pertti Vaisanen, in this study they found that the digital competence have a positive influence in teaching. (Zafarullah Sahito and Pertti Vaisanen, 2017). The findings of the study are similar to the article written by Geir, Marijana and Greta explains the positive relationship between digital competence and job satisfaction of teachers (Geir Ottested, Marijana Kelentric, Greta Bjork Gudmunsdottir, 2014).

SUMMARY AND CONCLUSION
This chapter contains summary of the present research work, major findings, conclusions, implication, limitations, and scope for further research. The present study was undertaken to study the digital competence and job satisfaction among school teachers in online classes. The sector that is the government and private school is the independent variable; digital competence and job satisfaction is the dependent variables. The sample included 60 participants, comprising of 30 government school teachers and 30 private school teachers. The Purposive Sampling Technique was used to collect the data. The Sample Survey Research Design was adopted in the study. The participants who have minimum 10 years teaching experience who started taking online classes only during the COVID-19 lockdown period were included in the study. The samples were collected from the state of Kerala.

"Job Satisfaction Scale (JSST-DM)" developed by Dr. Meera Dixit (2011) were used to asses job satisfaction and "Teachers' Digital Competence Scale" developed by DR Ramakrishna (2017) were used to asses digital competence. The obtained results were analysed using independent sample t-test and Pearson's product moment correlation.

Findings Of the Study
Digital competence and Job satisfaction of the participants were determined.

- Majority of the teachers having an average level of digital competence in government and private sectors.

- Majority of the teachers having an average level of job satisfaction in government and private sectors. Independent Samples t-test: The Independent Sample t-test was undertaken to know the difference in the digital competence and job satisfaction government and private school teachers.

- Obtained result indicates that there is no significant difference in the level of digital competence in government and private school teachers.

- Obtained result indicates that there is a significant difference in the level of job satisfaction in government and private school teachers. Karl Pearson's Co-efficient of Correlation: The relationship between digital competence and job satisfaction was found out using Karl Pearson's Co-efficient of Correlation.

- The result indicates that with the increase in digital competence, there is an increase in the level of job satisfaction and it is significant.

CONCLUSION
The study reveals that there is no significant difference in the level of digital competence among different sectors that is government and private school teachers. But coming to the job satisfaction, there is a significant difference in the level of job satisfaction among government and private school teachers. The study also indicates that with the increase in digital competence, job satisfaction also increases. The present study reveals the importance of digital competence is relevant in the job satisfaction of school teachers especially in online mode.

Limitations Of the Study
- The data of the study was collected mainly from the state of Kerala; hence caution has to be exercised while generalizing the findings.

- Only questionnaire method was used.

- Other individual factors of the participants were not considered.

- Not met the participants personally.

Implications

The study can be later implied to the field of education and school settings which can help them to give awareness about the importance of digital competence in teaching in future, efficiency of the teacher and easy understanding of pupils also. The findings of the study help to improve the digital competency of teachers for being more efficient in their job.

Scope Of the Study

- Qualitative research with face-to-face interview can be done for improving the quality of the paper.

- The study can be extended across the diverse geographical locations and the comparative study between the localities, different age groups and cultures can be initiated.

- A pre-test and post-test analysis can be initiated to observe the influence of interventions given to improve the digital competence and its influence of job satisfaction.

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DIGITAL ENTREPRENEURSHIP IN AN EMERGING ECONOMY CONTEXT: A MULTIPLE CASE STUDY

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ABSTRACT
Digital entrepreneurship is a highly topical area and is being viewed having emancipatory potential as well as transformative power. The present study is an attempt to understand the nexus of digital entrepreneurship and sustainable development. In order to achieve this aim, we introduced agriculture sector as the context of the study. The findings elaborate five major domains where the relation of digital technology and sustainability has been explored. We draw these inferences based on the biographical narratives of 15 agri-tech startups in India.

Keywords Digital Entrepreneurship, Sustainability, Emerging Economy

INTRODUCTION
Entrepreneurship has long been considered as a prominent vehicle to address social as well as environmental challenges including climate change and social inequalities (Gast et al., 2017; Muñoz & Cohen, 2017). Together with this, the outset of Net Economy has paramountly changed the structure of societies and radically shifted the context, management and usage of information, communication and transactions (Kollmann, 2006). As pointed out by Kollman this economy is characterized by four technological innovations: Telecommunication, Information Technology, Media Technology and Entertainment, the so-called TIME market (Kollmann, 2006). The emergence of these technologies have changed the rules of majority of industries where "Knowledge and Information" has become an important strategic resource (Carrier et al., 2004). The forum of these available technologies has led to many possibilities of developing innovative business concepts (Kollmann, 2006). One such concept which is the focus of this research is Digital Entrepreneurship that is starting ventures in the Net Economy embracing the digital technology space, ranging from having a virtual value chain to website as an support mechanism (Kollmann, 2006). There is literary evidence to the fact that digital technologies can be effective for addressing the challenges entrepreneurs face in their pursuit of developing sustainable business models (Gregori & Holzmann, 2020). This is in light of the view held about the nature of digital technology as being transformative that has paramountly changed the nature of entrepreneurial activity (Nambisan, 2016) and major approaches to address the issues of sustainability. Digital technologies have been documented to offer tremendous possibilities for creating new entrepreneurial ventures as well as enable the development of novel business models that support environmental, social and economic value creation (George et al., 2020). Therefore, the nexus between digital technology and sustainable development is of high topicality which has been addressed in this study. The study addresses the role that digital entrepreneurs play in combating challenges that are faced by the agriculture sector in India as an important sustainable development goal.

LITERATURE REVIEW
In this section we discuss the relevant streams of literature identified for the study

Sustainable Entrepreneurship
Sustainable development is a futuristic development orientation that aims at fulfilling the needs of the present, without compromising the skill and ability of future generations to meet their own needs. Initially originating from the Brundtland Report in 1987, it is a way of organizing society with a long term orientation with the aim of preservation of environment and natural resources. World has witnesses numerous examples of economic, social and environmental crisis owing to industrial revolution that in turn brought mass awareness about the importance of sustainable goals. From business perspective sustainability refers to both entrepreneurial and intrapreneurial strategies that are cardinal for developing an integrated mechanism for addressing social, environmental, and economic issues (Whiteman et al., 2013). Sustainable entrepreneurship includes voluntary actions aimed at bringing change in business practices and at the same time an intensive look out for opportunities on poverty, health and other major social and environmental issues. Moreover, Sustainable entrepreneurship has been viewed as a progression in firm strategy orientation ranging from reducing environmental impact at the minimum an can range upto incorporating economic, social and environmental concerns (Hall et al., 2010). Therefore sustainable entrepreneurs work in the direction of achieving positive environmental impact with a focus on triple bottom line that is, people, profit and planet.

Digital Entrepreneurship

Digital entrepreneurship is a sub category of entrepreneurship which entails 'the pursuit of opportunities based on the use of digital media and other information and communication technologies' and in which some or all of the entrepreneurial activities that are physical in traditional ventures has been digitized (Hull et al., 2007). As pointed out by Nambisan this specialist branch of entrepreneurship leads to democratization of the entrepreneurial phenomena with less spatial and temporal impediments providing ever increasing product and service opportunities(Nambisan, 2016). Additionally Hull et al. highlighted the broad horizon over which digital business models can span across as the important business functions including "products, distribution, and the workplace" can be configured in digital forms in an entrepreneurial venture (Hull et al., 2007). It is important to mention here the types of digital entrepreneurship advocated by Hull et al delineated as per the extent of use of digital technology across the business functions. 1) The first categorization pertains to using digital technology for supplementing some of the important business functions e.g., marketing and sales. This type of venturing is referred to as *mild digital entrepreneurship* as the firm still has a physical presence and the delivery of goods is done through traditional mode; 2) The second categorization is an extended form of mild version where digital marketing is the primary mode and the level of digital transactions are significant; 3) The final categorization is referred to as extreme type of digital entrepreneurship. Here the firm is completely digital in major activities of firm including sales, marketing, stakeholder management and even the product/service in question is also digital for example digital gaming.

METHODOLOGY

Research Design

Since the study is exploratory in nature, interpretive case study was found to be the most appropriate. We used narrative biographies through semi-structured interviews as a means to get deeper insights about how digital technology enabled the agricultural activity and empowered the farmers. We used Startup India online portal to identify the entrepreneurs that would match the objectives of our research. We randomly selected 15 listed entrepreneurs and contacted them through their official email addresses to get their acceptance for participation in the study. Semi structured interviews were used. The interviews were conducted face to face and lasted for three hours on an average. Qualitative data analysis software QSR Nvivo 12 was used for the analysis of the significant amount of data that was collected in the study. In the first step of analysis, first order provisional categories were developed by analyzing the statements of entrepreneurs. In the second step, the relationships of these first order categories were analyzed through axial coding. In the third and final step, aggregate dimensions were formed which have been discussed below, (Refer to Table I).

Findings

Based on the analysis we arrived at five aggregate dimensions that are deemed to be the substantive findings of our study.

1. Pricing of produce: Many start-ups e.g., *Agribolo* provide farming services online platform based on aggregator model help connect farmers to experts, developmental and training institutions, where they learn the mechanism of price setting and understand the dynamics of demand and supply. Demand and supply analytics, Online transparent pricing and real-time pricing are the major sub themes.

2. Equipment Marketplaces: These agri-entrepreneurs including *Farms2Fork, Agro Wave*, provide IoT wireless soil sensors, farming equipments that these farmers are still no aware of. *Gold Farm* provides solar-powered pumps to over 25,000 farmers connected through mobile apps. With farming as a service, some of the platforms connect farmers, farm equipment manufacturers and government schemes in the interest of farmers. AI based testing and measurement, drones and thermal imaging services are its sub themes.

3. Digital Workflow: Many other mobile based platforms help farmers grow vegetables and fruits on mini-farms and monitor the process of growing food on a real-time basis. E.g. *Farmizen* provides recommendations based on real time inputs from the field as well as pre-defined schedules for over 50 different types of crops. IoT devices for monitoring, real time growing, big data clustering of produce, crop specific mobile applications are its major sub themes.

4. Smart Supply chains: these start ups also provide platform based access to supply side as well as demand side of the market. E.g. *Ninja cart* enables retailers to directly purchase their raw material from farmers without resorting to middlemen. This has benefited both the sides of the market. Web-enabled connection with wholesalers, readymade retail market, and digital farm cooperatives are its major sub themes.

5. Organic Farming: Start-ups like *Organic Thelawala, Earth food* assist farmers to resort to organic farming and promote micro entrepreneurship. They stress the use of chemical free produce and help farmers to sell them at market rates. These start-ups use combination techniques using traditional methods as well as digital technology to keep pollution to the minimum.

Table I. Data Structure

First Order Codes	Second Order Codes	Theoretical Dimension
Statements about; information dissemination, quality input, market linkages.	Demand and Supply Analytics Real Time Analytics Online Transparent Pricing	Pricing of Produce
Statements about; water monitoring, reducing wastage, farming equipments, devices to record moisture content and soil conditions, right fertilizer mix.	AI based Testing and measurements IoT based farm equipments Farming as a Service (FaaS) Drones and Thermal Imaging services	Equipment Marketplaces
Statements about; real time growing on mini fields, helping farmers to get an estimate of the total agricultural production, working with agri-insurance companies	IoT devices for monitoring Real time growing Big data based clustering of produce Crop specific Mobile Applications	Digital Workflow
Statements about; connecting farmers to retail shops, restaurants, wholesalers, sale of inputs and advisory to farmers	Web enabled connection to wholesalers Readymade Retail Market Digital Farm Cooperatives E-commerce platform Integration	Smart Supply Chains
Statements about; chemical free fruits, vegetables, groceries and dairy products, soil contamination, bio-diversity working directly with suppliers and e-commerce platforms for organic produce	Chemical Free Produce Online aggregation of organic produce Web enabled integrated supply chains	Organic Farming

DISCUSSION AND RECOMMENDATIONS

The present study provide evidence to the fact that digital entrepreneurship has emancipatory potential and in the present context has led to transformation of one the oldest professions of the world. Technologies like distributed ledger technologies (block chain), artificial intelligence and machine learning (AI/ML), Big Data Analytics, mobile technology and applications, sensors and other IOT devices, and other telemetry tools like satellites and drones has led to a sustainable transformation of the agriculture sector. We draw this inference that technology has a huge role to play in an emerging economy like India which employs half of India's workforce but contributes only 13% to GDP. Coupled with the fact that thousands of farmers commit suicide each year, technology seems to be more promising towards the ideation of sustainable agriculture. However, compared to global counterparts the extent of technology used in agriculture is not that extensive which warrants some policy changes. On this front there has to be collaboration between industry, academia and government so that the beneficiaries can be brought to forum and possible technology solutions developed.

CONCLUSION AND LIMITATIONS

The present is on the fewest to address the concept of sustainability through the lens of digital technology in the agricultural context. We conclude that technology has emancipatory potential that needs to be discovered for achieving sustainable goals. However, the study is qualitative in nature and is based on a small sample. Future studies can take a large sample so that the results could be generalized in different contexts.

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EFFECT OF CORPORATE SOCIAL RESPONSIBILITY ON ORGANIZATIONAL PERFORMANCE AMONG THE EMPLOYEES OF PRIVATE BANKS IN COIMBATORE

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ABSTRACT

The main of the study is to find out the effect of CSR on organizational performance. The study is done with reference to the private bank employees in Coimbatore and the respondents are selected through simple random sampling. The sample size of the study is 100 and the tool for data collection is a questionnaire. The statistical tool used in the study is regression. The results of the analysis of the data of the study show that organizational performance is predicted by CSR. Overall finding shows that CSR predicts the organizational performance.

KEYWORDS: Corporate Social Responsibility (CSR), Organizational Performance

INTRODUCTION

All the business entities are started mainly with a view to increase their revenue or the profit. In the past this was done without any concern for the benefit of the environment or the customers. But in recent days, many elements have made the organizations to focus on the concept of corporate social responsibility (Balathandayutham, P. 2019). Some of those elements include enhanced awareness regarding the environment problems, pressure given by the clients, enhanced competition from the business rivals, globalization, scrutiny by the media channels, legal considerations and the complex and dynamic business atmosphere (Awad et al., 2016; AlGhwayeen and Abdallah, 2018). In such situations, the business entities are responsible to be efficient to fulfil the above said expectations. The managers of the business organizations should always try to follow the ethical, legal, social and environmental requirements. As a result, the element of social responsibility gets known to the organizations and they start to implement such activities of into their processes and structures. (Thorone et al., 2013). This means that the concept of CSR is not an option alone, rather it is an essential requirement (Cone, 2013).

The term organizational performance refers to the measurement of the actual results and outputs as against the outputs that are intended by the organization. It comprises of the analysis of the performance of the company as against the objectives and goals framed. The goals and objectives which are framed by the organization go hand in hand with the society and environment where they operate and cannot be separated from each other. The failure of the organization to comply with the societal and environmental concern makes it to be unsuitable for survival. Several organizations around the world had recognized the significance of the responsible activities to be undertaken by them for the society and the environment for their betterment (Balathandayutham, P., & Anandanatarajan, K. 2019; Sritharan, R., & Balathandayutham, P. 2019). The companies had also identified the effect of the activities of CSR on the employees, customers, environment, investors and the sustainability of the business (Balathandayutham, P. 2019).

STATEMENT OF PROBLEM

Many organizations of the present global world had started to focus more on the activities of CSR for enhancing their organizational performance. The companies have started implementing the CSR activities in their structures and processes for improving the life style of the people in the area in which the companies are operating. However, no clear view is available yet to decide what type of activities of CSR improves the organizational performance. Hence, this study has tried to explore the influence of the activities of CSR on the performance of the organization.

OBJECTIVES

The rationale to perform this study is to discover the effect which the organizational performance has got due to the CSR activities that the organization undertakes.

REVIEW OF LITERATURE

Bana Al-Ma'ani et al., (2019) studied the effects of CSR on the organizational performance. The study was done in the telecommunication industry of Jordan. The aim of the research was to investigate the effect of internal as well as external CSR on financial as well as non-financial organizational performance. The sample population of the study was the telecommunication sector of Jordan. The authors had framed a questionnaire for conducting survey among the respondents and the sample size was 500. The authors had conducted SPSS to check the validity and reliability of the data. The findings showed that financial and non-financial organizational

performances were affected by the internal CSR. Non-financial performance was seen to have positive effect by the external CSR and financial performance was negatively related with external CSR. To conclude, it was found that the organizational performance of the telecommunication sector of Jordan was affected by the CSR activities. The activities of CSR improved the satisfaction of the customer and the employees. It also increased the loyalty of the stakeholders too.

Rongoei Gladys Chebet and Willy Mutur (2018) explored the impact of CSR on the organizational performance. The study was done in the context of the Sony & Chemelil sugar industries in Kenya. The main aim of the research was to explore the impact of CSR on the performance of the organization. The authors had performed descriptive statistics. Also, analysis was done using multiple regression. The outcomes of analysis exhibited that economic activities of CSR helped for existence of the firm; the legal activities of CSR had constructive impacts over the performance of the organization; ethical CSR activities also had a positive influence over the organizational performance and finally the philanthropic CSR activities means the investment of business in donations, sponsorships etc, which also had an optimistic effect over the organizational performance. It was concluded in the study that the activities of CSR have to be performed along with other operations of the business.

Tabitha Nasieku et al., (2014) had made a theoretical review of the CSR and organizational performance. The organizations can achieve the goals and objectives and also attain maximum effectiveness and performance in the organization, provided they focus more on the activities of CSR. The place or the society in which an organization carries outs its business occupies a major place in the corporate culture influencing the performance of the organization. This requires the organizations to make the necessary alterations in their processes, behaviour and structures. The review made by the authors regarding the practices of CSR exhibited a very strong connection of the practices of CSR of a firm with its performance.

Mohamed A. K. Basuony et al., (2014) investigated the effect of CSR (corporate social responsibility) on the performance of the firm. The study was done in the context of Mena country. The authors had made use of cross-sectional information of the non-financial sectors of Kompass Egypt data base. The association and the impact of corporate social responsibility on the financial performance of the organization was discussed with the help of regression analysis. The results showed that there existed an optimistic impact of corporate social responsibility on the performance of the firm. It was also explored that all the elements of CSR had an association with the financial performance of the firm. It was concluded by the authors of the study that old and bigger organizations had an optimistic influence over the profitability, i.e., financial performance of the firm, which paved the way to the better usage of the practices of CSR.

RESEARCH METHODOLOGY

The activities of CSR are the independent variable of the study and the dependent variable of the study is the organizational performance. The study is performed among the private bank employees in Coimbatore. The simple random sampling is used to select the respondents of the study and the sample size is 100. The information required for the study is collected using the questionnaire and the tool used for statistical analysis of the data is regression. CSR scale used in this article has been developed by the researchers themselves.

ANALYSIS AND INTERPRETATION

R	R Square	Adjusted R Square	F	Sig.
.774(a)	.600	.578	28.163	.000(a)

a Predictor: (Constant), CSR

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.453	.190		7.640	.000
1. The CSR activity of my banks makes me loyal to the bank.	.206	.046	.376	4.483	.000
2. The CSR activity makes me believe that my bank concerns for the people in the society.	.124	.041	.253	3.032	.003

3. My bank also carries on CSR activities of planting trees which assures me for a better and safe environment for the future generation.	.151	.038	.318	4.028	.000
4. The bank's personal initiatives like disclosure of the facts regarding interest on loan, interest on savings, balance check enquiry reduces the burden of the employees.	.148	.046	.256	3.210	.002
5. Cleanliness activities carried out by the banks to keep the surrounding clean assures hygiene and makes me to concentrate more in my work than on my health elements.	-.052	.048	-.098	-1.086	.280

a Dependent Variable: organizational performance

The 5 predictors are determined to check if they are statistically significant. If so significant, the subsequent step was to observe the direction of relation. It was observed that every factors of OCB were significant. Further, a positive coefficient was also observed, which in turn pointed out every statement in the table was seen to persuade organizational performance. Analysis done through regression of the OCB was shown in the above table. Regression analysis was carried out. The table also shows a positive coefficient, which means that between all the statements, one statement was not influence on the Organizational performance. In the present research, the independent variable is corporate social responsibility and organizational performance is regarded as the dependent variable.

Analysis through multiple regression portrayed that R^2 (the coefficient value) is 0.600. This indicated that 60 % of the variables which are independent had an influence over the organizational performance.

In order to identify whether the coefficient value (R^2) was significant, ANOVA was performed. Value obtained for "F" was 28.163 (P<0.000). Hence, it was arrived at a conclusion that there exists a significant relation between the dependent and independent variables. Furthermore, it was found that CSR predicts the organizational performance of the employees. It was also ascertained that organizational performance is predicted by CSR.

CONCLUSION

The present research study is an attempt to explore the influence of CSR on the performance of the organization. Hence, it is concluded that every organization should implement the activities of CSR as one of its main business operations, thus ensuring improves organizational performance. This further pave the way to enhancement of the delivery of services to the community, customers and the society as a whole. In other words, the CSR of a firm cannot function in isolation, rather it has to be operated along with other functions of the organization. The outcomes of the study concluded that the organizations have to try hard to accomplish the approaches of CSR in order to be competitive and for enhancing the performance. It was also ascertained that organizational performance is predicted by CSR. . The table also shows a positive coefficient, which means that between all the statements, three statements were not influence on the Organizational performance. Overall findings of the study is CSR predicts the organizational performance.

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EFFECT OF CORPORATE SOCIAL RESPONSIBILITY ON ORGANIZATIONAL PERFORMANCE: A STUDY AMONG THE EMPLOYEES OF GOVERNMENT BANK EMPLOYEES IN COIMBATORE

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ABSTRACT

Many companies, in the current scenario, have started to operate the activities of CSR. The customers get attracted towards the organizations which indulge in the activities of CSR as a result of better reputation for the firm. The individuals who seek for job also move towards such companies. All these facts make the company to improve their organizational performance. In this context, the current study has been performed to analyze and explain the impact of corporate social responsibility (CSR) on the organizational performance. This study is to discover the effect CSR on organizational performance among the employees of government banks in Coimbatore. The simple random sampling is used to select the respondents of the study and the sample size is 100. The information required for the study is collected using the questionnaire and the tool used for statistical analysis of the data is regression. Overall finding shows that CSR predicts the organizational performance.

Keywords : Corporate Social Responsibilities, performance

INTRODUCTION

The term organizational performance refers to the on the whole performance of the organization. it is revealed by the total performance of marketing, finance and the HR functions in the firm at a stipulated time period. Objectives and goals to be accomplished, are set by the organizations for a specific period of time. The organizational performance assesses the effectiveness of the organization with which it operates all these functions. Hence, in the words of Koontz & Donnell (2003), the term organizational performance means the capability of the firm for accomplishing its objectives like the margin for high profit, quality of the product, good financial outcomes, larger share in the market at a specified time period by the implementation of the required strategy (Sritharan, R., & Balathandayutham, P. 2019; Balathandayutham, P., & Anandanatarajan, K. 2019).

Corporate Social Responsibility is a term which suggested that it is the duty of the companies inside the society, to contribute to the development of the society in large, may it be social, economical or economical (Balathandayutham, P. 2019). CSR is a kind of self regulation of a business. It is also referred to as corporate sustainability, corporate conscience, sustainable business, corporate citizenship, responsible business or conscious capitalism. It aspires to make sure that the business is being carried out ethically. In other words it aims to look into the fact that the company is being run by considering the economic, environmental and social impact and human rights too.

STATEMENT OF THE PROBLEM

No clear view is available yet to decide what type of activities of CSR improves the organizational performance. Several studies had been performed which exhibits varied outcomes regarding CSR. But, dilemma still continues to explore the form of CSR which will promote the organizational performance. Hence, this study has tried to explore the influence of the activities of CSR on the performance of the organization.

OBJECTIVES

The rationale to perform this study is to discover the effect which the organizational performance has got due to the CSR activities that the organization undertakes.

REVIEW OF LITERATURE

Tabitha Nasieku et al., (2014) had made a theoretical review of the CSR and organizational performance. The organizations can achieve the goals and objectives and also attain maximum effectiveness and performance in the organization, provided they focus more on the activities of CSR. The place or the society in which an organization carries outs its business occupies a major place in the corporate culture influencing the performance of the organization. This requires the organizations to make the necessary alterations in their processes, behaviour and structures. The review made by the authors regarding the practices of CSR exhibited a very strong connection of the practices of CSR of a firm with its performance.

Mohamed A. K. Basuony et al., (2014) investigated the effect of CSR (corporate social responsibility) on the performance of the firm. The study was done in the context of Mena country. The authors had made use of cross-sectional information of the non-financial sectors of Kompass Egypt data base. The association and the impact of corporate social responsibility on the financial performance of the organization was discussed with the help of regression analysis. The results showed that there existed an optimistic impact of corporate social responsibility on the performance of the firm. It was also explored that all the elements of CSR had an association with the financial performance of the firm. It was concluded by the authors of the study that old and bigger organizations had an optimistic influence over the profitability, i.e., financial performance of the firm, which paved the way to the better usage of the practices of CSR.

RESEARCH METHODOLOGY

The activities of CSR are the independent variable of the study and the dependent variable of the study is the organizational performance. The study is performed among the bank employees in Coimbatore. The simple random sampling is used to select the respondents of the study and the sample size is 100. The information required for the study is collected using the questionnaire and the tool used for statistical analysis of the data is regression. CSR scale used in this article has been developed by the researchers themselves.

ANALYSIS AND INTERPRETATION

R	R Square	Adjusted R Square	F	Sig.
.844(a)	.712	.696	46.373	.000(a)

a Predictor: (Constant), CSR

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.053	.187		5.620	.000
1. The CSR activity of my banks makes me loyal to the bank.	.129	.034	.254	3.815	.000
2. The CSR activity makes me believe that my bank concerns for the people in the society.	.090	.040	.174	2.276	.025
3. My bank also carries on CSR activities of planting trees which assures me for a better and safe environment for the future generation.	-.055	.036	-.122	-1.524	.131
4. The bank's personal initiatives like disclosure of the facts regarding interest on loan, interest on savings, balance check enquiry reduces the burden of the employees.	.346	.050	.511	6.931	.000
5. Cleanliness activities carried out by the banks to keep the surrounding clean assures hygiene and makes me to concentrate more in my work than on my health elements.	.199	.040	.310	5.013	.000

a Dependent Variable: organizational performance

The 5 predictors are determined to check if they are statistically significant. It was observed that every factors of OCB were significant. Further, a positive coefficient was also observed, which in turn pointed out every statement in the table was seen to persuade organizational performance. Analysis done through regression of the OCB was shown in the above table. Regression analysis was carried out. The table also shows a positive coefficient, which means that between all the statements, one statement was not influence on the Organizational performance. In the present research, the independent variable is corporate social responsibility and organizational performance is regarded as the dependent variable.

Analysis through multiple regression portrayed that R^2 (the coefficient value) is 0.712. This indicated that 71.2% of the variables which are independent had an influence over the organizational performance.

CONCLUSION

Several studies had shown the outcome that, if an organization has got an active involvement in the activities of CSR, the healthiness of that organization improves to a great extent. Further, the improved level of social service and the enhanced level of satisfaction of the employees will surely add up to the development of the economy, thereby improving the firm value in the society. It was arrived at a conclusion that there exists a significant relation between the dependent and independent variables. Furthermore, it was found that CSR predicts the organizational performance of the employees. It was also ascertained that organizational performance is predicted by CSR.

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EFFECT OF EMOTIONAL INTELLIGENCE ON THE ORGANIZATIONAL EFFECTIVENESS AMONG THE EMPLOYEES OF MANUFACTURING SECTOR IN CHENNAI

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ABSTRACT

The purpose with which this study has been undertaken is to explore the influence of emotional intelligence over the organizational effectiveness in the company. The research has been done among the employees of manufacturing sector in Chennai. The respondents for the study are selected through simple random sampling and the sample size of the study is 100. The tool used for data collection is a questionnaire and the technique adopted for analysis of the collected data is Regression. Finding shows that the emotional intelligence had a positive effect on Organizational effectiveness, which means Organizational effectiveness increase in the presence of emotional intelligence.

KEYWORDS: Emotional Intelligence (EI), Organizational Effectiveness

INTRODUCTION

According to the authors Mayer & Salovey, the term emotional intelligence refers to the processes inclusive in the identification, usage, awareness and management of the emotional states of the self and also of the others for solving any emotion-related challenges and for regulating the behaviour. As per the author named Law et al., (2004), the employees those who are emotionally intelligent, have the tendency to perform better, which means that the absence of emotional intelligence in an employee has got the ability to have a negative effect over his/her performance as well as the relationships with the co-employees at the workplace.

Mayer et al., (1999) had said that EI (emotional intelligence) refers to an ability of a person. It is referred to as a personality trait according to Schutte andMalouff (1999). Mayer & Salovey (1997) had described the emotional intelligence as the element of social intelligence which comprises of the ability of exploring the feelings and emotions of the self and also of the others as well as to make a distinction amidst the feelings and emotions for the purpose of applying the information of a person to direct the thought process and the actions. A remodelling of their definition for emotional intelligence was made by Mayer and Salovey in 1999, according to which EI refers to the capability of recognizing the emotions, accessing and producing emotions which helps in the thought process, appreciating the emotions as well as the emotional knowledge and finally adjusting the emotions for the purpose of rational and emotional growth.

The term organizational effectiveness refers to the fact that to how much extent is the organization to achieve the things for which it has been established. The advantages of organizational benefits comprise of enhanced levels of performance and engagement of the employees. the productivity of the employees is related directly with the performance and outcomes of the business units. This ultimately influences the performance of the organization. The term organizational effectiveness had been defined as the efficiency of the organization or a company with the help of which it achieves the goals intended. The level of production of an organization, the extent of wastes produced and the level of its process efficiency comes under the category of organizational effectiveness. It is defined as the measure of the efficiency of the organization by using the resources given to it with no stress laid on the workers. Organizational effectiveness is all about the way in which an organization achieves the goals, effectiveness of the process and the level of wastes which has been produced.

STATEMENT OF PROBLEM

Emotional intelligence has become a key factor to be possessed by everyone in an organization. today's world is filled fully with competitions, challenges and problems. In such a situation, the emotional intelligence of a person alone can help him/her to sort out the problems and come up amidst the hurdles. Te success of a person as well as of the organization where he/she is working depends on the emotional intelligence of that person.

OBJECTIVES

The purpose with which this study has been undertaken is to explore the influence of emotional intelligence over the organizational effectiveness in the company.

REVIEW OF LITERATURE

L.Sreelekha&V.Gokul (2018) had studied the role played by emotional intelligence in the organizational effectiveness. Emotional intelligence means the ability of a person in perceiving, controlling and evaluating the emotions of the self and utilize the emotions in the enhancement of the thought process. The concept of EI

(emotional intelligence) has turned out to be very significant for the development of the employees as well as for the organizational effectiveness. The leaders of the modern organizations facilitate and coordinate the work done by his/her sub-ordinates by establishing as well as maintaining a work environment which is supportive and constructive for the employees. in this context, the only best way to retain the employees is considered to be implementing the emotional intelligence in the philosophy of organizational management. The feature of EI (emotional intelligence) is very important for everybody's life. It has got the tendency of influencing the level of success in a person's relationship with others as well as in his/her career. The current study was done on the basis of the secondary data and the purpose was to examine the effects of EI (emotional intelligence) on the organizational effectiveness. The study also aimed to establish an awareness among the employers and the employees regarding the significance of emotional intelligence. The authors had also recommended certain measures for increasing the EI (emotional intelligence) quotient of both the employees as well as the employers.

Rajagopal and Rekha (2004) analysed the relationship of emotional intelligence with the organizational effectiveness. The study was done among the management staff in BIPCO (Bilt Industrial Packaging Company) in Coimbatore, TamilNadu. The company mentioned here is one among the top business conglomerates of India with several fields. The authors had done the study among the staff of the management of the company. The sample size of the study was 70. The main idea was to check if there is an association between emotional intelligence and organizational effectiveness. The authors had suggested the organization to make a test of the level of emotional intelligence of individuals before recruiting them.

Mehrbakhsh Nilashi et al., (2011) examined the relationship of EI (emotional intelligence) with the organizational effectiveness. The authors had reported that the organizational leaders must possess certain qualities for facing any type of changes for surviving and growing in any type of environments. With reference to this fact, it had been identified that emotional intelligence is the best way to be developed in managers and leaders in order to correspond with the changes in the business environments. The aim of this study was to make an investigation of the association of the emotional intelligence with the organizational effectiveness. The authors had used a statistical model as well as a drawing model to carry out the research and had also used standardized questions for exploring the purpose of the study. The population of the study comprised of the managers, executive regional manager and the assistants of Rasht municipality. The respondents of the study counted to 240. The maximum number of respondents possessed an educational qualification of B.A and above and many of them had an experience in job of less than 12 years. The analysis of the collected data was carried out with the help of EXCEL, SPSS and STATISTICA. The findings of the research study revealed the fact there is a relation of emotional intelligence with the organizational effectiveness. It was also explored that the element of motivation had an effective impact over the organizational effectiveness.

RESEARCH METHODOLOGY

The research has been done among the employees of manufacturing sector in Chennai. The respondents for the study are selected through simple random sampling and the sample size of the study is 100. The tool used for data collection is a questionnaire and the technique adopted for analysis of the collected data is Regression. Emotional Intelligence scale adopted from Ra'ed Masa'deh (2016);

ANALYSIS AND INTERPRETATION

R	R Square	Adjusted R Square	F	Sig.
.906(a)	.821	.800	40.696	.000(a)

a Predictors: (Constant), Emotional Intelligence

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.270	.242		5.259	.000
I can explain the emotions I feel to my colleagues.	.130	.047	.143	2.784	.007
I give a fair hearing to my colleagues' ideas.	.267	.058	.401	4.631	.000
I can read my colleagues "true" feelings, even if they try to hide them.	.121	.051	.163	2.386	.019
I am able to describe accurately the way my	.098	.053	.130	1.848	.068

colleagues are feeling.					
When I talk to my colleagues I can gauge their true feelings from their body language.	.094	.053	.134	1.790	.077
I can tell when my colleagues don't mean what they say.	.192	.060	.242	3.199	.002
My enthusiasm can be contagious for my colleagues.	-.299	.051	-.435	-5.909	.000
I am able to cheer my colleagues up when they are feeling down. …	-.153	.080	-.152	-1.923	.058
I can get my colleagues to share my keenness for a project.	.100	.061	.113	1.643	.104
I can provide the "spark" to get my colleagues enthusiastic	.098	.050	.153	1.948	.055

Dependent Variable: Organizational effectiveness

Findings show that all statement of emotional intelligence was significant. The table also shows a positive coefficient, which means that between all the statements, five statements were not influence on the Organizational effectiveness. There was a relation found between the dependent variable and the emotional intelligence. The coefficient value, R^2, was found to be 0.821 through multiple regressions, which shows that 82.1% of the independent variables had an influence on the Organizational effectiveness. In order to examine whether the value of coefficient (R^2) is significant or not, ANOVA was executed. The F value so got was 40.696 which means p<0.000. It was also reported that emotional intelligence was seen to predict Organizational effectiveness. Finding shows that the emotional intelligence had a positive effect on Organizational effectiveness, which means Organizational effectiveness increase in the presence of emotional intelligence.

CONCLUSION

The leader of an organization with a high level of emotional intelligence quotient is capable of being more confident, adaptable to any form of situation as well as capable of handling the threats or challenges which are unexpected in the business environment. Such a leader is also able to direct his/her emotions in the crisis management period. Absence of the emotional intelligence will lead to the disruption being caused in both the professional and the personal life of an individual. Finding shows that the emotional intelligence had a positive effect on Organizational effectiveness, which means Organizational effectiveness increase in the presence of emotional intelligence.

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EFFECTIVENESS OF ADOLESCENT'S BEHAVIOR TOWARDS JUNK FOODS PRODUCTS IN TIRUVANNAMALAI

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ABSTRACT

The period of adolescence is the one where the individuals are prone to lifestyle changes as well as the changes in food habits. The adolescent people have got the tendency to make a choice between the conventional and non-conventional (junk food) food practices. The unhealthy eating habits of the adolescent people lead to enhanced intake of fast foods, low level of hygienic practices, consumption of carbonated beverages, avoiding breakfasts and low or not at all consuming vegetables and fruits. The junk foods are inclusive of the foods which do not have any nutritional value and on the other hand, comprise of increased amount of sugar, fats, salts, additives and artificial flavors. The junk foods are mostly preferred by the adolescents and also leads to chronic health issues like obesity and so on. In this context, the current research study has been conducted to analyze and explore the behavior of adolescent people regarding the junk food products. The study is done by the author in the area of Tiruvannamalai, Tamil Nadu. The respondents of the study are selected through simple random sampling and the sample size of the study is 100. The information for the study is collected through questionnaires and the analysis is performed through mean score. The findings of the study reveal that most of adolescents say that consumption of junk food gives me pleasure.

Keywords: Adolescent, Behavior, Junk Food

INTRODUCTION

The consumption of junk foods means the low consumption of vegetables, fruits, dairy products and milk. Rather, it involves the consumption of high levels of sodium, calories and fats rich food products or even the consumption of carbonated beverages or products high in sugar content [Rodrigues PR et al., 2017;]. The practice of unhealthy diets includes skipping of meals, having food outside, eating a lot of snacks, and consuming more amount of fast foods [Ganasegeran K et al., 2012]. These unhealthy eating habits as mentioned here lead to nutrition-related problems among the individuals and the adolescents in specific. Such unhealthy food habits may be the reason for chronic problems like the increase in weight, heart problems, cancer, bone-related problems and so [Neslişah R and Emine AY, 2011].

The consumption of saturated fatty acids, cholesterol rich products, fibre, sodium and fats is seen to be more among the adolescent people. On the contrary the consumption of folic acid, vitamin E and vitamin B6 is low because of the non-consumption of vegetables and fruits. This paves the way to deficiency of zinc, vitamin C, vitamin B6, vitamin E, riboflavin, niacin, phosphorous and pyrodoxine. All these are common reasons for the arousal of anaemia and osteoporosis in adolescents [Neslişah R and Emine AY, 2011; Washi SA and Ageib MB, 2010]. The factors of overweight and obesity has been observed to be increasing all over the world among all the ages and in both the genders (Shah.T et al., 2014). The main reason for these two factors is the intake of fast food.

The study regarding the consumer behaviour deals with the examination of the consumers and the procedures they follow to select, consume and also dispose of. The term consumer behaviour refers to the actions and the processes of making decisions by the individuals in the purchase of products for consumption. It is the physical activity and process of decision making in which the people get themselves engaged while doing evaluation, acquisition or the disposing of the products.

The behaviour and perceptions of the adolescent people towards the choices of their food had turned out to be a major topic of concern for the health professionals and the researchers. Most of the adolescent people think that their health will not be affected by their eating habits. They have the feeling that eating healthy food is not essential during the period of teenage. They also feel that the healthy food habits will be adopted by them only if they get attracted or the food looks appealing, should have better taste and also should be available throughout. The behaviour and the perception of the adolescents regarding the choices for food depend on the social environmental factors like the friends, family and peer group. Such behaviours and perceptions also depend upon other factors like the outlets of fast food, schools, social norms, cultural norms, availability of food and its production.

STATEMENT OF PROBLEM
Diversity in food habits is an implied feature of the diversified culture of India comprising of varied states and regions. In earlier days, the Indian people preferred only the foods that were cooked at home. This concept was the one which was supported individually as well as religiously. But, the enhanced awareness and effect of the western culture had made a shift in the patterns of food consumption among the Indian families of urban areas. This practice got initiated with the habit of eating outside and then moved towards the acceptance of a wide range of foods from all over the world. Therefore, it has become essential to analyse the behaviour of consumers, especially the adolescents, regarding the fast food or the junk food.

NEED FOR THE STUDY
The industry of fast food has been developing due to the changes in the lifestyle of the younger generation in India. Most of the dishes which are traditional in nature had been altered so as to suit the needs of the younger generation's desire for junk or fast foods. The main reason for such an adaptation to the fast food trend is the reduction in the processing as well as serving time. The fast foods are readily available, quick and reasonably-priced. On the contrary, these junk foods have high level of calories, saturated fats, salt and sugar content. Therefore, it had become necessary to explore the behavior of adolescents regarding the junk foods.

OBJECTIVES
The current study has been conducted to identify the factors that influence the perception and behaviour pattern of consumers towards fast food in Tiruvannamalai.

REVIEW OF LITERATURE
Vinit and Vanishree(2011) had explored the behaviour of consumers regarding the industry of fast food. The research was a case study and was done in Pune.The restaurants of fast food or the so-called junk foods are becoming more and more popular from 1921. The term fast food means the form of food that can be prepared quickly and presented to the customers within few minutes. The trend of fast food had seen an upward curve due to its convenience with which it is prepared and served. The sector of fast food is growing at a fast pace with the changes in lifestyle of the individuals and the level of their disposable income. The greatest benefit of fast food is that it is less time-consuming and the consumers have a lot of time to do other tasks. Now-a-days, the fast food sector has also started to change its strategy for offering food with healthy nutrients since the society has been changing to food habits of healthy nature. According to the market analysis of the fast food of India, our nation, India, has been observed as one among the nations with fast growing markets for fast foods. The Indian market for fast foods is identified to be growing at 30-35% annually. Even some well-known food chains are making strategies to expand on a wide basis in future.

Najeemudeen and Panchanatham (2016) explored the behaviour of buyers regarding the fast foods. The study was done in the context of the Chicking Restaurants. With the increase in the level of disposable income of the individuals, willingness of the consumers to make an experiment of all the cuisines in the world, the sector of fast foods is growing at a very fast pace. Other than these factors, the busy schedules in the life of individuals, the processes which consume less time and homogenous food had also increased the demand for fast foods from the consumers. ChicKing, the area of the study undertaken, is considered as one among such industry for fast foods, which has its specialization for fried chicken and has got over seventy branches all over the world. The authors had tried to explore the behaviour of buyers regarding the restaurants of fast foods. The data was collected with the help of a questionnaire. The respondents were the customers of three branches of the restaurants in Malappuram district, Kerala. From a total of 150 dispersed questionnaires, 105 questionnaires were received back. The analysis of the collected data was done with the help of test for weighted average score and percentage analysis.

Naresh and Anmol (2013) studied the behaviour of consumers regarding the consumption of the fast foods. The consumer is the person who pays the price for consuming the products as well as the services that are produced. They have got a vital role to play in the development of the economy of the nation. If there is no sufficient demand for a product, there will be an absence of motivation for the producers to produce a product or service. The authors of this paper had attempted to understand the consumer's behaviour about the preferences they have regarding the fast foods, likes, dislikes and eating habits. The aim of the study was to make an analysis of the consumer preference regarding the outlets for fast foods. The authors also examined the level of satisfaction and preference of the consumers regarding the fast food chains in the Eastern Delhi. The methods of data collection were experimental treatments and questionnaires. The findings showed that 64% of the participants made a visit to the outlets of fast foods only once in a week. It was also found that nearly most of them spent 15% of monthly income in fast foods and their preference of the customers was for junk foods in western areas

of the world. The authors also had explored that the participants felt that the effective activity for the promotion of fast foods was the discount offered for the fast foods.

RESEARCH METHODOLOGY

The research study has been done to explore and analyze the consumer behavior towards the junk foods in Tiruvannamalai. The respondents of the study are selected through simple random sampling and the sample size is fixed at 100. The data required for the study is collected through a questionnaire and the tool used for analysis is Mean and standard deviation.

ANALYSIS AND INTERPRETATION

ATTITUDE TOWARDS JUNK FOOD	Mean	Std. Deviation
Item1: I will become obese if I eat junk food.	3.50	.847
Item2: The consumption of junk food will make me famous.	3.19	1.042
Item3: The taste of junk food is very good.	3.45	.857
Item4: Consumption of junk food gives me pleasure.	3.83	1.155
Item5: Consumption of junk food gives me enough time for doing other work.	3.54	1.039
Item6: Junk foods are very cheap.	3.75	1.019
Item7: Junk foods increase the fat content in my body.	3.42	.843
Item8: The consumption of Junk food is the method of enjoyment with friends outside.	3.73	1.100
Item9: It is easy to consume Junk food.	3.39	.973
Item10: Junk foods are good for health.	3.41	1.120

Graphical representation of behavior
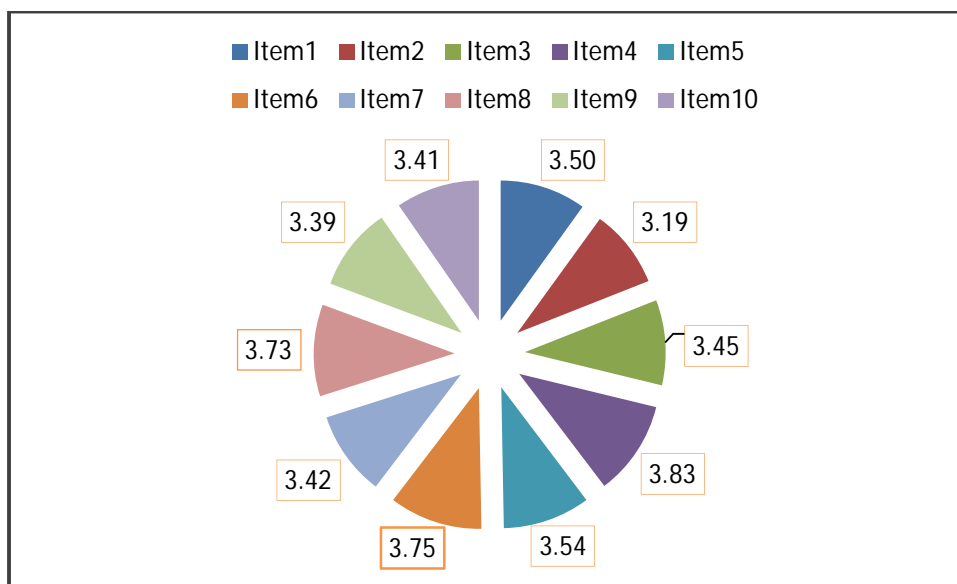
. The Adolescents' behavior was investigated through questions. The table shows that the respondents who stated that "Consumption of junk food gives me pleasure" have the highest mean value of 3.83 & S.D 1.155. Next to that the respondents who stated that "Junk foods are very cheap" have the mean value of 3.75 & S.D 1.019. The respondents who stated that "The consumption of junk food will make me famous" have the least mean value of 3.19 & S.D 1.042. Most of adolescents say that consumption of junk food gives me pleasure.

CONCLUSION

The individuals all over the world had started to consume varied types of junk food. Due to the changing lifestyle and transitions in the dietary or eating habits of the people, a greater number of individuals belonging to varied age groups, especially the adolescents have become inclined to the consumption of fast foods. Their behaviour towards the junk foods have ben observed to be optimistic due to the reasons of easy availability, less time-consuming and reasonable price. The consumption of junk foods lead to many issues like hypertension, obesity and gastro-intestinal problems. Hence, the adolescents should be made aware of the ill-effects of consuming high level of junk foods. Most of adolescents say that consumption of junk food gives me pleasure.

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EFFECTIVENESS OF EMOTIONAL INTELLIGENCE ON ORGANIZATIONAL PERFORMANCE AMONG THE EMPLOYEES OF BANK EMPLOYEES IN CHENNAI

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ABSTRACT

To be in short, emotional intelligence is a reflector of the ability of a person in dealing with the challenges of the daily environment for the purpose of achieving success in life, may it be personal life or professional life. In this context, the current study has been undertaken to check whether or not emotional intelligence affects the organizational performance. The study is carried out in Chennai. The respondents are the government bank employees who are selected through simple random sampling. The tool used for the collection of data from the respondents is a questionnaire. The sample size of the study is 100 and the analytical tool used in the study is Regression. The findings of the study show that the emotional intelligence had a positive effect on Organizational performance, which means Organizational performance increase in the presence of emotional intelligence. It is the capacity to effectively perceive, express, understand and manage their emotions and the emotions of others in positive and productive manner.

KEYWORDS: Emotional Intelligence, Organizational Performance

INTRODUCTION

In the midst of the acute competition of the twenty-first century, the organizations are in the search of the employees who are not just having high level of intelligence, logical and technical competencies for ensuring productive and effective work and high level of performance in the organizations. Apart from these skills, the organizations recruit such persons who are socially as well as emotionally capable to become aware of their emotions as well as feelings, make a control over such emotions and feelings and understand the feelings and emotions of others too. The term emotion has got the root word of motere, which is a Latin term and the meaning of which is to move. According to Akgül (2011), when the letter E is put in front of the Latin word, it becomes Emotere, which means to move beyond or move away. To be simple, emotions refers to the navigators which act as the locomotives for human behaviours.

According to Goleman (1995), the term emotions refer to the features which help the individuals in learning through the activation of their learning ability, facilitate them in asking questions, improving their ability and translating the learnt fact into action. It is actually one form of social intelligence which comprises of the capability of monitoring the emotions of the self and of the others, make a discrimination among them and utilize such information in guiding the thought process and actions (Salovey & Mayer, 1990).In this regard, in the organizations having employees with high level of emotional intelligence, predictions can be made that the communications and relationships amidst the individuals turns out to be efficient and effective and the chances of the employees to get connected with their co-employees and with their organizations are better. The term emotional intelligence means the ability of an individual to recognize his/her own emotions and also of the others for the purpose of motivating others and also self (Goleman, 1995)

In the world of business, the traits of emotional intelligence are being utilized as the decisive and significant measure in several phases of the performance process (ÇetinkayaandAlparslan, 2011). In this context, the absence of emotional intelligence leads the organization to become weak as against other organizations.

STATEMENT OF PROBLEM

The organization of any type depends on the employees working in it. It is not just enough to have the employees who are professionally skilled, rather, they should possess the ability of understanding their own emotions as well as the emotions of others. This ability is referred to as the emotional intelligence. Many firms recruit individuals for low pay and hence face difficulties to achieve success. Hence, it becomes important for such firms to become aware of the fact that emotional intelligence plays a crucial role in the success and better performance of the organization.

OBJECTIVES

Themain idea with which this particular study has been done is to identify and analyse the influence of emotional intelligence over the organizational performance of the firm.

REVIEW OF LITERATURE

Cemal Zehir et al., (2017) had examined the impact of emotional intelligence on the organizational performance. The authors had done the study with the mediation of organizational identification. Many literatures exist which analysed the influence of emotional intelligence over the organizational performance. But only a few of them had examined the mediation of organizational identification on this relationship. The current research study explored the mediation of organizational identification on the association of emotional intelligence with the organizational performance. The study also intended to examine the mediation of organizational identity on the association of emotional intelligence with the organizational performance. Additionally, the authors had tried to explain that the employees with high levels of emotional intelligence and those who have established organizational identity have the ability to exhibit a better performance. The authors had employed SEM for testing the model and hypothesis of the study. The sample size of the study was 314. Outcomes of the study showed that organizational identity played the role of a mediator on the association of emotional intelligence with the organizational performance.

Kalaiarasi Vet al., (2015) analysed the concept of emotional intelligence and also the concept of organizational performance. The individuals those who are emotionally intelligent of understanding and managing the emotions and feelings of the others. The employees at the level of management in the work area have got the duty of dealing with the workers for the purpose of getting the work done by them. Many organizations have recognized the significance of emotional intelligence in order to enhance the employee performance. The current study had been done for supporting the fact that emotional intelligence influenced the performance. The authors had utilized judgmental sample. The sample size of the study was 555 and the population comprised of managerial level people in the industry for manufacturing cycles. The collection of data was done with the help of structured questionnaires. The analysis of the study showed that there was an optimistic relation of emotional intelligence with job performance.

RESEARCH METHODOLOGY

The research has been undertaken among the employees working in government bank located at Chennai. The size of the sample of the study is 100 and the respondents of the research are selected through simple random sampling. The data needed for the study is collected with the help of a questionnaire. Regression is the method used for statistical analysis. Emotional Intelligence scale adopted from Ra'ed Masa'deh (2016);

ANALYSIS AND INTERPRETATION

R	R Square	Adjusted R Square	F	Sig.
.868(a)	.754	.720	22.232	.000(a)

a Predictors: (Constant), Emotional Intelligence

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.746	.244		3.053	.003
I can explain the emotions I feel to my colleagues.	.152	.044	.217	3.413	.001
I can discuss the emotions I feel with other colleagues.	.149	.056	.218	2.659	.009
If I feel down, I can tell my colleagues what will make me feel better.	.131	.046	.214	2.857	.005
I give a fair hearing to my colleagues' ideas.	.146	.056	.214	2.611	.011
I can read my colleagues "true" feelings, even if they try to hide them.	-.215	.058	-.318	-3.712	.000
I am able to describe accurately the way my colleagues are feeling.	-.241	.079	-.294	-3.053	.003
When I talk to my colleagues I can gauge their true feelings from their body language.	.024	.051	.042	.476	.635
I can tell when my colleagues don't mean what	.367	.063	.421	5.816	.000

they say.					
My enthusiasm can be contagious for my colleagues.	-.150	.061	-.220	-2.451	.016
I am able to cheer my colleagues up when they are feeling down. …	.175	.061	.237	2.873	.005
I can get my colleagues to share my keenness for a project.	.183	.059	.324	3.095	.003
I can provide the "spark" to get my colleagues enthusiastic	.121	.057	.203	2.133	.036

Dependent Variable: Organizational Performance

Findings show that all statement of emotional intelligence was significant. The table also shows a positive coefficient, which means that between all the statements, one statement was not influence on the Organizational performance. There was a relation found between the dependent variable and the emotional intelligence. The coefficient value, R2, was found to be 0.754 through multiple regressions, which shows that 75.4% of the independent variables had an influence on the Organizational performance. In order to examine whether the value of coefficient (R2) is significant or not, ANOVA was executed. The F value so got was 40.696 which means p<0.000. It was also reported that emotional intelligence was seen to predict Organizational performance. Finding shows that the emotional intelligence had a positive effect on Organizational performance, which means Organizational performance increase in the presence of emotional intelligence.

CONCLUSION

The study finally makes a conclusion that EI of the workers in an organization makes a positive contribution towards the organizational performance of the companies. Therefore, it becomes essential for developing the inter-personal relations, financial status of the workers, work-life quality, opportunities for growth and development in career, process of decision-making and also the personality development. All these competencies, if developed by the organization in the employees, will surely pave the way to organizational efficiency and growth. Finally, to conclude, the EI of the workers helps to enhance the individual as well as organizational performance and efficiency. Finding shows that the emotional intelligence had a positive effect on Organizational performance, which means Organizational performance increase in the presence of emotional intelligence.

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EFFECTIVENESS OF PLANNED TEACHING PROGRAMME ON IMMUNEBOOSTING FOODS DURING COVID-19 PANDEMIC AMONG MOTHERS OF CHILDREN (3-5 YEARS) AT THIRUMAZHISAI

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ABSTRACT

The present aim was to determine the effectiveness of Planned Teaching Programme on Immune boosting foods during COVID-19 pandemic among Mothers of children (3-5) years at Thirumazhisai. A quantitative approach Pre-experimental Design with one group pre-test and post-test design was used for the present study. 60 mothers of children aged (3-5) years among were selected using Convenient Sampling Technique. Self-structured questionnaire method was used to collect Pre-test and Post test level of knowledge on immune boosting foods during COVID-19 pandemic among mothers of children (3-5) years. Planned Teaching Programme on immune boosting foods was enlightened to mothers and post test was conducted after teaching Programme. The mean score on pre-test level of knowledge on Immune Boosting foods during COVID-19 pandemic among mothers of children (3-5) years was found to be7.05 with Standard Deviation of 4.54 and The Post-test Mean score level of knowledge was found to be 16.3 with Standard Deviation 1.80. Hence the findings of present study revealed that the planned teaching programme were found to be effective

KEYWORDS: Covid-19pandemic, immune boosting foods, planned teaching programme, children (3-5) years.

INTRODUCTION:

Good nutrition is the fundamental pillar for the maintenance of positive health ([1]). "Children are future of society and mothers are guardian of that future." Ultimately, it is the children who benefit from having parents who understand and know how to protect and promote their safety and well-being by knowing regarding nutrition. Nutrition is provided to cells and organisms, to support life. Many common health problems can be prevented (or) alleviated with a healthy diet [2]. Mother is the one who take care of the child, it is very important that she should have knowledge regarding care of under five and Balanced Nutrition to them. Healthy eating and physical activity are essential for growth and development in childhood. To help children develop healthy eating patterns from an early age, it is important that the food and eating patterns to which they are exposed - both at home and outside the home - are those which promote positive attitudes to good nutrition[3].

Diet during Covid-19 to

Improve Immunity, in the wake of the COVID-19 pandemic, improving the immunity assumes a significant job in keeping up optimum health. As a well-known saying "prevention is better than cure". Even though vaccine is boosting the Immune. Nutrition play a vital in maintaining good immune booster which help our immunity during circumstances such as the present. The food plays a key role in deciding generally health and Immunity. Regularly ingest vegetables and natural products good in β-carotene, Ascorbic acid and other essential nutrients [4]. Certain foods like mushrooms, tomato, chime pepper and green vegetables like broccoli, spinach are additionally acceptable choices to develop resilience in the body against microbes, viruses etc[5]. Eating a low-fat, plant-based eating habit may help give the immune system a boost. The immune system depends on WBCs which produce antibodies to battle against microbes, viruses etc. Vegetarians have been appeared to have improved white platelets as compared to non-vegetarians, because of a high consumption of nutrients and low ingestion of fat [6]

. Eating allow-fat eat food may likewise be protective. Studies have indicated that restricting dietary fat helps stronger immune defenses. Research additionally shows that oil may impair WBCs function and that high-fat diet may disturb the gut micro-biota that supports immunity. Maintaining a good weight can also boost the immune system [7]. Obesity has been connected to expanded hazard for flu and different infections. Plant-based diet are effective for weight reduction, since they are rich in fiber, which help in filling the stomach, without including additional calories [8]. Fiber can likewise regulate BMI, which is connected to improved immunity. A plant-based diet like fruits, vegetable, whole grains have additionally been appeared to reduce inflammatory biomarkers [9].

According to J. Wardle et *al*., (1999) conducted a Nutrition knowledge and intake; correlations between nutrition knowledge and dietary behavior have failed to reach statistical significance, leading researchers to question the relevance of nutrition knowledge on food choice, and the value of nutrition education campaigns.

This study aimed to investigate the relationship between knowledge and intake of fat, fruit and vegetables using a well-validated measure of nutrition knowledge. The study was a postal survey, using 1040 adult participants selected at random from General Practitioners' lists in England. Nutrition knowledge and food intake followed the expected demographic patterns. Knowledge was significantly associated with healthy eating, and the effect persisted after controlling for demographic variables. Logistic regression showed that respondents in the highest quintile for knowledge were almost 25 times more likely to meet current recommendations for fruit, vegetable and fat intake than those in the lowest quintile. [10] Nutrition knowledge was shown to be a partial mediator of the socio-demographic variation in intake, especially for fruit and vegetables. This demonstrates the value of using more sophisticated statistical techniques to investigate associations between knowledge and food intake and indicates that knowledge is an important factor in explaining variations in food choice. [11]

The results support the likely value of including nutrition knowledge as a target for health education campaigns aimed at promoting healthy eating [12] so, the main objective of study was to assess the effectiveness of planned teaching programme on immune boosting foods during COVID-19 pandemic among mothers of children (3-5) years

MATERIALS AND METHODS:
A quantitative research approach with one group pre-test and post-test (pre-experimental) research design was used for the study. Before commencing the data collection, authorized setting permission was obtained from the higher authority of selected community area Thirumazhisai village, Thiruvallurdistrict the study was conducted. A total of 60 mothers of children aged (3-5) years residing in Thirumazhisai village who met the inclusion criteria were selected as study participants by using convenient sampling technique.

The inclusion criteria for the study participants were the mothers of children (3-5) years and who are available during the study period. The exclusion criteria for the study participants were mothers of children aged (3-5) years who don't understand Tamil and English language. The purpose of the study was explained by the investigator to each of the study participants and a written informed consent was obtained from them. The demographic data and the pre-test and post-test level of knowledge was collected by using a self structured questionnaire and planned teaching programme on immune boosting foods and the collected data were tabulated and analyzed by using descriptive and inferential statistics.

RESULTS AND DISCUSSION
SECTION A: Demographic characteristics
Among 60 mothers of children (3–5 years), with regards to age 25 (41.7%) were in the age group of 3years. With regards to male, 35 (58.3%) were preschoolers

With regards to education qualification of mother, 21 (35%) belongs to secondary

education. With regards to information 28 (45.6%) received through television and internet.
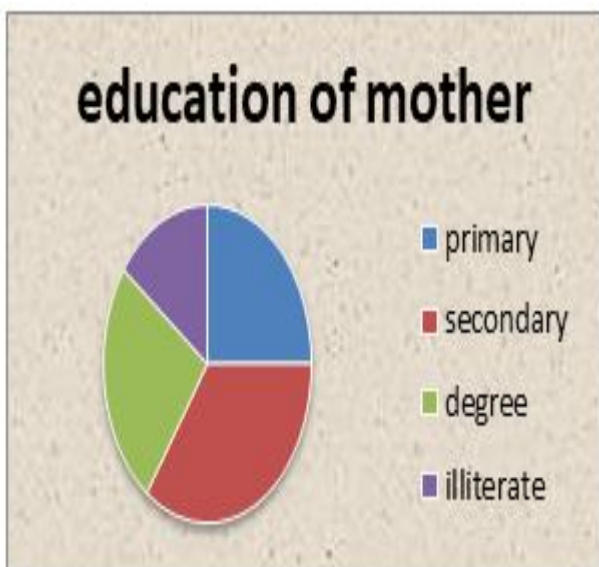
Percentage distribution of education of mother mothers of children
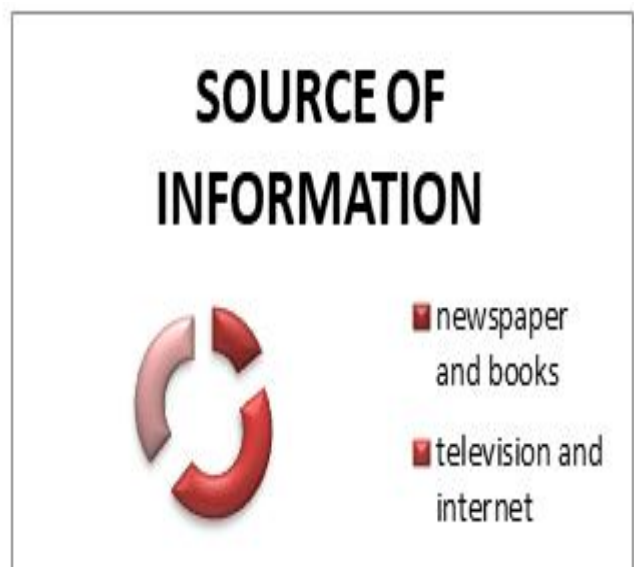
Percentage distribution of source of information among

SECTION B: ASSESSMENT OF LEVEL OF KNOWLEDGE ON IMMUNE BOOSTING FOODS DURING COVID-19 PANDEMIC AMONG MOTHERS OF CHILDREN (3-5) YEARS.

Table 1: Frequency and percentage distribution of level of knowledge on Immune boosting foods during COVID-19 Pandemic among mothers of children (3-5) years.

N=60

Knowledge	Inadequate (≤50%)		Moderate (51 – 75%)		Adequate (>75%)	
	No.	%	No.	%	No.	%
Pretest	45	75.0	11	18.33	4	6.67
Post Test	0	0	23	38.33	37	61.67
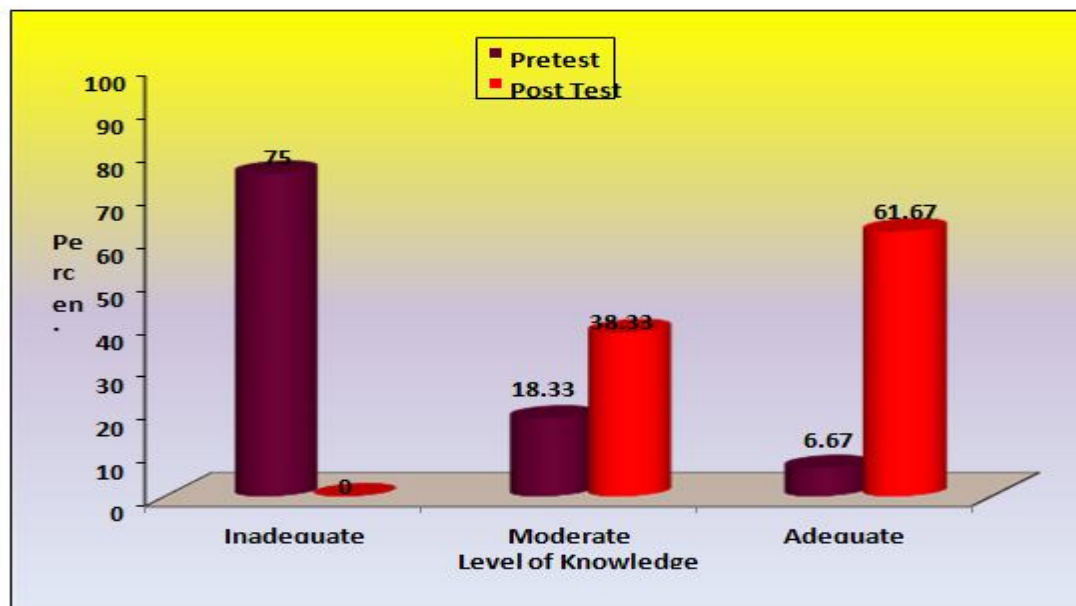
Percentage distribution of level of knowledge on immune foods during Covid-19 Pandemic among mothers of children (3 – 5 years)

The present study finding is supported by chetan s patali et al., (2018) conducted a descriptive study to assess the knowledge of mothers regarding the nutrition for under five children in selected areas of bagalkot with a view to develop a self- instructional module, The study results determined out of 100 samples in the descriptive group, majority of the mothers 41% had satisfactory knowledge level (41 mothers), inadequate knowledge about 36% (36 mothers) and 23% (23 mothers) were had adequate knowledge regarding nutrition for under five child.

This finding is supported by **Sonika Sangra et al., (2019)** conducted a cross-sectional study in rural settings on Knowledge, attitude, and practice of mothers regarding nutrition of under-five children among 300 mothers who visited the Primary Health Centre (Miran Sahib) and had children under the age of 5 years. The results revealed that regarding nutritional practices and prevention of malnutrition, 45% of the mothers Malnutrition had good knowledge, 32% had fair knowledge, and 23% had poor knowledge.

SECTION C: EFFECTIVENESS OF PLANNED TEACHING PROGRAMME ON IMMUNE BOOSTING FOODS DURING COVID-19 PANDEMIC AMONG MOTHERS OF CHILDREN AGE GROUP (3-5) YEARS.

Table 2: Comparison of pretest and post-test level of knowledge on immune boosting foods during COVID-19 pandemic among mothers of children (3-5) years.

N = 60

Knowledge	Mean	S.D	Paired 't' test Value
Pretest	7.05	4.54	t = 18.862
Post Test	16.03	1.80	p = 0.0001
			S***

$p < 0.001$, S – Significant

For the present study, the pretest mean score of knowledge was 7.05 with standard deviation 4.54, and the post test mean score of knowledge was 16.03 with standard deviation 1.80. The calculated paired 't' test value of t = 18.862 was found to be statistically significant at p<0.001 level.

This clearly infers that planned teaching programme was found to be effective in enhancing the post test level of knowledge on immune boosting foods for the mothers of children age group (3-5) years.

SECTION D: ASSOCIATION OF LEVEL OF KNOWLEDGE WITH SELECTED DEMOGRAPHIC VARIABLES

Table 3: Association of post test level of knowledge on immune boosting foods during COVID-19 pandemic among mothers of children (3-5) years with their selected demographic variables

Demographic Variables	Inadequate		Moderate		Adequate		Chi-Square Value
	No.	%	No.	%	No.	%	
Age							χ^2=1.946
3 years	-	-	12	20.0	13	21.7	d.f=2
4 years	-	-	7	11.7	13	21.7	p=0.378
5 years	-	-	4	6.7	11	18.3	N.S
Sex							χ^2=0.851
Male	-	-	14	23.3	18	30.0	d.f=1
Female	-	-	9	15.0	19	31.7	p=0.356 N.S
Developmental Age							χ^2=1.694
Toddler	-	-	12	20.0	13	21.7	d.f=1
Preschooler	-	-	11	18.3	24	40.0	p=0.193 N.S
Mother							
Demographic Variables	Inadequate		Moderate		Adequate		Chi-Square Value
	No.	%	No.	%	No.	%	
Primary	-	-	8	13.3	7	11.7	χ^2=**20.705**
Secondary	-	-	7	11.7	14	23.3	**d.f=3**
Degree	-	-	0	0	15	25.0	**p=0.0001**
Illiterate	-	-	8	13.3	1	1.7	**S***
Source of information							χ^2=**10.483**
Newspaper and Books	-	-	1	1.7	9	15.0	**d.f=2**
Television and Internet	-	-	8	13.3	20	33.3	**p=0.005**
From Neighbors	-	-	14	23.3	8	13.3	**S****

The present study shows that the demographic variables mother's education and source of information had shown statistically significant association with post test level of knowledge on immune boosting foods during COVID-19 pandemic among mothers of children (3-5) years at p<0.001

CONCLUSION:
Thus the findings of present study revealed that, effectiveness of planned teaching programme on immune boosting foods during COVID-19 pandemic conducted to mothers of children aged (3-5) years was found to be effective in improving the post test level of knowledge immune boosting foods during COVID-19 pandemic among mothers of children (3-5) years.

CONFLICTS OF INTEREST:

Author's declare no conflicts of interest.

FINICAL SUPPORT AND SPONSORSHIP:

None

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EFFECTS OF GRIEVANCE REDRESSAL MECHANISM IN PRIVATE SECTOR BANKS

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ABSTRACT
The banking sector plays the most important and vital role in the growth of a country, as it is a service-oriented industry, which provides various services to the customers not only in monetary terms but also non-monetary services as well. Thus in the case of Yes Bank Ltd. as one of the leading bank operating in India, causing a twofold problem as one in case of Bad Loans or NPA's and the other in case of customer grievances.

In this paper, we have conversed about all are the inconveniences that customers are facing while accessing the banking services, as Yes bank is the Private Sector Bank, so we have compared the grievances with Kotak Mahindra bank, a private sector organisation, in order to understand whether there are any similarities in types of grievances or else some other exceptional problems are there.

In this, we have also discussed about the analysis of the complaints which are solved by the Yes Bank Ltd. and also to discuss what all grievances which are still left for examination by the end of every year.

Keywords: - Grievances Redressal Mechanism, RBI Amendments to Grievances Redressal, Yes Bank, Analysis of disagreeable Experience, Kotak Mahindra Bank and Customer Dissatisfaction from Yes Bank.

INTRODUCTION
Being a Service sector Industry, banks need to provide exclusive services to the customers. Adding to this, they have dual responsibility as they have to solve the customer grievances as well as the problem of increasing bad loans, which causes sombre predicaments for the Banking sector. In the case of Yes Bank Ltd., as one of the leading bank, has to deal with twofold problems, as in the case of Rising Non-performing assets and also customer grievances.

Incompetency in solving the grievances shows a lack of satisfactory and accomplished predicament deciphering mechanism. While in this paper, we have discussed the various problems which Yes Bank Ltd. is getting from the customers. Grievances show the dissatisfaction among the customers of the banks, and at the end of every year, if the bank is unable to resolve all the queries, then the pending or the unsolved queries show the lack of competency of the bank, thus incompetent management and redressal Mechanism proves the working of Banking Company. In this case, we have discussed Yes Bank Ltd. and in comparison with Kotak Mahindra Bank Ltd. as to whether there are any similarities in the problems arising in both the private sector banks or there are some exceptional problems also been faced by Yes Bank Ltd.

From the past few years, the performance of Yes Bank was declining and the customers were also not getting satisfied as the Bank is not performing as per the prescribed level, and the level of unsolved grievances is proof that the Yes bank performance is getting declined; customers are shifting from Yes Bank to other Private or Public Sector Banks.

The Banks should monitor the customer problems on a priority basis and along with that, other obligations are also to be taken care of while working. In order to fully satisfy the customers, the bank must adopt various policies as shown Reserve bank of India website, ref. (www.rbi.org.in) as Comprehensive policy for deposits, well-equipped cheques collecting Policy, Grievance redressal policy for the customers etc. In order to prove competency and also to grow in the economy, immediate and accurate measures are to be taken care of.

REVIEW OF LITERATURE
To comprehend the study, we have measured various commentaries and many researchers who did a study on the telecommunication sector, the growth prospects and the challenges which are been countenanced by Yes Bank Ltd. in India.

(Vashishta & Chadichal, 2012) in this, the authors examined all the changes which have taken place in Yes Bank Ltd. as a study on innovative business strategies in order to grow and what are the various key to progress in the area of emerging opportunities in the areas of business. (Rajan, 2019) in this, the author discussed a case study of Yes bank Ltd. beginning from when Yes Bank Ltd. started as a dream of the founders and at the current scenario where Yes Bank is at the stage of liquidation, and what are the losses and shortcomings which Yes

Bank faced during their time frame. (Manda & Polisetty, 2020) in this, the author analyzed the quality of the asset which yes bank is having as to how strong their assets are and a thorough risk management practices which yes bank is having for measuring the risk potential of the borrowers, also whether the bank is having proper risk management control in case of Bad debts occurs. (Babaria & Price, 2020) in this, the author examined the performance of Yes bank, the reason for not performing at the specified level, and discussed why it is going down even after having such a renowned name.

The financial issues which the bank was facing along with the issues faced in the case when Rana Kapoor was at the top management position. (Saxena & Kumar, 2019) in this, the author examined the grievances which customers face and what are the innovative strategies which the Banks have implemented in order to facilitate the banking companies for the smooth functioning of the work. (Patnaik, 2011) In this, the author describes the case of Yes Bank Ltd, as to differentiation in over risk management and over competitive scenarios. As in the present time when there are more than 25 banks including public and non-public entities so the over competitive scenarios would lead to a downfall in the performance of Yes Bank.

RESEARCH OBJECTIVES

1. To understand the methods of solving various customer grievances and Grievance Redressal Mechanism.

2. To analyse the grievances which Yes bank Ltd. is having and other private sector banks.

3. To understand the problems raised for the customers from various services which Yes Bank offers.

METHODOLOGY

India's Private Sector bank i.e., Yes Bank was founded by the two renowned members Rana Kapoor and Ashok Kapur in the financial year 2004. This was a young and aggressive bank but from the past few years, yes bank performance is decreasing and its growth has declined.

The Customers are also not satisfied with the services the bank is offering to their customers. The problems and the issues are left unanswered and there is no response from the bank's side about the solutions to these problems.

Yes Bank's performance is downgrading day by day, the level of satisfaction of customers is also getting deteriorated and there is a lack of proper customer grievance redressal mechanism.

Explanation

From Chart 1, it is clear that the satisfaction received by the customers from the problems raised by the customers, the satisfaction level is not at all satisfactory and Yes Bank is not improving their Grievance Redressal Mechanism, as out of 559 complaints receives in financial year, 2019-20 only 12 Percent customers are satisfied for the problem raised and with the banking services.

Chart No, 1

Chart no. 2, for the sake of comparison, we have considered Kotak Mahindra Bank.
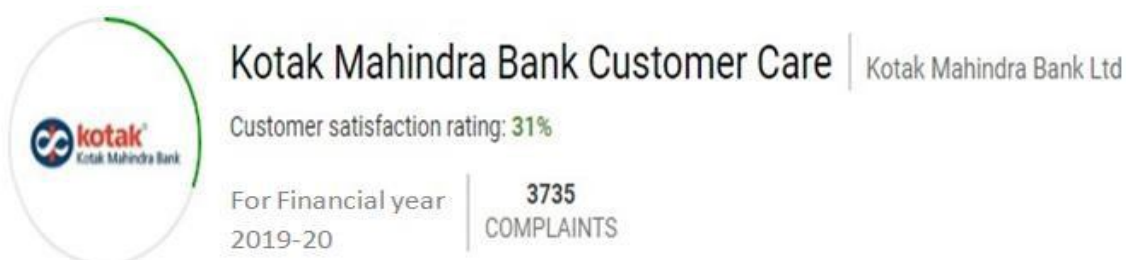
From Chart 2, the number of complaints showing that the bank is having good customer base, the bank is performing well in terms of services offered to the customers and also by solving the grievances which they are receiving, as per the current ratings available, Kotak Mahindra is having satisfaction level of about 31 percent which is 3 times more than Yes Bank Ltd.

Thus from chart 1 & chart 2, we are coming on the fact that Yes Bank Ltd. is not focusing much on the problems which are received by the general public from the services offered by the bank, and they are not even performing at proper competency with the complaints and other things. Thus, this shows deteriorating aspect in case of Yes Bank, and with these unsolved customer grievances and reduction in customer satisfaction level, even after coming of many big banks including SBI Bank in stake there are chances that the Reserve Bank of India can order Liquidation of Yes Bank as provided in www.consumercomplaints.in.

Chart 3

Year	Particulars	Yes bank	Kotak Mahindra Bank
2019-20	No. of Complaints Received During the Year	1463	10116
	No. of Complaints Redressed During the Year	2731	22297
2018-19	No. of Complaints Received During the Year	25721	7836
	No. of Complaints Redressed During the Year	25195	6897

Stating that there has been a change of CEO and MD of Yes Bank to Ravneet Gill, who made changes in the redressal mechanism of the bank, and made changes as to if there is any complaint which is encountered by the bank has to measured and responded within 30 days of the case received, if unanswered the case will immediately transferred to Ombudsman and if the case is in favor of customer then the bank will pay the compensation to the customer, thus the new grievance redressal mechanism shows drastic changes in the Redressal System, which is easily encountered from the above chart.

From the above figures concerned, there has been a decline in the number of complaints received in the year and number of complaints redressed in the year in case of Yes Bank Ltd. from financial year 2018-19 to financial year 2019-20, while on the other hand In case of Kotak Mahindra Bank, the number Increases from financial year 2018-19 to financial year 2019-20,

Graph No. 2

NO. OF COMPLAINTS REDRESSED DURING THE YEAR
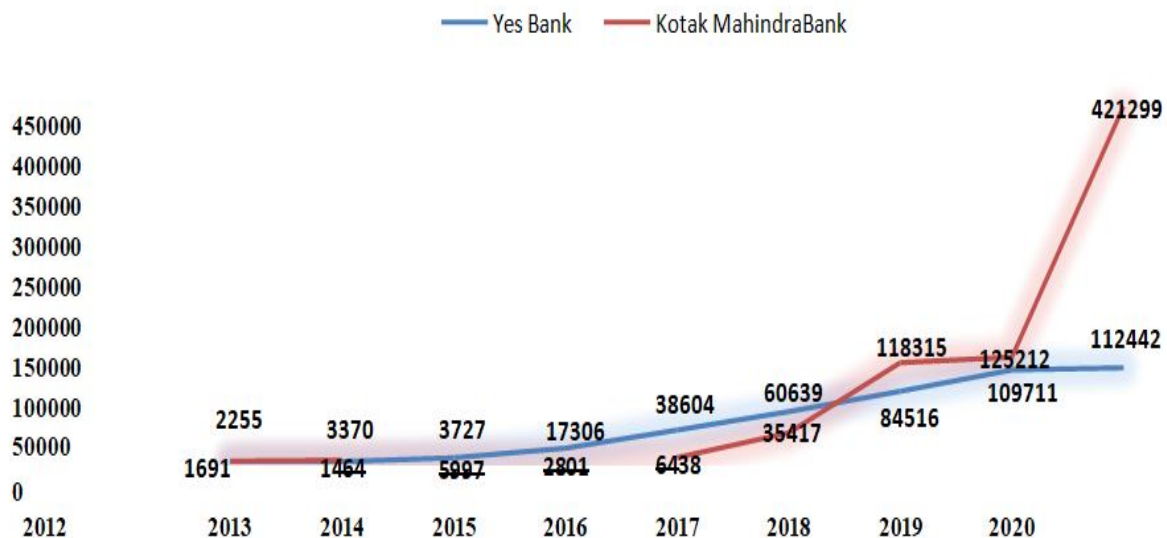
Explanation to Graph no. 2:- From the above graph we have compared Yes bank with Kotak Mahindra Bank, thus there is consistency in the number of complaints redressed in case of Yes

Bank, but there is not same in case of Kotak Mahindra Bank, as in the financial year 2019-20 & 2018-19, there has been rise in grievances redressed from 125212 to 421299.

Graph No. 3

NO. OF COMPLAINTS RECEIVED DURING THE YEAR
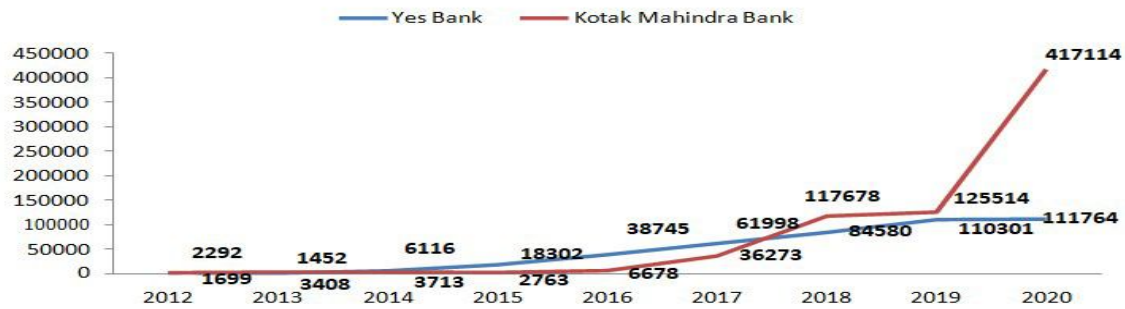
Explanation to Graph no. 3:- While comparing among Yes Bank and Kotak Mahindra bank, no doubt they are receiving higher complaints that in case of Yes bank, it is only because of customer base which Kotak Mahindra Bank is having and moreover people due to bad image in the previous years of Yes Bank, are leaving yes bank, thus showing a consistency in case of Yes Bank.

Yes bank grievance redressal policy-

The grievance redressal policy of YES BANK was divided into three levels, viz the branch level, the grievance redressal officer, and the nodal officer. If the customer was not satisfied by the verdict of one level he could shift to the latter. Each of the levels was provided 30 days of the period to reach the final decision. And if the customer thinks that the decision is wrong then he can present his case to the banking ombudsman ultimately (abiding by some terms and conditions).

After the appointment of Mr. RAVNEET GILL as the MD and CEO of Yes Bank, a slight change was made in the grievance policy, the case is directly handled by the banking ombudsman if the branch and zonal verdicts are unsatisfactory eliminating the unnecessary delay in complaint settlement. Also, the bank has to pay a penalty for the same. This policy helped to grow the bank in respect of the customer complaint redressal and it showed a significant decline in pending complaints of YES bank.

Mr. RAVNEET GILL also made some significant changes in the capital infusion of the bank and raised it from 1.2 million dollars to 2 million dollars (following the SEBI procedures and guidelines of RBI) as he thought that the financial system is growing vividly. Apparently he also issued the shares on a premium amount than market capitalization rate and made a big move from the regular book building bids. But due to some internal amendments Mr. GILL was removed from the position within 11 months time frame only.

FEW CASES WHICH ARE REGISTERED FOR CUSTOMER GREIVANCES WITH YES BANK LTD

1. In the case encountered title:- "Yes Bank — Late Payment fee & finance Charges on my YES Bank Credit Card 53XXXXXXXXXXX30" Dated 30th June, 2020

About the case:- In this case the customer has made payment of the Credit Card through SBI Internet Banking through NEFT on 6th March, 2020 and the due date is of 7th March, 2020 of Rs. 10560 and received back the amount paid on the same day itself. Then Customer again repays the amount of Rs. 10600 on 8th March, 2020 which got returned on 18th March, 2020. Finally he made transaction on 20th March, 2020 which got successful.

The Yes Bank Ltd. Charged Rs. 1337 for late payment including financial charges and GST applicable , and on informing the bank returns Rs. 957 and on the above they have also deducted Rs. 209, thus total charged Rs. 590.92 which customer didn't accept.

ANALYSIS: - As it is evident from above that the inward IMPS/ NEFT/ RTGS services of YES Bank were disabled by RBI and there was no fault or delay from my side in late paying the bill. Thus the late fee & financial charges does not become applicable to me as the inward IMPS/ NEFT/ RTGS services of YES Bank were disabled/ restricted by RBI.

For the Bank, if there services were disabled then there is no reason to deduct the charges as applied for the late submission, the incompetency of the banking officials and regulations made customer feel ill-treated, the case is still pending and more than 2 months have passed. Thus these need to be improved in order to build a good customer base and to provide pleasant banking experience to the customers

2. In the case encountered title: - "Yes Bank — fraud signature made by someone on behalf of me" Dated 4th December, 2017

About the Case: - The case discussed about the fraud signature of the customer by someone else, the agreement signed for the details as mentioned "Loan agreement Rs. 5, 50,000 & Tenure 60 months & ROI 11.29% & Pf 1% with no other hidden cost" and fraud signatures made on the document with the details as mentioned "Loan agreement Rs. 5, 50,000 & Tenure 36 months & ROI 15% & Pf 1% with no other hidden cost".

ANALYSIS: - For this the customer had raised the complaint and successfully got resolved from the Bank's end, and it is the discretion of the Bank, to not to indulge in unfair means as if the customer unable to take the picture, then he would have suffered for the losses incurred, the bank should strongly monitor all the loan agreement cases very thoroughly as these all things lead to increase in non-performing Assets of the bank.

Since the bank is facing complaints in case of Assets valuation when inspected by RBI, so it needs to improve the working of their loan department, Yes Bank, a medium-sized private sector bank, first ran into trouble following the central's bank's asset quality reviews in 2017 and 2018, which led to sharp increases in its impaired loans ratio and uncovered significant governance lapses that resulted in a complete change of management.

3. In the case encountered title: - "EMI charges wrongly collected and hidden charges" Dated 12th Sept, 2019.

About the Case: - A customer purchased a phone from Amazon, but received a faulty device. The phone was purchased by using Yes Bank Credit Card EMI option, it was returned to

Amazon and the money got credited back to Yes bank Credit Card, but till 8 months the Yes Bank is deducting the EMIs on monthly basis even after informing the bank about the reversal of funds used for purchasing phone. But there is no response from the bank's side. About 8 months have passed the bank is also charging interest and there is no resolution till now.

ANALYSIS: - From the above case it is analyzed that the Yes Bank's Loan department is not working upto the prescribed measure as they are supposed to work under all circumstances, the lack of formulations in case of Loan department, many customers have faced serious problems and due to which they have suffered huge losses. As per the Reserve Bank of India, the increase in Bad Debts/loans of Yes Bank is only the cause of Loan Department, as there is no thorough investigation for the Yes Bank. Due to lack of control and proper asset measurability, Yes bank today is under serious pressure of liquidation, which is not only a worst situation for the Bank but also for the Indian Economy as well.

4. In the case encountered title: - "Yes Bank — forex card" Dated: - 24th December, 2019

About the Case: - A customer made a forex card from Yes Bank ltd. on 12th Dec, 2019 as he wanted to travel abroad on 13th Dec, 2019 and the customer uploaded all the documents with Yes

Bank on 12th Dec, 2019 so that he won't be receiving any sort of problem regarding the same when he visited there and uses the card, Card didn't work for 4 days out of 6 days of his stay, and he was not having money to buy food as he was totally dependent on that card, he repeatedly send mails and response received was your documents were pending with the bank, and while he returned back to India, he visited the branch and branch officials said your card is now activated.

ANALYSIS: - From the above case we can easily describe the lack in customer belongingness and lack of proper working system with internal disputes, customer faced serious problem which no one can solve, but it is on the banking policies that they should not indulge in unfair practices and not to make customer in trouble which Yes Bank does always in Loan cases and Debit and Credit Cards. The case is still pending as the customer is demanding of compensation for which he suffered thus showing lack of competency among the Bank officials and Grievances redressal Mechanism.

Key Challenges Faced by Yes Bank

1. Retaining of Deposits of customers:- In this, as the bank came into moratorium, and the customers were only about to withdraw the funds upto Rs. 50, 000 and as per the records, the bank has seen a drop of about 72000 crore in the deposits from 2019, September to about Rs. 1.37 lac crore as on 5th March, 2020, thus by showing a downfall of about 34 percent, only because of their performance, as the new promoters are concerned, they have agreed to bring heavy deposits of about 30,000 crore, which gave a bit of relaxation to the customers and the shareholders of the bank.

2. Recovery of Bad Loans:- In this case, Yes bank has given huge loans and probably to the big investors only. Thus in the financial year 2020-21, Yes bank is hoping to have a recovery of Bad Loans of about 8500 crore from the defaulters. The defaulters of Yes Bank contributes to the total amount of Rs. 34000 crore of which, Anil Ambani group includes amount of Rs 12800 crore and other 16 companies which be in the right place to ESSEL Group account for about Rs. 8400 crore of Non-performing Assets of Yes Bank Ltd.

3. Downfall in Liquidity of the Yes Bank Shares:- In this, the bank has witnessed the growth of 40 percent in stock price after there was an concoction of SBI Bank with Yes Bank, but there has been a drastic decline in the tradable shares of Yes Bank from 255 crore to about 65 crore which has also affected the price of Yes Bank shares as the total downfall was about 74.5 percent of the total tradable shares.

4. Surround with slippage: - In this the bank is trying to fetch the slippage ratio to about 5 percent from that of 11.98 percent as the proof of advances which are becoming non- performing assets. The bank is adopting a very conservative approach to the advances which can become NPAs in the coming future. Prashant Kumar, New MD and CEO of Yes bank have disclosed the few financials of Yes Bank by describing total advances of Yes Bank excluding the Non-performing assets were Rs. 1.75 Lac Crore. Mr. Prashant Kumar also declared that Yes Bank has encountered 13911 crore NPAs till December, 2019. Thus with the huge provisions as put by Yes Bank on the bad loans made Bank's December Quarter Loss to about 18564 crores.

Measures of Improvement

In case of Yes Bank Ltd. there are some quick and immediate needs of improvement not only in terms of management prospective but also on the part of customer and stake holders prospective, as the bank is providing the services to the customers, so in-order to survive in the market, the bank need to have certain measures for the sake of growth of bank.

There is a quick need of an excellent and speedy Service Development Model, as the bank has recently adopted with the 5 stage service excellence for the purpose of improving their products and services along with the channels involved. Thus it is one of the tested and a comprehensive mechanism which banks need to develop to deliver the superior services to both the banking customers and non-banking customers.

The Bank's policy to customer grievances needs to be changed in-order to get hold on the complaints which customers are facing as because of these pending complaints thus shows the incompetency of the bank, and thereby making customer dissatisfied from the services and thus the dissatisfaction leads to decreasing of customer demands in the market.

There is a quick and immediate need of the improvement in process involved in credit sanctioning to the customers, in order to reduce in the delay of the loan application with proper external checks and there is also a immediate need to improve the risk department of the Yes Bank as in order to reduce the NPAs of Yes Bank, risk department needs to perform so that these NPAs problem won't struck again and there should be a system of EUC i.e. End User Computing which review end user reviews and experiences and to accomplish daily work load.

CONCLUSION

From the above analysis, we can conclude that, yes Bank is slightly moving upward, as in the financial year 2019-20, The CEO improved the grievance mechanism, and with the coming of new CEO in financial year 2020-21, the new policies to risk management and FPO was brought which helped in recovering of debt obligations, there is a slight upward movement in the Yes Bank performance. Moreover, this Covid-19 has also stuck, which has caused problem in working of the banks. As in the report mentioned, few measurements are to be taken care which will lead the bank to achieve new heights. There were unpleasant experiences which customers faced and thus customer redressal needs improvement, which Ravneet Gill did. But proper due diligence is required. Thus helps the bank to come ahead in future.

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EMOTIONAL INTELLIGENCE AND COGNITIVE FLEXIBILITY AMONG YOUNG ADULTS AT WORKPLACE

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ABSTRACT

Emotional intelligence and cognitive flexibility are closely related concepts in today's competitive business environment and these are the concepts which influence organizational

and personal life of people who are working. The main objective of the study is to comprehend the association between emotional intelligence and cognitive flexibility among young adults at workplace. Data pertaining to this study was gathered from 60 participants 30 male 30 female from different workplaces in Karnataka utilizing genos short inventory of emotional intelligence and cognitive flexibility scale (CFL). Findings were drawn by applying statistical tools, such as Mann -Whitney u-test, spearman's rank coefficient correlation. The study concluded that (r=<.001) there is relationship between emotional intelligence and cognitive flexibility among male and female young adults at workplace.

Key words: emotional intelligence, cognitive flexibility, workplace, young adults.

INTRODUCTION

Every day we make several thousand decisions that are emotionally charged, from, what we shop, with whom we spend time, what we eat, what to post online, and the tasks we have to finish at our work. We start to think from the movement we wake up in the morning. At that time our cognitive ability helps us to choose to make better decisions. Emotional intelligence combines the states of affect mind and cognition (kannaiah, 2015). Today the scientific proof indicates that, thoughts have an important effect on our cognitive processing, and that a balance between cognition and emotion should be the pleasant approach for right environmental and social adaptation ((gutierrez-cobo, 2016).

Emotional intelligence

Emotional intelligence is the emotional quotient (EQ). The term emotional intelligence was found by, Peter Slavoy and John Mayer in the article ''Emotional intelligence Imagination, cognition and personality'' in the year 1990. It was quickly spread in other areas like education, business, and popular culture. EQ is recognized widely as a precious skill that helps to enhance skills like, management, problem-solving, and relationship at the workplace (Cherry,2020). It is hard to handle the emotions at workplace due to the changes in the organisation, today's work environment is complex and the demands that are place on workers make them feel frustrated, irritated, worry, anger, feel down and sometimes dislike. When someone can evaluate the level of emotional intelligence in their personality then they can perform their duty in a better manner than others. Because they not only do their work with their brain but also with their heart of need of work (Raza, 2011).

Emotional Intelligence helps employees to enhance creativity, emotional expression, tolerance, integrity, and trust, improve relationships across the organization

(Kannaiah, 2015). If an employee has high emotional intelligence, he will be expressing emotions at the workplace in a healthy way. (Cherry, 2020).

Models of emotional intelligence

Three major models of emotional intelligence are. Goleman's emotional intelligence performance model, Bar-on's Emotional intelligence competencies model, Mayer, Salovey, and Caruso, s emotional intelligence ability model. These are the three major models of emotional intelligence developed from analysis, research, and scientific studies. Goleman's model says that Emotional intelligence is the cluster of competencies and skills, which are determined on four capabilities: relationship management, social awareness, self-awareness. Bar-on suggested Emotional intelligence interconnected system behaviour arises from social and emotional competencies. He further argued that competencies have an influence on behaviour and performance. Bar-on's model of Emotional intelligence consisted of five scales. Self-expression, interpersonal, decisions making, self-perception. Mayer's model suggests that gathered knowledge of emotions and managing them is used for guiding and thinking our decision-making.

Improving emotional intelligence

Here is how you can improve your level of emotional intelligence. When a person is able to reduce or manage negative emotions, they are less likely to become overwhelmed. When someone is making you upset, do not react suddenly. Instead look at situation in variety of ways. Practice mindfulness at work, being mindful of own vocabulary helps being strong communicator at the workplace. Had a bad meeting with in office? What did make feel bad about it, and how you can fix it next time? When you are able to recognize what's going on, then you have greater likelihood of addressing the problem, instead of just being upset and stewing on it. Practicing empathy. Think of what makes you stressful, be proactive and have less of it. Do not check your mails before you go to bed, just leave it for the next morning

Cognitive flexibility

Cognitive flexibility is the essential function that can be greatly described as the potential to adapt behaviours in response to change in the environment (Magnusson, 2014).

Cognitive flexibility is our ability to adapt the processing cognitive strategies to face unexpected and new challenges in our lives (Canas,2006). It is probably safe to say that, most of us have tried an approach to solving a problem before only to have it fail. In such a movement not wanting to give up and we ask ourselves where we go from here. And this point, as we try to adapt and pivot, we are using something called cognitive flexibility. A high level of cognitive flexibility enables us to switch from one processing strategy to another very rapidly (Laureiro, 2009).

Executive functions deal with managing one's resources to reach the goal. include higher order cognitive abilities such as working memory, inhibitory control, cognitive flexibility, planning reasoning and problem solving. (I Cristofori, 2019).

Factors affecting cognitive flexibility

Factors like stressful experiences, fatigue, anxiety, depression, emotional regulations have implication on the cognitive flexibility and control ((Robert L, 2018)Stress and anger at workplace, long working hours, harassment, low wages or salary, downsizing ((Helge, 2001). management style, substance abuse. effects of poor brain function can be felt in workplace, it may result in reduction of work performance, and job satisfaction.

improving cognitive flexibility

Improving cognitive flexibility will be a benefit to the organization, and productivity will be higher. There will be less waste and higher productivity. Adapting simple changes and farming healthy habits, such taking a break from work, altering everyday routines, sleeping well, practicing exercise, seeking out new experiences helps increasing motivation, practice creative thinking, by not choosing the easy way always can learn deeper learning. meeting new people, will help you to develop and increase your cognitive flexibility (Stenger, 2017)

Emotional intelligence and cognitive flexibility at workplace

Workplace is very challenging place to the young adults as it is beginning for them and they face many constant changes in the organisation. And they experience the range of emotions are enormous at work. Young adults who expose themselves to various situations and face them will be uniquely doing their work. One who is using emotions to facilitate thoughts, perception, understanding, and regulating others and their own emotions are successful and happier in their lives ((wu, 2021). relationship between emotional intelligence and cognitive flexibility and many other variables are examined However, there are very limited studies to examine the relationship between emotional intelligence and cognitive flexibility among young adults at workplace. The study discusses the effects of emotional intelligence and cognitive flexibility among young adults at workplace.

REVIEW OF LITERATURE

Studies on emotional intelligence

Muhammad Ashraf, Nawaz Ahmad, Omer Ahmed Shaikh, Saleem Raza Bhatti, (2014). Had conducted a study on Emotional intelligence and job satisfaction among Employees of Service Sector in Pakistan. collected data from the 100 employees, using BarOn EQ-1 scale To analyse data, statistical tools were correlation, ANOVA, multiple regression, the results of the study indicated that (r=<.001) there is significant relationship between job satisfaction and emotional intelligence.

Azita joibari, Niloufar Mohammad taheri, (janaury 2011). had done comparative study "Study of relation between emotional intelligence and students' academic achievement of high schools in Tehran city". The sample comprised with 380 subjects, 180 girls and 200 boys. The data was collected using standard cyber sharing emotional intelligence questionnaire. Data was analyzed using t-test and Pearson correlation test.

Results of the study indicates that there is significant correlation (r =0.881) between components of emotional intelligence, And also there is gender differences in emotional intelligence.

Study on cognitive flexibility

Aysem sedan onen (2014). has conducted a research on the effect of cognitive flexibility on higher school students' study strategies. The study compromised with 554 samples. To collect data, cognitive flexibility scale was used, designed by Bilgin, (2009). To analyze the data, they have used mean, Std Deviation, Pearson correlation coefficient. Results of the study indicates that there is significant relationship between three sub-dimensions (r=.162; $p<0.01$), (r=.262,) and (r=233; $p<0.01$).

Study on emotional intelligence and cognitive flexibility

Bulent gunduz (2013) has conducted a research to examine the "relationship between emotional intelligence, cognitive flexibility and psychological symptoms in pre-service teachers". Study consisted of 414 pre-service teachers in Mersin University, turkey. To analyze the data, they have used mean, median, multiple regression analysis and Pearson product-moment correlation analyses. Results show that ($P<.05$) emotional intelligence and cognitive flexibility showed significant negative correlation with depression and anxiety and evaluation of emotions.

Sayed Amir Amin Yazdi, Sayedhe Maryam Moshirian, Sayed Mohammed Mahdi Mohshirian Farahi and Javad, (2018). Had done a comparative study on "Emotional intelligence and its role in cognitive flexibility of children with and without attention deficit hyperactivity disorder". The study consisted of 8-14 years male population with ADHD in the city Mashhad in 2014, using EI test followed by Stroop test. Data analysis was done using SPSS 20, comparative tests of central tendencies for dependent and independent groups with correlation and regression tests. Results of the study indicates that in children with attention deficit-hyperactive disorder there is low performance ($p<.05$) of emotional intelligence and cognitive flexibility.

Summary of the studies

The review of literature suggested that there are more studies on Emotional intelligence and cognitive flexibility. By observing all the above studies, it is found that emotional intelligence and cognitive flexibility have significant relationship. And the studies revealed that,there is gender differences in the level of emotional intelligence and cognitive flexibility among young adults.

Need for the present study

Having job as young adult predicts the long-term work success. And also, as workplace is new environment to them, they face many challenges and stressors at workplace. also experience changes in their physiology that affects their work. It's important to support and encourage their work efforts. Efforts of early work can also help foster an identity as a worker and it provides skills and experience that helps to get ready for more success and better jobs. The rationale of the study is to check whether the variables- emotional intelligence, cognitive flexibility are interrelated with each other. The result of this study will help identifying individuals with low resilience, hence assist in planning better coping strategies and mechanisms to face stressors and new challenges at workplace.

METHOD

Aim: To assess emotional intelligence and cognitive flexibility among male and female young adults at workplace.

The present study adopts purposive sampling method where 30 male 30 female participants were invited to take part in the present research with the help of google forms. The participants hailed from different parts of Karnataka and their participation in the research was voluntary.

Variables

The independent variable chosen for the study was gender

The two dependent variable selected for the study was emotional intelligence and cognitive flexibility.

Inclusion criteria

1. Participants residing in rural, urban and semi urban areas of Karnataka.

2. Participants with minimum quality of education.

3. Participants, who are working currently.

4. In the age range of 18-24.

5.   Full time and part time works.

Exclusion criteria
1.   Participants residing outside of Karnataka.

Research design
The research design implemented was exploratory in nature as the present research was conducted to gain insight about the emotional intelligence and cognitive flexibility among young adults and the relationship between the two dependent variable on the independent variables**.**

Sampling method
The present study adopted purposive sampling method where 30 male and 30 male participants were invited to take part in the present research personally with help of google forms. The participants hailed from different parts of Karnataka and their participation in the research was voluntary.

Table 1.1 sample distribution based on gender

Gender	
Male	30
Female	30
total	**60**

Research tools
Genos emotional short inventory:
Genos emotional short inventory is especially designed for use in the workplace by Gignac, G. E. (2005). the scale consists of 14 items that participants rate on 5-point scale ranging from 1 (almost never) to 5 (almost always). The reliability of this scale was $\alpha=.87$.

Cognitive flexibility scale:
The Cognitive Flexibility Scale (Martin & Rubin, 1995) consists of 12 items that participants rate on a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). cognitive flexibility scale's internal consistency found to be .92. Corelation of the items were between .49 and .63. scale is internally reliable.

Procedure
1.   Permission from concerned authoritarians has taken before assessing the questionnaires to participants.

2.   Data was collected using google form.

3.   The tools assessed individually after building a rapport and collecting demographic details.

4.   The data collected is scored and interpreted with the help of respective norms.

Data analysis
First Mann Whitney u-test was used to test the hypotheses which states that

1.   There is no significant difference in the level of emotional intelligence among male and female young adults at workplace

2.   There is no significant difference in the level of cognitive flexibility among male and female young adults at workplace.

Second, spearman's Rank correlation co-efficient was used to test the hypothesis which states that,

1.   There is no significant relationship between emotional intelligence and cognitive among male and female young adults at workplace.

2.   The scores were analyzed with the help of SPSS (IBM) and discussed.

RESULTS AND DISCUSSION
Table 1.2 shows Mean, median range and u value of emotional intelligence among male and female young adult at workplace.

Group	N	df	mean	median	Range	u value	significance
male	30	1	29.43	45	8	418.00	.630
Female	30		31.57				

Mann Whitney u-test was carried out to examine the significant difference in emotional intelligence among male and female young adults. The mean score indicates that level of emotional intelligence seen more among female than in male. The obtained u-value is 418.00 and significance is .630, which is not significant.

Table1.3 *Shows Mean median range and u value of cognitive flexibility among male and female young adult at workplace.*

Group	N	df	mean	median	Range	u value	significance
male	30	1	30.43	44	14	440.00	.882
Female	30		30.83				

Mann Whitney u test was carried out to examine the significant difference in Cognitive flexibility among male and female young adults. The mean score indicates that level of cognitive flexibility. The mean score indicates that cognitive flexibility seen more among female than male. the obtained u-values is 440.00 and significance is .882 which is not significant.

table 1.4 shows spearman's Rank correlation coefficient between emotional intelligence and cognitive flexibility among young adults at workplace.

variables	r	p
emotional intelligence	.534	<.001
cognitive flexibility		

spearman's Rank correlation coefficient was carried out to determine if there existed a correlation between the emotional intelligence and cognitive flexibility among male and female young adults at workplace.

There is significant positive relationship between emotional intelligence and cognitive flexibility among young adults at workplace. The high positive correlation denotes that higher the emotional intelligence, higher is the cognitive flexibility among young adults at workplace.

CONCLUSION

The present study titled "emotional intelligence and cognitive flexibility among Young adults at workplace" was undertaken to assess the level of emotional intelligence and cognitive flexibility among male and female young adults. Gender was the independent variable; emotional intelligence and cognitive flexibility are the dependent variables. The sample included 60 participants out of which 30 were males and 30 were females aged between 18-24 years. The study was exploratory in nature and adopted the survey method for collecting the data using the tools. Genos emotional short inventory (2005) by Gignac, G. E. and cognitive flexibility scale (CFS) by (Martin & Rubin, 1995) was used to assess the level of perceived stress. The participants were recruited via WhatsApp, email, phone call to participate in the study with an attached copy of the google forms of the scales. The obtained results were analysed using Mann- Whitney u test and spearman's coefficient correlation was used to find the relationship between emotional intelligence ang cognitive flexibility among male and female young adults.

Implication
1. The results can be used to explore the reasons behind the relationship between emotional intelligence and cognitive flexibility using a qualitative research method.

2. The results can also be used for planning the intervention for those who have scored low in emotional intelligence and cognitive flexibility.

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ENVIRONMENT CONSERVATION AND HUMAN VALUES

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ABSTRACT

Protection of environment and public health is a constitutional obligation of state. It is our fundamental right under article 21 right to life with human dignity in healthy environment. It is duty of state also in directive principle of state policy which is of great importance. Its essence is Human welfare. Healthy environment is required for physical and mental health of people because healthy mind lives in healthy body. Industrialization, Urbanization and population explosion effected the Environment on large scale it is only controlled by sustainable development. Conservation of soil, air, water and natural resources is necessary for present and future generation.

There are many movements like "chipko movement" etc. for deforestation, united nation also works for environment Conservation There is disarmament for reducing the use and production of arms and nuclear weapons. Kyoto protocol and Nagoya protocol for climate change and Bio-diversity. The conclusion of Kyoto protocol fixed the target for reducing green house effect. This target covered emission of six main green house gases like carbon dioxide, methane, nitrous oxide, cloro floro carbons, sulphur- hexa fluoride. Sustainable development is now the basis for the U.N. Environment philosophy and is already giving a sharper edge to global environmental action. The principle of "One Earth" is accepted in Stockholm Conference,1972 in this conference the former PM of India Smt. Indira Gandhi said that poverty and necessity is the main cause for environmental pollution. The national Environment tribunal Act was also set up for determining the liability and compensation for the victims of pollution and other environmental damages was passed in the year 1995. Green Courts have been established for hearing the matters relating to environment alone. Section 110 of the motor vehicles Act, 1988 empowers the Central Government to prescribe emission standards for vehicles and to frame rules regulating the construction, equipment and maintenance of motor vehicle in relation to emission of smoke, sparks, ashes, girt or oil. In I.P.C., 1860 certain provisions under section 272 to 277, 426, 430, 431 and 268 to 294 A deals with offences which affect the public health and morals. Section 133 to 144 can be most effective and speedy remedy for preventing and controlling public nuisance which causes Air, Water and Noise pollution. Writ jurisdiction under article 32 and 226 of constitution and problems can also be brought before judiciary through PIL and SAL (SOCIAL ACTION LITIGATION).

INTRODUCTION –

Today every one in the world is affected by pollution which is the result of unnecessary use of human resources and if we are not aware about environment the future generation will shoulder the consequences. For this we have to follow the doctrine of sustainable development, intergenerational equity and intra generational equity. Intra generational equity is concerned with equity between people of same generation and aim to assure justice among people that are alive today. Inter generational equity is also explored in inequality of the living standard of the people. Environmental concerns including sustainable development, global warming and climate change. The continuing depletion of natural resources that has occurred in past century will be a significant burden for future generation.

The definition of Environment U/S 2(g) of Environment Protection Act 1986 is -

Environment includes water, air land and the inter-relationship which exists among and between water, air, land and human beings other creatures, plants, micro organism and property.

Biosphere is the part of world where life can exist.

Types of pollution-

Air pollution

Water pollution

Land pollution

Food pollution

Radio-active pollution

Noise pollution

Air pollution means presence of any air pollutant as any solid, liquid or gaseous substance including noise present in the atmosphere in such concentration which is injurious to human beings or other creatures or plant, property or environment.

Central Pollution Control Board- Constituted under sec.3 of Water Act, 1974 shall also exercise the powers and perform the functions of the Central Pollution Control Board for the prevention and control of air pollution under this Act.

In Case K Ram Krishnan v. state of Kerala, AIR 1999 Kerala H.C.285.

Court held that smoking at public place will be considered to be Air Pollutant

POWERS AND FUNCTIONS OF CENTRAL BOARD (section-16(2))
1. Advice the Central Government for importance of the quality of air and prevention, control and abetment of air pollution;

2. Plan to be executed a nation-wide Program;

3. Coordinate the activities of the state Boards and resolve disputes among them.

Air Act 1981 has following powers-

1. Power to declare Air pollution control areas.

2. Power to give instructions for ensuring standards for emission form automobiles.

3. Power to impose restrictions on use of certain industrial plants

4. Power of Board to make application to court for restraining person from causes of air pollution.

WATER POLLUTION CONTROL
Every person has right of pure and clean water.

Water Prevention and Control of Pollution Act, 1974 –

Water Pollution means such contamination of water or such alteration of physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or any liquid, solid, or gaseous substance into water as to create a nuisance or render such water harmful or injurious to public health or safety or to domestic, commercial, industrial, agricultural or other legitimate uses or to the life and health of animals or plants or aquatic organism.

Protection of environment and public health is a constitutional obligation of state. According to Article 21 of the Indian Constitution Right to life with human dignity in healthy environment is our fundamental right. The preamble, fundamental rights and duties and directive principles of state policy also have various provisions for protection of environment.

Art. 48A has a significant role for conservation of environment. Pollution is the result of our industrial and economical development for which has to pay a great value like health loss for economic progress. In developed countries environmental problems are result of industrialization and technological development and urbanization but in under developed countries it is a result of poverty.

Human activity changes the climate depleting bio diversity, destroying habitats and poisoning the earth, water, and the air. As we all know that we have limited natural resources and their use should be sustainable. Even then human continuously degrade the biosphere and deplete natural resources at an unprecedented rate.

Environment ethics is the philosophical discipline to consider the moral and ethical relationship among human being and environment.

Is it morally wrong for human being continuously burning fossil fuel which is responsible for air pollution and world climate change?

Does mining company have a moral obligation to restore the natural environment destroyed by their mining techniques?

There is a close relation between development and conservation of environment which was acknowledged in 1972 Stockholm conference on human environment.

Population explosion, increased urbanization and unprecedented expantion of science and technology are the basic causes responsible for the deterioration of the environment.

Environmental problem are due to poverty such as poor housing, bad public health, malnutrition and inadequate employment. Ten million ton of toxic and hazardous substances enter into the environment every year as unwanted wastes, disposing of those hazardous waste is main problem.

Food product can only be sustained if environment is preserved; conservation is a pre condition of long term food-security. Genetic resources which should be preserved as sources of future diversity and improvement are shrinking due to pollution, deforestation, and the neglect of traditional species of crops and livestock.

According to experts, the health of the planet demands a renewed research work for energy alternatives. The flow of energy to the Earths land surface s thousands times greater than mankind present rate of total energy use.

GLOBAL WARMING, DEPLETION OF OZONE LAYER Etc

Global warming and depletion of ozone layer is more dangerous then use of nuclear weapons. As a result of warming up of earth water of seas will rise more than 4 feet and as a result, major cities of the world like manila which is like a bowl surrounded by seas due to climate change and all the ports will submerge in water. The melting point of Greenland glaciers and the arctic ocean, ice reached levels not seen in decades. If the present trend of shrinking continues at current rates year around average. Sea ice coverage may drop by 20% by 2050 and the Arctic may be almost ice free during summer months. By the year 2030, temprature of earth will be increased by 4.5 degree centigrade.

The main cause for the warming up of earth is the emission of Carbon di oxide from the burning of coal, oil fossil fuels and industrial gases. The emission of Carbon-dioxide has increased by 25% and in the next 50 years it is increased by 50% more nitrous oxide, methane, Chloro-floro carbon and other green house gases are warming up the earth. The problem of green house gases is solved by reduced the production of energy. capitalist countries are not prepared for this.

In the upper atmosphere, ozone layer protects the earth from ultra violet rays of the sun. UV rays causes skin cancers, cataracts, destruction of aquatic life and vegetation and loss of immunity of depletion.1% of ozone layer may be responsible for reaching 2 or 3% more UV rays on earth. The Montreal protocol came into force on 1st January 1989 as more then 1/3 of signatory states have ratified it.

U.N. Environment program (UNEP) choose "Global warming: Global warming" as a slogan for environment (5th June, 1989) It requires strong measures, will and determination of states to implement it. The U.S.is the world's worst polluter beside consuming the most resources and giving out 21% of CFC's in the atmosphere. Scientists have detected cases of sheep becoming blind and children suffering allergies and sunburns in southern Chile because of ozone layer depletion.

According to the study of scientific panel the further warming could disrupt agriculture and cause sea levels to rise swamping coastal cities. The Kyoto global warming treaty entered into force on 16 Feb.2005. 187 countries have signed and ratified the treaty but America refused to ratify because it would harm the economy.

The panel also clarified that more than 90% of global warming is due to human activities. Environmental protection as a component of sustainable development consistent with active alleviation is imperative in the prevention and mitigation of natural disasters.

On 17dec. 2007, the general assembly adopted a landmark agreement on international forest policy and cooperation and national action to reduce deforestation, reverse the loss of forest cover, present forest degradation promote sustainable livelihood and reduce poverty of all forest dependant peoples.

Sustainable development is now the basis for the U.N. Environmental philosophy and is already given a sharper edge to global environmental action.

The organizations like U.N. conference on trade and development, UNDP, UNIDO, OECD, European Economic Community etc. are making great contribution in this respect.

SUGGESTIONS FOR ENVIRONMENTAL CONSERVATION

Many government and non-government organization on national and international level works for conservation of environment and make efforts for this international problem.

INTERNATIONAL TREATY AND ENVIRONMENTAL CONSERVATION ACT-

Today all developed and underdeveloped nation of the world aware for conservation of environment and for this there are so many treaties like,

For example-

-Test ban treaty 1963,

-Outer space treaty 1967,

-Non proliferation treaty 1968,

-SALT Strategic Arm Limitation Talks etc.

World environment is protected only by international Cooperation. We have to control pollution of Outer Space Sea and wild animals and protection of wild life and soil is the supreme necessity.

WORLD ENVIRONMENTAL AND DEVELOPMENT COMMISSION

U.N. Conference on human and environment held on International level for the solution of world environment. Some Declaration on conservation of environment are following -

1 Future of all;

2. Challenges for the whole world;

3. World population and Human resources and nutrients;

4. Int. Cooperation and Institutional improvement;

5. Implementation in practical form.

In India Judiciary is also actively works for environment conservation through judicial activism. Article 21 of constitution says that No person weather citizen or non citizen shall be deprived of his life except according to procedure established by law.

Art.21 also includes Right of pollution free air and water.

In case Subhas Kumar v State of Bihar AIR1991 SC 420 it was held that PIL is maintainable for enjoying of pollution free water and air which is included in the right to live under Article 21 of the constitution.

In Rural litigation and entitlement Kendra v state of U.P. (1985)2 SCC 431Court ordered the closure of certain lime stone quarries because a large scale pollution was caused by lime stone quarries adversely affecting the safety and health of the people in that area.

In Vellore Citizen's v. Welfare forum Union of India(1996) 5 SCC 650 the petitioner, Vellore Citizens Welfare forum filed a writ petition by PIL drawing attention of the court towards pollution caused by enormous discharge of untreated effluent by the tanneries and other industries in the state of Tamil Nadu. Tanneries discharging untreated effluent in agricultural field, water ways, open land, rivers rendering the river water unfit for human consumption, contaminating the subsoil water and had spoiled the Physico -chemical properties of the soil making it unfit for agricultural purposes. S.C. held hat such industries are of vital importance in the development of country but they cannot be allowed to destroy the ecology, degrade the environment and pose a health hazard and cannot be permitted to continue their operation unless they set up pollution control device. Principle of "Sustainable development" has to be adopted as a balancing concept between ecology and development. Kuldip singh J., held that "Precautionary Principle" and the "Polluter Pays" principle are essential features of sustainable development and has to be adopted. Remediation of the damaged environment is the part of the process of sustainable development.

The court also explain the meaning of these principles-

The" Precautionary Principle" means; the environment measures by the state government must anticipate, prevent and attack the causes of environmental degradation.

The polluter pays principle means that the absolute liability for harm to the environment extend not only to compensate the victims of pollution but also the cost of restoring the environmental degradation". These are accepted as a law of land.Art.47, 48A and 51A (g) from the const. mandate to protect and improve the environment.

Mining in Aravalli hills range banned in case of M.C. Mehta v Union of India AIR 2004 SC 4016.

CONCLUSION –

The essence of all points is human welfare. Importance of environment is not only for the physical development of human being but also for developing mental development. Healthy mind lives in healthy body.

Industrialization, urbanization and population explosion effected the environment on large scale. Conservation of soil, air, water, vegetation and natural resources is necessary for present and also for future generation. Use of science and technology in sustainable way is also for protection of environment. Electric Vehicles and CNG also play an important role in pollution free air.

FACTORS AFFECTING WILLINGNESS TO RENEWAL OF MEDICLAIM INSURANCE POLICY: AN EMPIRICAL STUDY IN RANCHI

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ABSTRACT

Mediclaim insurance is a special type of healthcare insurance offered by both private and public sector banks, which offers specified financial protection against health-related expenses to their customers. Here banks play the role of a beneficiary. The growth rate of Mediclaim insurance market in India is quite high, there is a huge business opportunities for the banks offering Mediclaim insurance to get investment from the bank customers. However, one important factor to sustain insurance in long run is continuity of customers to remain in Mediclaim insurance pool. Since Mediclaim insurance is generally sold as one-year policy, policyholders need to renew the policy each year. Since health insurance is not mandatory, it faces challenge of ensuring all policyholders renew their policies, as these policies are not sold for long-term. At the same time the researchers have found that factors influence customers for buying Mediclaim insurance and factors influence customer for renewal of Mediclaim insurance are two different aspects. Thus in this work we have try to find what are those factors which motivate the customers for renewal of Mediclaim insurance. Here percentage analysis is used for demographic data and factor analysis as well as regression analysis is used for find the factors and most motivating factors.

Key words: Policy renewal, Mediclaim insurance, factors.

1. INTRODUCTION

Since the last couple of year's common people too became more concerned about their health and health related problems, therefore the frequency of visiting doctor's chamber / hospital/ nursing home has increased than earlier. As a result of which visiting doctors' chamber as well as hospitals are costlier than the earlier. At the same time cost of medicine has increased to a great extent, which is beyond the capacity of common people. One of the major region behind it is Privatization of healthcare system. Visiting private nursing homes or private hospitals require a lot of money

Health insurance is emerging as the most preferred form of health financing mechanism. In this type of situations where out-of-pocket expenditures on health are significantly high and cost recovery strategies affect the access to healthcare insurance is an appropriate solution for this[1] Insurance is the backbone of a country's risk management system. The risk is an inherent part of our lives. Since, health insurance as a mechanism is a combination of nuancing and service delivery of healthcare; it has its own complexities and requires a thorough investigation of the relationships and intricacies involved among different stakeholders [2].Since Mediclaim insurance is a special type of healthcare insurance provided by the banks to their customer, therefore mode of operations of both the insurance policies are likely to be same. At the same time renewal of Mediclaim insurance is very importance

2. REVIEW OF LITERATURE

As Research studies by Garg.A (2013) have stressed that seller of intangible services like insurance face special problems in making customers aware of the benefits they are receiving. Many researchers have emphasized the importance of quality service by insurance companies to enhance customer satisfaction and loyalty [3].Again Tripathy. P et al (2018) said that customer with documented low-to-moderate levels of financial, health, and health insurance literacy will be challenged to make health insurance purchase. There is an urgent need to help customers understand health insurance and to help optimize decision making for their particular situation during open enrollment periods [4]. Again, despite recent growth, the insurance market in India has low penetration rates compared to many other countries. Financial inclusion is one of the primary concerns of policy makers across the world. The World Bank defines financial inclusion as follows: "Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way". As told by Manohar Giri(2018)in his doctoral thesis[5]. As told by Mathur.T et al(2015) in his research work age, dependent family members, medical expenditure, health status and individual's product perception were found to be significantly associated with health insurance subscription. Personality traits have also showed a positive relationship with respondent's insurance status [6]. According to Tripathi.R(2013). In his study, it is found that majority of the sample respondents opined that the factor of Diseases covered. Premium amount, and flexibility of claim settlement are very important factor to insure their health insurance policy [7] In case of

Mediclaim since it is also a healthcare insurance with certain limitations the theory stands for. Therefore keeping that in mind the authors try to develop a relation between the customer's expectation while he/she was purchasing the Mediclaim insurance and what he/she was experienced in time of hospitalization of someone in the family who came under the coverage through this policy. It is also found that as the gap between the expectation and experience of the customers will minimize the motivation for purchasing the Mediclaim insurance will also increase. This concept is shown in the figure -1 by the authors.
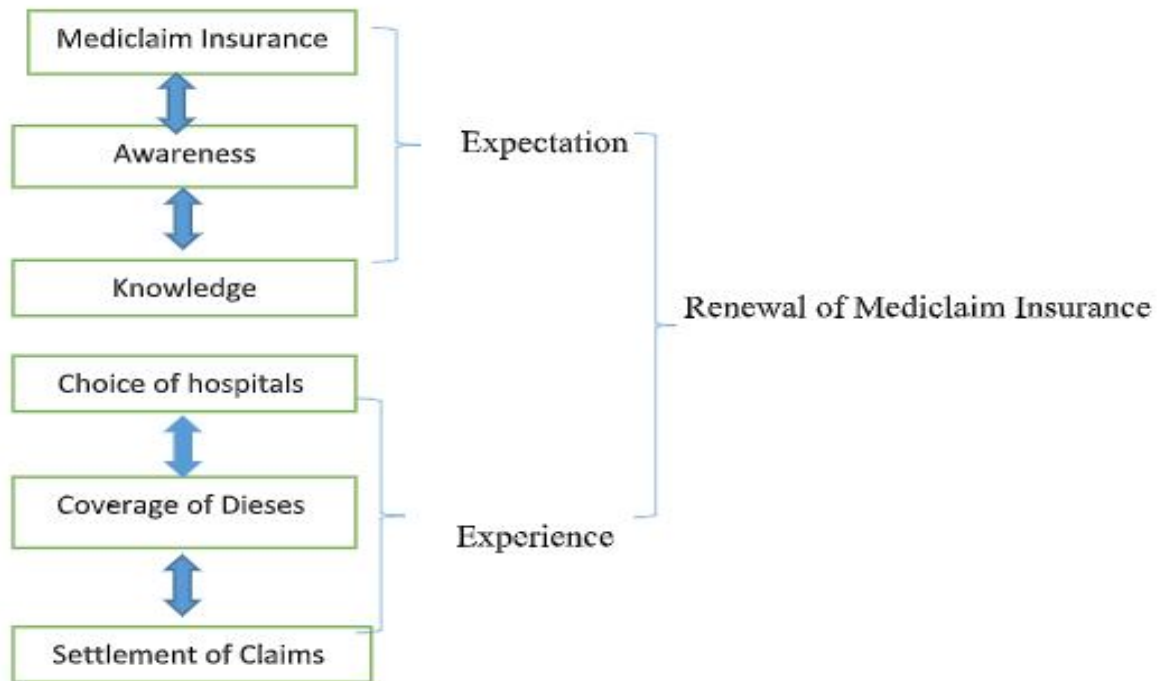
Figure-1: Customer renew Mediclaim insurance

Here the awareness and knowledge (or cognitive) stages are those what a bank customer is informed about Mediclaim insurance and the service provided by it and this information develop an expectation while a customer purchase Mediclaim insurance. Like any other healthcare insurance Mediclaim insurance has also has the three main parts in common: Coverage of dieses, choice of hospitals and settlement of claim. So in time of medical emergency the insurer or any other family member the customer expect that these three will cover properly. That what he/she want to be experienced. Thus there is always a gap between expectation and experience of the customer. This is the gap which plays the vital role in case of motivation or demotivation of the customers and doing so renewal of Mediclaim insurance.

3. STATEMENT OF THE PROBLEM.
In country like India, the objective of insurance companies, in case of selling healthcare insurance is not very discrete, especially in case of when they are tied up with banks. The success of marketing of Mediclaim insurance mainly depends upon renewal of the policy every year by the customer. Since the coverage by Mediclaim insurance is for only one year and the continuation of the policy purchased is not mandatory, it is found that a lot of dropout takes place here. On the other hand, there are customers who sincerely renew their policy every year. Thus there must be some motivational factors what make is possible. This study try to find what those motivational factors are.

4. OBJECTIVE OF THE STUDY
1. To identify the factors that influence a bank customer for renewal of Mediclaim insurance.

2. To identify the most important factor that influence a bank customer for renewal of Mediclaim insurance.

5. RESEARCH METHODOLOGY
A well-organized questionnaire is distributed among the bank (public and private both) customers, who have already Mediclaim insurance for at least one year or more for survey purpose. The questionnaire include two parts: While the first part contains customer's demographic profile, the second part covered customers experienced about the already existing policy/s. Eighty respondents were selected from private and public banks

using a systematic random sampling technique. The names of the banks are not mentioned here to keep it confidential. The present research paper is exploratory and descriptive in nature. While percentage analysis is used to explore demographic profile of the customer, Factor analysis and Regression analysis are used to find motivational factor and most influential factor. All the calculations are made and statistical tools applied on the basic of available data, collected from the bank customers using the SPSS software.

Table-1: Respondents Demographic Profile

Demographic Factor	Particulars	Frequency	percentage
Gender	Male	48	68.5
	Female	22	31.42
Total	**70**	**70**	
Age	Up to 18	13	18.57
	19 - 35	18	25.7
	36-50	27	38.57
	more than 50	12	17.14
Total	**70**	**70**	
Educational Qualification	10th	14	20
	12 th	12	17.14
	Graduation	22	31.4
	Post-Graduation	13	18.57
	Professional	09	12.85
Total	**70**	**70**	
Occupation	Student	11	15.7
	Business	15	21.4
	Service	27	38.5
	Housewife	17	24.28
Total	**70**	**70**	
Yearly Income	<300000	14	20
	<500000	17	24.28
	<1000000	23	32.85
	More than 1000000	16	22.85
Total	**70**	**70**	
Marital Status	Single	14	20
	Married	37	52.85
	Widow	11	1.57
	Widower	04	5.71
	Separated	04	5.71
Total	**70**	**70**	

5.1 Analysis and Interpretation
Descriptive statistics

The descriptive statistics depicted that the table (Table -1) it is found that 68.5% were male and 31.42% were female and the average age group of the customer is in between (36 – 50) i.e 38.57% followed by (19 – 35) i.e 25.7%. While 32.85% customer fall in the income group less than Rs 1000000/- per annum, the majority of them belong to service class- 38.5%. It seems that married people are more health conscious – 52.85% while most of them are graduate 31.4%.

5.2 Reliability

Table-2 Reliability Scale: All variable

Case Processing Summary			
		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	.0
	Total	70	100.0
a. Listwise deletion based on all variables in the procedure.			

List deletion based on all variables in the procedure.

Table-3: Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
.890	20

A total of 70 complete responses were obtained. The reliability test was employed on the responses received from the customers of the both private and public banks. The reliability of the data was checked by calculating Cronbach's alpha (α) which was calculating to be 0.890(> 0.7) well within acceptable range as from the Table-3.

5.3 Factor analysis

Exploratory factor analysis helps to understand the underlying dimension that could cause correlation among the observed variables and also it leads with building theory.

Table-4: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.797
Bartlett's Test of Sphericity	Approx. Chi-Square	1084.967
	df	190
	Sig.	.000

Factor analysis through principle component analysis with Varimax rotation method was applied on experience of bank customer towards renewal of policy questionnaire and items with factor loading above 0.40 were considered to determine items clubbed into a single factor. Further the measure of sampling adequacy KMO comes out to be 0.797 and Bartlett's Test of Sphericity indicate that Chi-square of 1084.967 with df = 190, P =0.000< 0.05]. These values indicates that the appropriateness of proceeded with factor analysis as from the table-3 and Table-4.

Table-5: Total Variance Explained

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.703	33.517	33.517	6.703	33.517	33.517	3.502	17.509	17.509
2	3.575	17.874	51.391	3.575	17.874	51.391	3.242	16.211	33.720
3	2.538	12.689	64.079	2.538	12.689	64.079	3.166	15.829	49.548
4	1.964	9.822	73.902	1.964	9.822	73.902	3.152	15.759	65.308
5	1.344	6.720	80.622	1.344	6.720	80.622	3.063	15.314	80.622
Extraction Method: Principal Component Analysis.									

Five factors emerged prominently covering 80.622% variance. The identified factors were analyzed for a common thread and accordingly the naming of the factors was performed. Further to test the sampling, Kaiser-Meyer-Oklin measure of sampling adequacy is computed variance explained 80.622%, as from the Table-5.

Table-6: Rotated Component Matrix[a]

Rotated Component Matrix[a]					
	Component				
	1	2	3	4	5
Fulfillment of terms and conditions mentioned in the policy	.947				
Insurance company offers its services to the customer within the specified time limits.	.914				
Insurance company uses current and modern information technology	.890				
Safe and secure transactions with insurance company	.859				
Services of well experience and well informed bank staff.		.903			

Explain customers about the pros and con of the policy before purchasing	.874			
Suggest customer about premium amount keeping in view the transaction made by the customer	.845			
Reliability of services offered	.828			
Experienced and helpful agents of Insurance company are there in time of hospitalization		.910		
Try to provide Maximum customers' satisfaction		.893		
Give a Wide policy options in time of renewal		.818		
Proper communication with the insured customer		.805		
Critical illness benefits			.866	
Preexisting illness coverage			.825	
Accidents and disability benefits			.813	
Cash less facility			.809	
Pre and Post care of the patient in the hospital				.825
Appropriate hospital bills				.810
Service of highly qualified doctors available by-24 x 7				.804
Provide Ambulance facilities in time of emergency				.775
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 6 iterations.				

Table -08: Factors identified

Sl No	Factors	Variables
1	**Quality of product** (Mediclaim insurance).	Fulfillment of terms and conditions mentioned in the policy
		Insurance company uses current and modern information technology.
		Insurance company offers its services to the customer within the specified time limits.
		Safe and secure transactions with insurance company
2	**Quality of service bank point of view** (Mediclaim insurance).	Services of well experience and well informed bank staff.
		Explain customers about the pros and con of the policy before purchasing.
		Suggest customer about premium amount keeping in view the transection made by the customer
		Reliability of services offered
3	**Quality of service insurance companies point of view**	Experienced and helpful agents of Insurance company are there in time of hospitalization
		Try to provide Maximum customers' satisfaction
		Give a Wide policy options in time of renewal
		Proper communication with the insured customer
4	**The best of Mediclaim insurance Coverage benefit**	Critical illness benefits
		Preexisting illness coverage
		Accidents and disability benefits
		Cash less facility
5	**Service provided by enrolled hospital**	Pre and Post care of the patient in the hospital
		Appropriate hospital bills
		Provide Ambulance facilities in time of emergency
		Service of highly qualified doctors available by-24 x 7

Extraction Method: Principle component analysis.

Rotation Method: Varimax with Kaiser Normalization

7. CONCLUSION:

Here we can see that the decision of renewing of the Mediclaim insurance policy by the customer is depending upon certain factors like: Quality of service (both bank and insurance), quality of product, hospitalization benefit. Actually when a customer purchase Mediclaim insurance for either the person him/herself or the family

member (as per rule),the customer has some expectation, since the validity of the policy is only for one year, thus the service provided by insurance company and the banks both plays the vital role. When a customer or any insured family member get admission in the hospital it's a common expectation followed by the experience which that the hospitalization benefit as well as other terms and conditions will be full filled by the insurance company. So there is a comparison between expectation and experience of the customer.

As the gap between this two are minimize, the willingness of the customer will increase for continuing the Mediclaim policy on the other hand the low renewal rate may also indicate the insurance company is not able to deliver value to its policyholders because of poor networking with the provider or inadequate access to health care facilities. The low renewal rates also indicate high new business strain affecting the financial performance of insurance provider

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FEMINIST EPISTEMOLOGY AND ITS IMPORTANCE IN SCIENCE AND RELIGION

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ABSTRACT

The paper criticizes mainstream epistemology as partial to women. It proposes feminist epistemology as a solution to end gender disparity in the fields of science, philosophy and religion. The paper shows the presence of androcentrism in science and religion and how hegemony of knowledge has ignored women as knowers. The paper focuses on the need to start from the standpoints of women to claim objectivity in various fields of knowledge.

Keywords: Epistemology, Islam, Feminism, Feminist Epistemology

Epistemology is a branch of Philosophy which involves study of knowledge. It deals in methods, tools and theories which help in distinguishing between knowledge and belief. There has been great regard for epistemology as it has added to the fields of knowledge. Plato was doing epistemology when he differentiated between world of ideas and matter. It is part of epistemology only when Copernicus talked about helio-centrism, however, with the advent of feminist discourses, the favorite child of social sciences came under attack. What feminist discovered was that the application of epistemology was androcentric; it was biased and discriminating to women. With increasing scholarships on feminism, feminist epistemology came into existence.

Elizabeth Anderson (2014) in her article "Feminist Epistemology: An Interpretation and a Defense" defines feminist epistemology as "the branch of naturalized, social epistemology that studies the various influences of norms and conceptions of gender and gendered interests and experiences on the production of knowledge" (p.50). Elizabeth Anderson (1995) argues that feminist epistemology go deep into investigating how the social location of the knowers affects what and how they know. It also attempts to show how the exclusion of women has led to partial and unilateral production of knowledge. Feminist epistemology stresses on women experiences as their experiences are often ignored and experiences of others (men) have been imposed on them. Feminist epistemologists have made an attempt to show gender discrimination in different fields of knowledge. Women have been recipients of knowledge not makers, hence their viewpoint and experience is overlooked. In order to claim objectivity in the field of science, religion and philosophy, one needs to look from the perspectives of women. Feminist epistemology is of mainly three kinds: feminist empiricism, feminist standpoint theory and feminist post- modernism. My paper is based on last two forms of feminist epistemology which places high importance to viewpoints of women.

Sandra Harding(1991) in her book *Whose Science? Whose Knowledge* talks about importance of including these experiences by saying:

Consider suffering, for example. A woman suffers not only as a parent of a dying child, as a child of sick parents, as a poor person, or as a victim of racism. Women suffer in ways peculiar to mothers of dying children, to daughters of sick parents, to poor women, and in the special ways that racist policies and practices affect women's lives. Mother, daughter, poor woman, and racially oppressed woman are "nodes" of historically specific social practices and social meanings that mediate when and how suffering occurs for such socially constructed persons. (p.122)

What feminist epistemology tends to show is that subjectivity can never be ignored. The delusion that mainstream epistemology tries to create is of objectivity and absolutism. Feminist epistemologists call this objectivity as 'weak objectivity' which is devoid of women. Earlier no one dared to talk about presence of subjectivity in discourses of knowledge. Whatever was established was taken as generally speaking for all. The subjective aspects were completely ignored. The subjective points like "(1) The individual creativity of the human knower, (2) the location of every knower within a period of history, (3) the location of every knower within a linguistic and cultural setting, and (4) the affective side of human nature (contrasted with its purely intellectual side)" (Code, 1981, p. 269) were not considered.

Marnia Lazreg (2002) in her article on "Women's Experience and Feminist Epistemology" explains that:

The most significant characteristic of empiricist philosophy is that it neglects a number of crucial issues: (1) it does not address the contradiction between the individual character of experience and the social character of knowledge.

As a social product, knowledge constitutes a 'material cause' of cognitive acts. Knowledge at any given time includes 'antecedent knowledge, facts and theories' (Bhaskar 1978:187). While knowledge may not be analysed in terms of individual experiences, it is however analysable in terms of the *social* category of experience. This means that 'my experience includes *the experience of others'* (187)……. (2) Empiricist philosophy does not investigate the conditions under which experience becomes 'epistemically significant in science' (Bhaskar 1978:30) p(51-52).

Apparently, what has been seen as the absolute body of knowledge are mere male experiences speaking on the part of women. Elizabeth Spelman (1983) writes in detail how Aristotle called women impotent men and biologically inferior to be knowers. Feminist epistemology has broaden the scope for women and other genders by (1) showing that best of the theories can lack inclusivity and be dogmatic (2) giving importance to emotional aspects of an individual, which was long suppressed by rationality.

What feminist epistemology strives to show is gender of the knower plays significant role in different fields of knowledge. The knower which is thought to be passive is quite active and indulging from the assimilation of knowledge to its dissemination. To prove my point I would start with science first.

Science has been a field dominated by men scientists. Though with the increase in female literacy rate, many women have been successful to put "girls should not do science" like statements to rest. However, the disparity still exists, Huang et al (2020) in their article "Historical comparison of gender inequality in scientific careers across countries and disciplines" provide extensive evidence to show how even after 60 years of increase of women in science there is still gender disparity in the science, technology, engineering and mathematics (STEM). The causes are lower productivity rate in women because of their gender roles. Men are freer than women to lead well their academic careers. They show:

The low proportion of women actively publishing in STEM captures only one aspect of gender inequality. Equally important are the persistent productivity and impact differences between the genders. We find that while, on average, male scientists publish 13.2 papers during their career, female authors publish only 9.6, resulting in a 27% gender gap in total productivity. The difference is particularly pronounced among productive authors, as male authors in the top 20% productivity bracket publish 37% more papers than female authors. Interestingly, the gender gap disappears for median productive authors (middle 20%) and reverses for the authors in the bottom 20%. The gender gap in total productivity persists for all disciplines and almost all countries. (p.4611)

This is one aspect of gender inequality in the field science. Due the different gender disparities, their lesser participation has impacted the outcome of science as well. The disparity won't go till it becomes crucial to think from women's lives. It is not like what feminist empiricism suggests to add more women to the male dominated fields. This won't cure the disease the antidote is to question methods, researches, tools prevalent in the field as they are also product of male/ mainstream epistemology.

Elisabeth A. Lloyd (1996) in article "Pre-Theoretical Assumptions in Evolutionary Explanations of Female Sexuality" talks about the biases that tend to relate female sexuality to reproduction. She shows how there were given evidences that had shown that female rats or dogs were only sexually active when they were fertile (hormonal determinism), which led to the belief that animal female did not orgasm during their non-fertile days. She adds that "observations, measurements, interpretations, and experimental design are all affected by the background assumptions of the scientists. There is a pervasive and undefended assumption that female sexuality in non-human primates is tightly linked to reproduction." (p.94)

Elisabeth in her article goes ahead to show that these theories are not true for all female animals. There has been scientific evidence to show that female animals orgasm when they are not fertile. Despite many evidences, there exists still the notion that links female sexuality to reproduction. This has been extended to human females as well. According to researches, sexuality does not make any sense until it serves reproduction.

Elisabeth takes from other researches which show that:

Kinsey, for example, found that 59 per cent of his female sample experienced patterns of fluctuation in their sexual desire during their cycle but only 11 per cent experience a peak of sexual desire in mid-cycle, when they are most likely to be fertile. 10 More recently, Singer and Singer, in a survey of studies, found that only 68 per cent of women experience an increase in sexual desire around the time of ovulation. Most studies found peaks of sexual desire right before and after menstruation, when the woman is almost invariably infertile (p.93-94).

Focusing on male pleasures, giving contraceptives methods to women (though there has been change in the psyche of society to some extend) have shown science's negligence towards women and their needs. It is only through addition of women to different fields that these problems have come to the surface. Feminist epistemology has played important role in establishing a discourse so that what once was a taboo is trying to make its place in our societies.

Having said enough about science, I want to address the issue of gender discrimination in the field of religion and how feminist discourses may help in bridging gender gap. Since I am a Muslim, the following section of my paper will show why there is a need to revisit history and add women to the field of religion.

Women's participation by feminist epistemologists is considered to be a way of knowing how objective a theory is. Lesser the women, lesser the chances of it being just and objective. If we look that the position of women in Islamic world it is has not been a good one. The reason for this poor representation is their lack of involvement in making Islamic discourses. During the life of the Prophet (S), women used to inquire about day to day life problems from him. The Prophet (S) was there to resolve matters related to women. After the death of the Prophet it remained in the hands of subsequent generations. The first generation after the death of the Prophet (S) had his wives who were direct sources of his traditions. Along with his wives, many women who had direct contact with the Prophet(S) were transmitting the religious knowledge to the people. Women were equally participating, in fact major portion of the the traditions are from his wife Hazrat Ayesha.

It is to be noted that during these times when there was any misinformation being spread about women, these women used to rectify the mistakes. In one instance, Hazrat Ayesha is said to fought Abu Huraira who was a companion of the Prophet. Abu Huraira had said that Prophet said "three things bring bad omen: house, women and horse". Ayesha on hearing this narration corrected him and said "Abu Hurayra learned his lessons very badly. He came into our house when the Prophet was in the middle of a sentence. He only heard the end of it. What the Prophet said was: 'May Allah refute the Jews; they say three things bring bad luck: house, woman, and horse." (Mernissi, 1991:76) however this tradition still survives in one of the greatest collections of traditions of Imam Bukhari. No one dared to remove it, lay men and women read and quote it as something from coming from divine.

So we learn that women were there to correct what was being tempered by men. With subsequent generations we see downfall of women's participation in the field of knowledge. One of the reasons was newly established Muslim dynasty which was powerful and frivolous. The women lost their values as humans and became to be seen as sex objects (Leila Ahmed, 1992). The other reasons were Rihala (travelling in search of knowledge from one place to another) which was difficult for women at that time and making transmission for knowledge a specialized category which was full of men. In Sahih Al-Bukhari, the participation of women from the first generation of Muslims has dropped from twenty nine to zero in the subsequent generations (Asma,2013). With lesser participation of women, the power to create discourses was completely in the hands of men.

Also, there is a dire need to look at the cultural mores of the time when Islamic laws become canonized. The 'situatedness' of those who have written about women has played crucial role in shaping the Islamic world. Leila Ahmed, 1992 in her book *Women and Gender in Islam* explains:

The men creating the texts of the Abbasid age of whatever sort, literary or legal, grew up experiencing and internalizing the society's assumptions about gender and about women and the structures of power governing the relations between the sexes, assumptions and structures that were encoded into and manifested in the ordinary daily transactions of life. Such assumptions and practices in turn became inscribed in the texts the men wrote, in the form of prescriptive utterances about the nature and meaning of gender, or silently informed their texts simply as assumptions about the significance of women and gender. (Women were not, in this age, creators of texts in the way that they were in the first Islamic age, when they were among the authors of verbal texts, later written down by men.) The practices and assumptions regarding women that informed the social and psychological reality of Abbasid writers—theologians, legists, philosophers—reappeared in their texts as the prisms through which they viewed and understood women and gender. The texts the men of this period created are regarded as the core prescriptive texts of Islam. (p. 82)

To this day we see women become prey to misinterpretations of the Islamic texts like Quran and traditions. The passages in the Quran too have been misread and misinterpreted that became cause of deteriorating position of women. I won't talk about Quran as much here as it is the subject matter of another research. The point I want to make in this paper is to appeal for revisiting the history and historical texts and rectify what has been derogatory to the status of women. The laws are divine however it is the human mind that interprets them. It can

only be possible when we see women as knowers and make their lives and experiences as our starting points in researches.

Abou Fadl (2001) in his book *Speaking in God's Name* mentions how there are traditions of the Prophet (S) that go against blacks. These traditions are racist and demeaning to the community. It goes like that the Prophet said "one should avoid marrying blacks as they are deformed race". Abou Fadl notices how many scholars have rejected the authenticity of these traditions and regarded as them pure fabrications. When this attitude can be adopted for one community, why cannot this be a case for women? Just because we live in a patriarchal setup where women are underrepresent does mean we forget to treat them humans and not help them in elevating their status.

To conclude, the feminist epistemology which has shaken the buildings of patriarchy has made changes in science, philosophy and religion. The critical expositions of methods, reports etc. would not have been possible without the advent of feminist epistemology. Though feminist epistemologists may differ in their approaches, however their aim to raise the status of women in our societies remains steadfast.

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- (S) stands for salutations to the Prophet

- Sayings and deeds of the Prophet (S)

FISH DIVERSITY OF JOHILA DAM, ANUPPUR DISTRICT (M.P.)

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ABSTRACT

Freshwater fish biodiversity of Rajendragram reservoir, is poorly studied. There is no proper documentation on fresh water fish resources of Rajendragram reservoir of Pushprajgarh Tehsil, Anuppur District. This study aims to prepare database of fishes found in Anuppur. Fishes are the unique creature of animal world. It is one of the good sources of protein and is able to combat problem of malnutrition. Anuppur District is basically a tribal district. This is the first study to catalogue species of fishes found in Johila Dam. Total 32 species were recorded from Johila Dam.

Keywords: Fish Diversity, Johila Dam, Anuppur District (M.P.)

INTRODUCTION

My study area is Johila Dam,Anuppur District (M.P.). A fish is an animal which lives and breathes in water. All fish are vertebrates (have a Back Bone) and most breathe through gills and have fine and scales. Fish constitutes almost half of total number of vertebrates in the world. They live in almost all conceivable aquatic habitats, 21730 living species of fish have been recorded out of 39900 species of vertebrates (Jayaram,1999). About 21730 species of fishes have been recorded in the INDIAN waters.

Fishes are aquatic creature, perfectly adapted for life in water. Fresh water bodies comprise variety of fishes. Fishes alone contribute about 2546 species and the fishes of inland water bodies of Indian subcontinent have been subject of study since last century (Kalbande et al., 2008). Human Beings from time immemorial use fishes for various purposes. The aquatic ecosystem is important and it has large number of economically important animals especially fish which is an important source of food. The development of fisheries in these.

Fishes are the important vertebrate group of animal's world contributing to the biodiversity of animals. Primarily fishes are used as a food source. Many vital vitamins and fatty acids are found in fishes so sometimes it is referred by doctors as a good food source. The study of fish and their stability is important because fish population of a water body may vary significantly from year to year. The Fish Fauna is an important aspect fishery potential a reservoir. They play an important role, as they are not only useful for food and recreation but also act as a tool for biological control by feeding upon the planktonic population and aquatic vegetation in the reservoir. They are useful indicator of environmental equality and ecological integrity.

Fish is sensitive to water chemistry due to different anthropogenic activities from there catchments. Fish responses to environmental disturbances, including hydro-morphological factors are different in time and space in comparison to simpler organisms, as they tend to be integrated over larger intervals. Fish has been identified as suitable for biological assessment due to its easy identification and economic value (Siligato & Bohmer. 2001). Fish assemblages have widely been used as ecological indicators to asses and evaluate the level of degradation and health of water bodies at various spatial scales. Many Fish species have become highly endangered, particularly in river were heavy demand is placed on fresh water. However, the impact of the anthropogenic activities hebetate degradation, exotic species introduction water diversion, pollution and global climate change are the main causative agent for the aquatic species rapid decline. Reservoir play a very important role in the geochemical cycling of element an influence the chemical composition and material transfer of the river system (Abhay et al., 2005). They are of high ecological, economic and recreational importance (Carol et al., 2006). They contribute significantly in fulfilling the basic human need water for drinking and industrial use, irrigation, flood control, hydro power generation inland navigation, fishing and recreation.

The objective of present investigation was to give recent data regarding fish diversity in relation to abundance, richness, relative abundance and diversity status of the reservoir system, aiming to contribute a better knowledge of the fish diversity profile of Rajendragram reservoir and a tool for conservation planning of aquatic environments in this region.

Study Area

Johila dam is situated in a rural area of Rajendragram, Pushprajgrah Tehsil, Anuppur District, Madhya Pradesh. Johila dam is located in the river Johila. The johila river originates from the hill of Amarkantak in Anuppur District (M.P.). Its original origin site is Jawleshwar Dham 10 km. away from Amarkantak. The river is

emanating from the hills Jawleshwar and though it is found in the Son River chain in the macaulay mountain range. Amarkantak is situated at an elevation of 3600 ft. above sea level. Amarkantak is said to be the mother of rivers. Amarkantak is a place that preserved that the historical heritage.

Material And Method

The fishes were collected from Johila Dam, Pushprajgrah Tehsil, Anuppur District and from local fisher men. Fisher men generally use many types of nets like gill nets, cast nets, drag nets etc. Fishes were preserved in 10% Formail Solution and identified with the help standard key and book. This study was conducted between May 2019 to April 2020. The fishes were identified with the help of Jhingram 1982, Day 1989, Gopalji Shrivastava 1992 and Jayaram 1999.
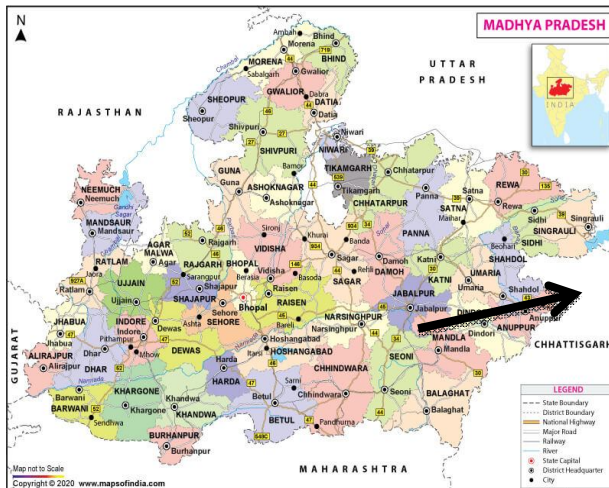
Fig 1: Map of Madhya Pradesh   **Fig 2:** Map Showing Area of Rajendragram
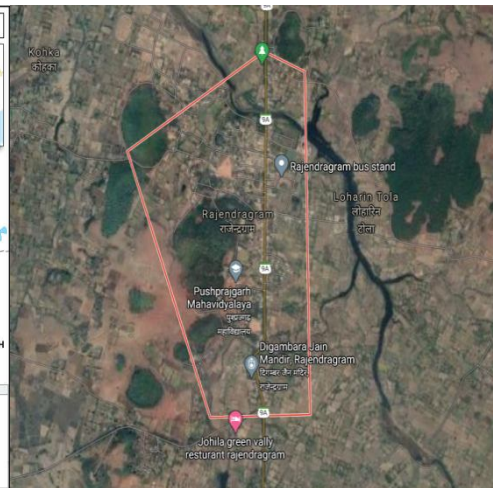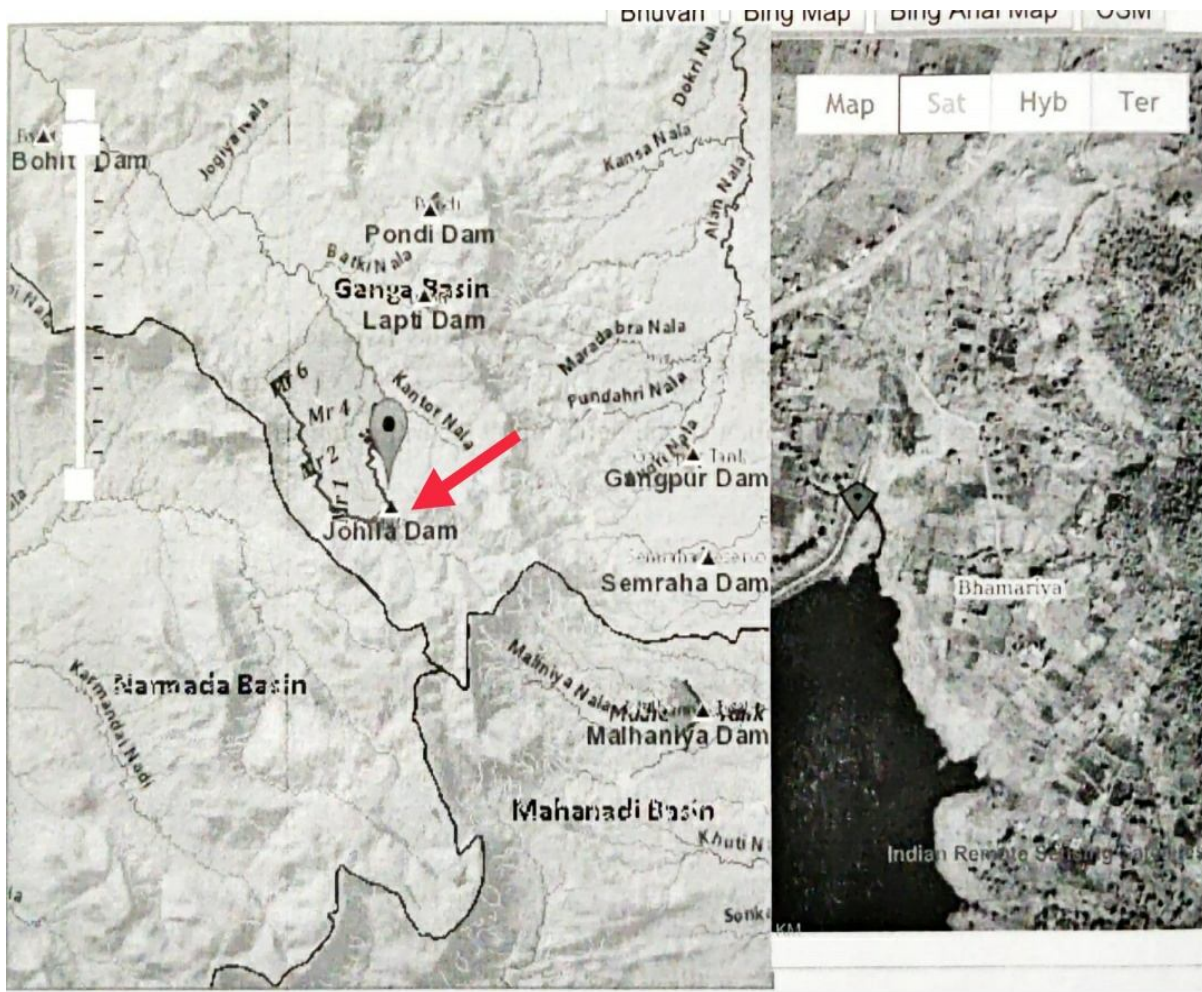
Fig 3: Location of Johila Dam

RESULT AND DISCUSSION

The present investigation of fish diversity of Johila Dam, Rajendragram, Anuppur District (M.P.). A total of 32 Species of fishes belonging of 5 orders and 11 families were recorded. Fishes belongs Cypriniformes was dominated the order group in the fish diversity in the Johila Dam. Fishes found in Johila Dam are edible an important source of protein.

Table 1: Order wise Fish Species in Johila Dam

S.No.	Order	No. of Fish Species
1	*Cypriniformes*	27
2	*Clupeiformes*	2
3	*Mastacembeleformes*	1
4	*Perciformes*	1
5	*Cyprinodontiformes*	1
	Total No.	32

Fig 4

Legend:
- 1 Cypriniformes (84%)
- 2 Clupeiformes (6.2%)
- 3 Mastacembeleformes (3.1%)
- 4 Perciformes (3.1%)
- 5 Cyprinodontiformes (3.1%)
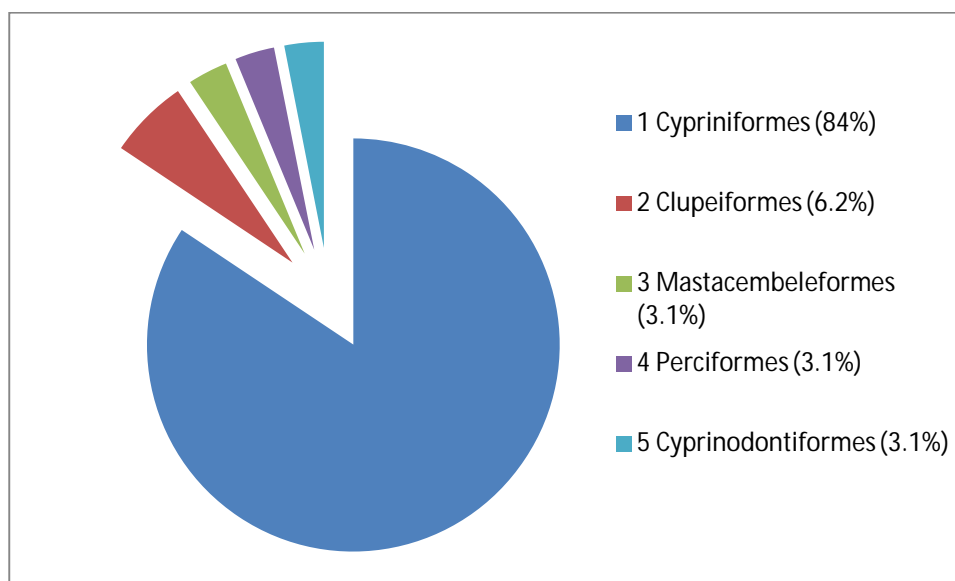
Table 2: List of Fish Diversity Recorded from Johila Dam with Local Name

S No.	Name of Fish Species	Order	Family	Genus	Common Name
1	*Labeo rohita*	Cypriniformes	Cyprinidae	Labeo	Rohu
2	*Labeo gonius*	Cypriniformes	Cyprinidae	Labeo	Kursi
3	*Labeo calbasu*	Cypriniformes	Cyprinidae	Labeo	Calbasu
4	*Labeo bata*	Cypriniformes	Cyprinidae	Labeo	Bata
5	*Catla catla*	Cypriniformes	Cyprinidae	Catla	Catla
6	*Cirrhinus mrigala*	Cypriniformes	Cyprinidae	Cirrhinus	Mrigla
7	*Cyprinus carpio*	Cypriniformes	Cyprinidae	Cyprinus	Common Carp
8	*Cirrhinus reba*	Cypriniformes	Cyprinidae	Cirrhinus	Reba
9	*Esomus danricus*	Cypriniformes	Cyprinidae	Esomus	Dandia
10	*Puntius chola*	Cypriniformes	Cyprinidae	Puntius	Kotri
11	*Puntius ticto*	Cypriniformes	Cyprinidae	Puntius	Sidhri
12	*Puntius sarana*	Cypriniformes	Cyprinidae	Puntius	Sarana
13	*Oxygaster bacaila*	Cypriniformes	Cyprinidae	Oxygaster	Sarangi
14	*Ctenophoryngodon idella*	Cypriniformes	Cyprinidae	Ctenophoryngodon	Grass carp
15	*Clarias batrachus*	Cypriniformes	Cyprinidae	Clarius	Mongri

16	*Hypopthalmichthys molitrix*	Cypriniformes	Cyprinidae	Hypopthalmichtys	Silver carp
17	*Salmostoma bacaila*	Cypriniformes	Cyprinidae	Salmostoma	Chal
18	*Tor tor*	Cypriniformes	Cyprinidae	Tor	Mahseer
19	*Ompok bimaculatus*	Cypriniformes	Siluridae	Ompok	Paniha
20	*Wallago attu*	Cypriniformes	Siluridae	Wallago	Padhani
21	*Mystus seenghala*	Cypriniformes	Bagridae	Mystus	Seenghala
22	*Mystus tengara*	Cypriniformes	Bagridae	Mystus	Tengana
23	*Mystus aor*	Cypriniformes	Bagridae	Mystus	Bade Tengana
24	*Rita rita*	Cypriniformes	Bagridae	Rita	Kokia
25	*Bagarius bagarius*	Cypriniformes	Sisoridae	Bagarius	Rechha
26	*Eutropiichthys vacha*	Cypriniformes	Schilbeidae	Eutropiichthys	Patara
27	*Heteropneustes fossilis*	Cypriniformes	Saccobranchidae	Heteropneustes	Singhi
28	*Notopterus notopterus*	Clupeiformes	Notopteridae	Notopterus	Phalia
29	*Gudusia chapra*	Clupeiformes	Clupeidae	Gudusia	Suhia
30	*Mastacembelus armatus*	Mastacembeleformes	Mastaeembelidae	Mastacembelus	Baam
31	*Gambusia affinis*	Cyprinodontiformes	Poeciliidae	Gambusia	Mosquito fish
32	*Oreochromis mossambicus*	Perciformes	Cichlidae	Tilapia	Tilapia

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FLOURISHING OF HOTEL ENTREPRENEURS USING INNOVATIVE TECHNOLOGY

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ABSTRACT

The aim of this article is to evaluate the importance of innovation for entrepreneurship environment in the context of current economic conditions. Throughout the last century, industry leaders learnt to master the production process to such an extent that now it no longer functions as a significant competitive advantage. Every entrepreneur is now facing a harsh and highly competitive business context in a globalized economy, and in order to resist and to be successful the new challenge is to master the innovation process, harnessing change, creating new competitive advantages by offering better products, using better processes, delivering better services or even offering entirely new solutions. Businesses that have been able to pivot to new operating models during the crisis have fared better than others. Hotels are catering to local clientele and making rooms Zoom-ready for people who want to work outside the home. Some restaurants are using commissary kitchens to cut operating costs as they switch to delivery-only models. Business agility will define success in this next normal, and it will rest on how hospitality companies reach and connect with their workforces. This article can be also used as a base for future studies regarding the process of innovation, the management of the innovation process, the establishing of a management system of innovation and its implementation into existing management systems.

Keywords: innovation, entrepreneurship, business success, hotel industry

INTRODUCTION

In today's national and global economy, innovation, knowledge and information are the central concerns of private and state entities. In this context, innovation is an important dimension of restructuring and modernization policies within an economy based on knowledge and competitiveness. Innovation is an everyday phenomenon that progressively changes economy and management through processes and systems. The concept of continuous improvement helped competitive positioning strategy. In the 90s, competition in a global market has led enterprises to consider quality as a key driving force, without leaving out productivity from the competitiveness equation. In the 2000s, there was a change of priorities and enterprises realized that innovation is as important as quality in order to provide a competitive advantage in the market. This approach is very popular nowadays. Equipping employees with information is just the first step in the process. After the year we've all just had, it's more important than ever to keep your hospitality teams motivated and engaged, especially when we require so much from them. The jobs that your associates, servers, and customer service reps have today are very different from what they initially signed up for. Customers can be more difficult and demanding. Tensions are at an all-time high. The stressors of working on-site and with the public are massive. Keeping your team's spirits up and morale high will be critical in your road to recovery. "Innovation is the new ways of doing the regular things, or unique or better combinations of the production elements." To attract customers and grow their business, hoteliers are doing research and development activities to come up with innovative product and services. People prefer herbal product in comparison to the chemical product. Example, in body care product or in food and beverage product, most people buy herbal and eco-friendly materials only. In the recent years, the social activist, environmental agencies and group those are conscious about the green earth taking initiatives and pressuring all industry to reduce their process that is affecting to the environment.

The Concept of Innovation

Innovation efforts over the years have provided a wealth of innovation projects that failed. Even large companies that were once forerunners and creators of all markets have failed to remain competitive when major changes occurred, particularly technological. Organizations are accustomed to what they do (basic competencies) that they get stuck there, and when the environment changes (for example, change in customer requirements, change in regulations), they are unable to adapt quickly and easily. Innovation is novelty, change, transformation, solving a technical problem or work organization problem in order to improve a performance indicator. Innovation comes from the verb to innovate, the action to innovate and its outcome, renewal, innovation. To innovate means to make a change, to introduce a novelty in a field, in a system, to renew, to introduce, adopt or disseminate innovation. Innovation can be analysed as an invention and its commercialization. However, the boundaries are not always clear, as the invention may be relevant not only for

research and development, but also for optimizing or enhancing new methods and processes, and its marketing may also include significant research work . Innovation is seen as the key element to obtaining sustainable competitive advantages for the success of the enterprise. The goal of innovation is mostly to survive, to grow, to make a profit, but what matters for innovation is how it affects the chances of survival, profit with growth of technology in hotel industry as shown in fig.1.

Fig.1: Technology used in hotel industry

Approaches to the Process of Innovation in Connection with Hotel Business

A thorough examination of the literature on the innovation process carried out in this paper allows us to point out some important conclusions regarding the approach to the innovation process in organizations, the stages of the innovation process, as well as the outcome and benefits of the innovation process. The innovation process is a sequence of activities carried out by the management of an enterprise to create products and services, intended for sale At the same time, the category of innovation processes also includes market expansion activities, supply improvement activities, production processes, equipment maintenance, distribution channels, service activities and, not least, administrative and management improvement activities . In other words, any change made in the enterprise in order to improve its economic situation, its position on the market, staff working conditions or environmental protection, is an essential part of the innovation process. The key processes that lie at the center of the system are knowledge, dissemination and exploitation, which are shaped by the organization's capabilities and the strength of its relationships. Supporting the commercial, technological and regulatory environments where enterprises operate is another key component of the system. The result of this complex set of capabilities and the connections of the national innovation capacity is an important factor in determining economic performance.

Influencing elements of innovation in Hotel industry

There are five influencing elements of innovation in the hotel

1. Innovation supporting process

A meticulous strategic planning is required for radical innovation, for which enough budgets and capital is required. There should be well developed employees' evaluation and compensation plan to motivate them. Knowledge management and Training and development are also required to encourage every individual in the firm to contribute towards business strategy.

2. Firm (Hotel) Size

The size of the firms also matter a lot for innovation process. If a firm is big in size and operate globally then its approach will be different.

3. Supplier Driven

Hotels are supplied driven business and to achieve maximum profit it strives for standardized goods. Value to the hotel is produce by its reliable suppliers.

4. Market Factor and Competition

In the fierce competition, firms need to adopt well developed marketing strategy. Building guest loyalty, providing greater customer satisfaction, connect with the customer emotions, earning the high value of guest

experience, adopting latest trends in the hotel, are the major elements that a hotelier should focus on for strategically development of market initiatives.

How a guest is treated by an hotelier is most important. Guest is always satisfied by the personal attention by the staffs of the hotel. But it is differ from person to person. For different age group, different kind of attention is required. Example, kids prefer electronics more than the personal attention and they insist their parents to go such place.

5. Hospitality trends (Eco-Friendly Initiatives)

The hotel industry in global, are mainly struggling to undertake the problem of low rate of occupancy. Like any other industry, hoteliers are also giving much more importance to the creativity and innovativeness to attract customers and to earn loyalty. Inevitably, in the hospital sector, the luxury facility is given top most priority and that to in reasonable price. To provide luxury facility hoteliers have to work 24x7 to differentiate themselves with respect to uniqueness and level of satisfaction they are offering to the customer, also justifying the greater expenses. Hotel industry is segmented according to its services such as:

A) Boutique Hotels: Boutique hotels are the traditional players in the hospitality sector. Right now, "Change the times" is the slogan for hospitality industry. Boutique hotel mainly offers late night disco clubs and techno grooves to replace the boring concerts.

B) Energy Spa: "Energy medicine" industry is growing at the faster rate. This is considered as part of the hospitality sector. To face the fierce competition, people are working hard for their existence in the corporate world. People are losing their health due to this hectic schedule. They prefer to go hotels for getting energy-spa for balancing body, mind and spirit.

C) No Pet Friendly Initiatives: Dogs are not allowed in many hotels as it is not acceptable by some customers. Now pets are not allowed on the red carpet rolled out for the guests. Generally pet sleeps on the guest beds and moves in the other guest's area and it creates problem to the other guests also.

D) Resurgence of Traditional Wines Some of the pleasing guest, who doesn't want to compromise with the quality or taste of the wines, serves in the hotel. They go to hotel to enjoy the drink so the hotelier takes special care of this type of guest.

MAKING SAFETY A TOP PRIORITY IN THE NEXT NORMAL IN HOTELS

Cleanliness and guest/employee safety have always been a top priority in hospitality, but with the events that transpired in 2020, the emphasis on safety and hygiene is more prominent than ever. In 2021, hotels, restaurants, and other hospitality verticals will be looking to technology to support new safety initiatives for both guests and employees to comply with new labor laws and regulations. Building Safety Into Workplace Culture Frontline teams are the backbone of the hospitality industry, making up 80% of the workforce. Companies are kicking off the new year with a commitment to protect these valuable workers. Up-to-the minute communication is paramount to any successful safety campaign. According to Edelman Trust Barometer, 63% of workers want daily updates on COVID-19. Companies are complying with this need while also weaving safety into their core values and culture, especially for frontline workers who interact directly with the public.

Fig.2: Safety measures of new normal in hotels

Creating a Safer Guest Experience As travel screeched to a halt this past year, nearly a billion hotel rooms went unsold by the end of 2020 as shown in fig.2. As eager as people are to return to travel and leisure, there will be a period of readjustment. While the pandemic will recede, consumers will carry lingering fears about doing the simple things they once enjoyed without a second thought, like grabbing a bite to eat, going to the movies, or

booking a hotel room. It will take time for the public to resume their pre-pandemic spending habits. Looking towards the future, companies have already taken proactive measures to encourage guest engagement. They're creating safer spaces, adopting new cleaning protocols, and accommodating guests at greater distances. Marriott was one of the first big hotel chains to announce a safety plan and protocols with its "Commitment to Clean." With mobile check-ins and digital keys, the chain quickly moved to contactless accommodations. At the Marriott's Westin Houston Medical Center, they're even using virus-killing robots to provide a deeper clean and keep workers safe.

Beekeeper as a Mobile Solution for Hospitality Workers :
Beekeeper's mobile collaboration and productivity platform is the single point of contact for your frontline workforce. With all communications and tools in one place, employees are more agile and productive so they can focus on providing an exceptional customer experience. Deskless workers can check resources and share best practices in real time. Managers can resolve issues quickly, handle non-routine work efficiently, and motivate customer-facing teams. Executives can increase business resilience and agility in uncertain times. Our secure platform offers a consumer-grade employee experience at the scale you need. Integrate seamlessly with your existing systems to create the future, now.

FRAMEWORK TO SUPPORT INNOVATION
Supporting innovation, measuring and improving the efficiency of national innovation systems are the most important issues and priorities in Europe, especially the mechanisms and measures to support innovation, turning research into new products and services. There are many definitions of innovation support measures, but herein we will mention the most widely applied definition suggested by Reid and Peter: "an innovation policy measure can be defined as any action taken or (co-) financed by the public sector in order to influence innovation processes and capacities in enterprises. Four types of action policies can be identified within this definition:

1. Provision of financial resources directly to enterprises to support innovation processes

2. Provision of financial resources to organization functioning such as innovation-related service providers or intermediaries which support innovations in enterprises and/or connect research and business actors (Modality: knowledge and technology transfer, business incubation innovation management training, infrastructural development for new-technology based firms, entrepreneurship policies for start-ups).

3. Creating and coordinating knowledge exchange among actors in innovation system by public authorities through establishing public-private partnerships (Modality: transfer and exploitation of research results, mobility of personnel between two sectors of academia and business, information and best practice diffusion, demonstrator projects, networks and clusters).

4. Creation of new institutions, as a kind of legal framework, that indirectly affect innovation process in enterprises (Modality: Legal framework, Tax and financial incentives, support to protection of IPR, standardization & certification, administrative simplification).

CONCLUSION
The competition on the market is increasing and in order to be competitive an entrepreneur must adopt innovation as his weapon and thus to overcome competition. Our research has shown some key aspect that every Entrepreneur must be aware of. One of the aspect is the management support, this is the beginning of the innovative thinking for every company, but the managers must have an active support not only to approve the new innovative way of thinking but also a more active support such as employees motivation or the provision of training and development programs. Another aspect is related to the involvement of the employs in the innovation process, and for this an environment where every employee can freely expose his ideas. The rewarding of employees, they should be rewarded accordingly and here we do not mean just a monetary reward but also an emotional one, such as public recognition of theirs merit in the company. In 2021, the hospitality industry will begin operating in new ways in this next normal after the major disruption of 2020 that cost the industry billions of dollars and millions of workers. Rebuilding and reinventing the hospitality business will be a top priority for leaders in 2021, with a focus on bringing guests back and fortifying a skilled workforce. We can expect to see hospitality leaders across all verticals leverage new and existing digital technologies to attract new talent and retain their current workforce. Industry leaders will also emphasize safety as a mainstay of their culture and core values for both employees and guests. Finally, hospitality companies will begin to adopt lean management strategies to cut costs, reduce waste, and run their hotel operations more efficiently in an effort to be more agile as they rebuild and recover in 2021 and beyond.

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GREEN LIBRARY: CONCEPT AND ELEMENTS

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ABSTRACT

Now are the days of environment protection, ecological balance, sustainability, sustainable development and green initiatives, as every one of us in the world is talking about it. In fact, these are the most commonly used and applied terms around the world. Moreover, it the need of today, which may ensure the survival of today's lives as well as lives of tomorrow. In this context we people can take a lot of initiatives, which may be called as 'Green Initiatives' in the different spheres of our lives. And the 'Green Library' is one of such initiatives.

'Green library' is reasonably the concept of recent origin. Though it is of recent origin it is gaining popularity among the researchers, academicians, and library professionals around the world. The amount of information available on green libraries and green library practices is limited but continues to grow. Environmentally conscious people and library users around the world are looking at and expecting that libraries of today should not only a centre of information but also a green place. Now days various interconnected topics of green libraries and sustainability have received a great deal of coverage in various publications targeted toward world librarians. Even many library and other information professionals are taking action to ensure that their workplaces will be environment friendly.

This conceptual research paper/article essentially highlights and discusses the concept and elements of green or sustainable library.

Keywords: Green or Sustainable Library, Green Library Movement. Sustainability

I. INTRODUCTION:

With the advancement of science and technology our life styles are influencing and changing with a greater pace. Today, the demand for anything is increasing rapidly, and we people are harnessing the power of it to fulfil our unending demands. In this scenario we people are forgetting something important, which should be recognized before we people talk about sustainable development in this faster changing world. It is nothing but the word 'Green', which is of a great significance for a healthy survives. We have observed that, over the past few years there are increasing interests towards green revolution in almost every sector and library is one of them.

Today, libraries work as gateways for knowledge are particularly responsible not only for disseminating the idea of sustainability but also for leading by example and thus serving as exemplars. Libraries of today should incorporate green elements into their operations. In fact, there are several reasons why libraries should incorporate green features into their buildings. It is vital for the health of library users and the mother earth on which we people live.

II. CONCEPT:

It is to be noted that the concept of 'Green library' is of recent origin. Therefore, there is no univocal definition of the term 'Green Library'. When we say 'Green Library' we necessarily mean by it overall library operations and library building. The concept seems to be much comprehensive. There are a number of central themes that run through all of them, which seek to minimize the negative and maximize the positive effects the building will have on the local environment. Green libraries seek to reduce the use of water and energy by designing the building to maximize the use of natural and renewable resources. They also integrate actual plants into the building design, preferably with drought resistant and/or native vegetation. Furthermore, the maintenance of high standards of indoor air quality to help ensure the health of the people who inhabit the building. It is not merely a term but it is an activity, a process, and a movement. In simple words, Green Library is nothing but environment friendly or eco-library. Green or Sustainable Libraries are the structure that is designed, built, renovated, operated, or reused in an ecological and resource efficient manner. It is one of the many collective efforts of all mankind to make green planet by reducing global warming effect. The Online Dictionary of Library and Information Science (ODLIS) defines Green Library or Sustainable Library as, "A library designed to minimize negative impact on the natural environment and maximize indoor environmental quality by means of careful site selection; use of natural construction materials and biodegradable products; conservation of resources like water, energy, paper, and use of responsible waste disposal recycling system; etc." Further,

according to New World Encyclopaedia 'Green Library', also known as a 'Sustainable Library' is, "A library built with environmental concerns in mind."

Here, the term 'Sustainability' is defined in Online Dictionary of Library and Information Science (ODLIS) as, "The capacity to meet the needs of the present without compromising the ability of future generations to meet their own needs." It has economic, social, and environmental aspects. And sustainable library is one which performs its functions and plays its role in an environment friendly manner. In new construction and library renovation, sustainability is increasingly achieved through Leadership in Energy and Environmental Design (LEED) certification, a rating system developed and administered by the U.S. Green Building Council (USGBC).

Basically, green libraries are a part of the larger green building movement. Also known as sustainable libraries, green libraries are being built all over the world, with many high profile projects bringing the concept into the mainstream. Along with library, green design is an emerging trend, defining the library of the 21st century. Many people view the library as having a unique role in the green building movement due to its altruistic mission, public and pedagogical nature, and the fact that new libraries are usually high profile, community driven projects.

To sum up it can be said that green library can be characterized as environment friendly library or sustainable library. According to one more definition given in Online Dictionary of Library and Information Science (ODLIS), "Green library is a library designed to minimize negative impact on the natural environment and maximize indoor environmental quality by means of careful selection of site; use of natural construction materials and biodegradable products; conservation of resources like water, energy, paper, and use of responsible waste disposal recycling system, etc." Thus, every green library necessarily possesses certain essential features.

III. ELEMENTS:

Basically, the 'Green Library Movement' has been emerged in the early 1990s and is gradually gaining popularity in the field of library and information science profession. Many of the library professionals of today are working on the idea of green library, which will use natural and regional construction material, minimize consumption of water and electricity, and also use environment friendly technology. Though it is somewhat in the initial stages of development, we need to understand that green or sustainable library is the structure that is designed, built, renovated, operated, or reused in an ecological and resource efficient manner. There are wide range of ways to promote the idea of green library, such as use of environmentally friendly or recycled and regionally available materials, optimal use and conservation of natural resources, virtual user services and resource-saving copy services, waste separation, elimination of plastic bags, no more paper cups and instead use of recycled/private crockery, fair-trade coffee in the library's coffee shop, green events, choosing library suppliers with green certificates and many more.

While the term 'Green Library' is often used specifically to describe a library building that has built by using standards or guidelines like LLED, it can also be refer to a library, which is becoming more environmentally sustainable in a significant ways, whether by using nontoxic cleaning supplies, reducing energy consumption, or collecting and promoting materials with environmental themes. Basically, green design is an integrated process. No one aspect of a building's architecture makes it a green architecture. Without proper integration right from the early stages of the planning phase, redundancies can occur, and can eliminate many of the potential benefits of sustainable design. Good sustainable design always capitalizes on the synergistic relationships that occur between the various design elements. LEED groups these elements into five categories. Buildings can be designed in a way in which, one category helps another category fulfil its goal of good and sustainable design. These five elements can be discussed as under.

Site selection: Library is the heart of any college or institution or university or any department. It should be at an appropriate site or locality so as to make users concentrate on their reading or study. Accessibility or connectivity through public transportation system is a necessary element, which should need extra attention while searching for site. In this regard various guidelines are given by different agencies and organizations like LEED, USGBC, and Indian Green Building Council (IGBS) to developed green library, which need to be considered.

Water conservation: It is one of the essential resources required everywhere in houses as well in offices. It is scares and valuable, hence, need to use very carefully. A library should undertake proper water management, which help to keep library clean, hygienic and green. There are many different ways for libraries to conserve and make optimum utilisation of water like rainwater harvesting system, use of low flow fixtures, and waterless

urinals. Moreover, library can reuse of waste water and rainwater for plantation and gardening, and for flushing in toilets.

Energy conservation: Though the use of energy is unavoidable, its consumption should be reduced. In a library it can be save in many different ways. A library can have sufficient number of windows, glass windows, use of natural light, use of energy efficient bulbs and lights, etc. Even required electricity can be generated using direct sunlight by planting solar system on the roof top of library building. Also the surplus energy can be conserved and used when there is a need of extra energy.

Construction/Building materials: While thinking about a green library the first thing which comes in to our mind is the library building. There are many standards and protocols available in India and outside to make a green building by using recyclable and environment sustained materials. Indian Green Building Council (IGBC) is a part of Confederation of Indian Industry (CII), which offers a variety of services like green building rating programs, training programs, certification service program, etc. LEED is an internationally accepted program planning environmentally compatible high performances green building for a healthy environment. It is necessary to select materials for the library, which lead to minimum waste as possible and causing less damage to the natural environment.

Indoor air quality: Today, fresh, healthy, and breathable air is a most important factor. Particularly, inside the library building there is the need of a quality air. For this proper plantation is needed in the surrounding campus, which provides clean and pure air and also make library a cool place. Basically, trees give pleasant air and controls air conditioner operation during summer season. In hilly area building should be in a sunny place so that it will become little warmer and reduces room heater and blower expenses during winter season. Further, proper arrangement s should be made for air circulation and ventilation. It is to be suggested that a green building need to be designed in a way in which, the air gets recycled and does not stay stagnant.

IV. CONCLUDING REMARKS:

conclude it is to be said that a 'Green Library' or 'Sustainable Library' is a modern library i.e. a place, which uses environment friendly building materials, which make optimum use of natural resources, which minimizes wastages, which make better use of renewable sources and which carries its operations in more cost effective and efficient manner.

Now days it is much more needed for a library to greening the library environment. In this context library professionals of today should make some concrete decisions and take essential steps to make their libraries green and should also take part in green library movement. Many national and international bodies are extending their help making libraries a green place. However, along with these bodies, library users, librarians and government should take initiatives and actively participate in green library movement making it successful. It is to be noted that today's libraries as gateways for knowledge are particularly responsible not only for disseminating the idea of sustainability but also for leading by example. Small steps in going green can produce big results over a period of time. The concept can be develop and bring into reality in cooperation with unpaid partners like NGOs, friends of the library groups, school projects, library suppliers and, last but not least, the library users.

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GROWTH AND FUTURE OF INTERNET IN INDIA

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ABSTRACT

Mobile phone is the best friend of the present generation. Mostly people use the smart phone. Smart phone cannot function without internet. So, internet is the primary requirement for the smart phone user. This paper shows the growth and frequency of internet user in India. It focuses on the frequency of access of internet usages by gender, by age group and by cause in India. This research also found that there is a huge discrimination by gender and by age group in India. Correlation, frequency, growth rate and mean analysis were done to find the effects of certain parameters which effect the growth of internet user in India. Paper analysis also finds the correlation with total internet access with face-book and social network user in India. Internet growth rate is closely linked with subscription rate through internet mode. Youth is a big market for use of internet in India.

Key words: Correlation analysis, CAGR, mean analysis, social network, Tele-density, penetration etc.

INTRODUCTION

India is second largest country followed by China in world. India is the six largest economy on the basis of GDP in the world and on the basis of Purchasing Power Parity (PPP) it is third largest economy in the world. India had the second largest internet using population followed by China in the world. In 2020, India had almost 700 million internet users in the nation. It very well might be extended to develop more than 974 million users by 2025. India is very fast growing economy in internet user. It is not growing only in urban areas but it is growing very fastely in rural areas also. With the access of internet user social network user stood at 376.1 million in 2020 and it is expected to be almost 448 million in 2023. In 2023, the number of face-book users in India is relied upon to arrive at 444.2 million from 346.20 million of 2020. It is showing a consistent growth in the in the social media platform's user base in India. India is biggest Face-book user on the planet. There were around 195 million Face-book users in May 2016, against 191 million in U.S.A and 90 million in Brazil. At present near to 50 percent population is accessing social network. It is estimated that by 2025 the penetration of social networks would be 67 percent of India's population. India is number one in the user of Face-book. Looking forward we see online channels staying solid this year and taking a 45 percent share in the Indian smart phone market in 2020. The COVID-19 pandemic hugely affected the current market situation and utilization of internet in Indian economy as well as its way on entire world.

According to the report of Internet and Mobile Association of India (IAMAI), "Digital in India", March 31, 2019, India had 504 million monthly active internet users in Nov. 2019. Out of absolute internet population, 433 million are of the age of 12 years or more and 71 million are in the age bunch 5-11 years who access the web on gadgets of their relatives. The report likewise noticed that almost 70% of the active internet users are daily users with nine out of 10 users in metropolitan India getting to the web at least once per week.

According the research report of Nokia in 2018, mobile data usage in India jumped 144 percent (y-o-y) to 2360 petabytes, with average consumption per user in 4 G broadband reaching 11 (GB) gigabytes per month in Dec. 2017. Data consumption in the country continued to be driven by video, which contributed up to 65 to 75 percent of total mobile data traffic.

According to Sandhya Keelery, July 7 2020, in the report 'Internet usages in India- Statistics & Facts' found that data usage per smart-phone per month will triple 21 EB per month (one billion GB) by 2025. On an average Indian used around 12 GB data monthly. It is highest consumption globally. It is projected that use of data by 2025 may be increased around 25 GB per month.

In 2019 more than 73 percent of India's complete web traffic came from cell phones. Simultaneously, the number of ladies who approach web is a lot of lower than men in the nation and the inclination is considerably more clear in rural India. Essentially web use is lower among more established grown-ups in the nation because of web education and innovative ability. In rural India, a sizeable part doesn't approach the web and gives an enormous occasion to growth which will add to an expansion in the overall internet population over the next few years.

RESEARCH METHODOLOGY

Present study is based of secondary data. Data has been collected from TARI& Telecom Statistics India 2019. In the present paper we analysis the data through chart, mean value, growth rate, percentage methods and correlation methods etc.

HYPOTHESES

H1: Face-book User is related to Mobile Phone Internet User.

H2: Social Network User is related to Mobile Phone Internet User.

H3: Face-book User is related to Social Network User.

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}}$$

Correlation method, Correlation coefficient

1. Here x_i is Mobile Phone Internet Subscribers; y_i is Face-book Subscribers. If we apply our observed values in this formula we will get 0.992 at the 0.01 levels (2-tailed).

2. Here x_i is Mobile Phone Internet Subscribers; y_i is Social Network Subscribers. If we apply our observed values in this formula we will get 0.995 at the 0.01 levels (2-tailed).

3. Here x_i is Social Network Subscribers; y_i is Face-book Subscribers. If we apply our observed values in this formula we will get 0.992 at the 0.01 levels (2-tailed).

We calculate the correlation value between various variable in this paper. Mobile Internet Subscribers, Face-book & Social Network subscribers. It also shows the same positive vale between Mobile Internet, Social Network and Face-book subscribers that means there is correlation between them.

CAGR= Compound Annual Growth Rate

CAGR = (end/start)$^{1/n}$ – 1

CAGR = (Current Value /Base Value)$^{1/n}$ – 1

n= number of years

End= Current Value

Start= Base Value

Table No-1: Number of Face book, Social Network & Mobile Internet users in India from 2015 to 2018 with a forecast until 2023 (in Millions)

Year	Face-book User	Social Network User	Mobile Internet User
2015	135.6	142.23	242.92
2016	165.57	168.10	281.81
2017	248.3	296.30	361.60
2018	281.0	326.10	390.90
2019	313.6	351.40	420.70
2020	346.2	376.10	448.20
2021	378.9	400.30	469.30
2022	411.5	422.70	486.70
2023	444.2	447.90	500.90
Mean	302.76	325.68	400.34
CAGR	14.09	13.59	8.37

Source: DOT compiled data, TARI & Telecom Statistic India 2019.

Table No 1 depicts that overall Mobile Phone Internet subscription in India is expected to grow from 11.80% yearly from 2015 to 2023. We have done correlation analysis between Internet subscription rate and face-book

user and social network user in India. It has shown below is the correlation graph. Study also shows that during the study period CAGR of Number of Face book, Social Network & Mobile phone Internet users in India came 14.09%, 13.59% and 8.37% respectively.

Chart No-1: Number of Face book, Social Network & Mobile phone Internet users in India from 2015 to 2018 with a forecast until 2023 (in Millions)
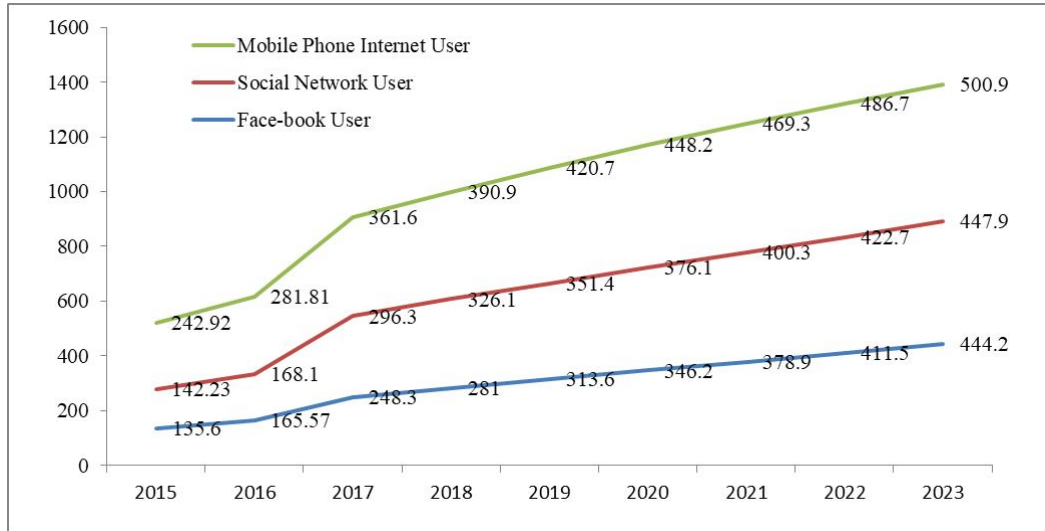
Source: DOT compiled data, TARI & Telecom Statistic India 2019.

Correlation is significant 0.986 at the 0.01 levels (2-tailed) between social network and face-book user. Correlation is significant 0.992 at the 0.01 levels (2-tailed) between face-book and internet subscription rate. Correlation is significant 0.995 at the 0.01 levels (2-tailed) between internet subscription rate and social network subscription rate.

Table No-2: Internet Penetration by States in India as on Dec 2019 (in % age)

Year	% age
All India	36
NCT Delhi	39
J&K, Haryana, Punjab, & HP	49
UP & Uttarakhand	31
Rajasthan	33
Maharashtra & Goa	43
Gujarat	36
Madhya Pradesh	30
Chhattisgarh	30
Assam & North East	38
West Bengal	29
Bihar	28
Jharkhand	26
Odisha	25
Kerala	54
Tamil Naidu	47
Karnataka	39
Andhra Pradesh & Telangana	31
Mean	35.76

Source: DOT compiled data, TARI & Telecom Statistic India 2019.

Chart No-2: Internet Penetration by States in India as on Dec 2019 (in % age)

Internet Penetration by States in India as on Dec 2019 (in % age)
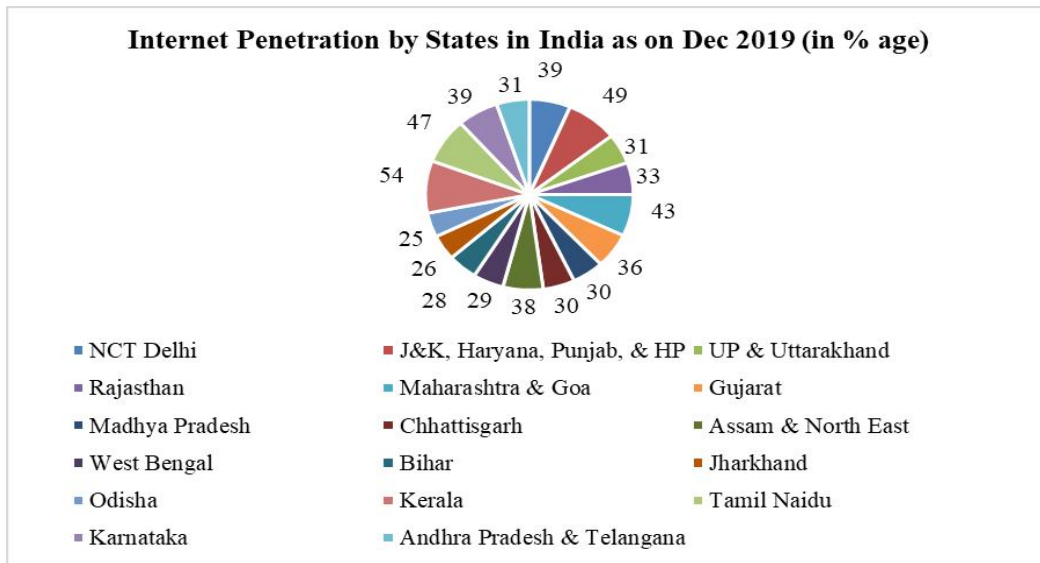
Source: DOT compiled data TARI & Telecom Statistic India 2019.

Table No-2 depicts that on country level internet penetration rate is 36 percent that is not satisfactory. At the state level Kerala has the most elevated internet penetration (54) trailed by J&K, Haryana, Punjab, and HP (49). While Odisha has the lowest internet penetration (25) followed by Jharkhand (26). It shows that advance states have the high internet penetration and backward states have the low internet penetration in India. However, with low (36 percent) interest penetration rate in India is still much heard-room for growth.

Table no-3 depicts that 67 percent male and 33 percent female are using the internet in India. In urban and rural area 62 & 72 percent male and 38 & 28 percent female are using internet in country respectively. The analysis shows that female internet user is half of the male internet user and it bias is more evident in rural India. Study fund that on an average 59.44 male and 40.56 female are using internet in India. It indicates that there is a huge gender disparity in internet usage in India.

Chart No-3: Distribution of Internet user by Gender and by area wise in India as on Dec. 2019 (in % age)

Source: DOT compiled data TARI & Telecom Statistic India 2019.

Chart No-4: Distribution of Internet user by Gender in Big Cities in India as on Dec. 2019 (in % age)

Source: DOT compiled data & Telecom Statistic India 2019.

Table No-3: Distribution of Internet user by Gender in India as on Dec. 2019 (in % age)

	Male	Female	Total
All India	67	33	100
Urban	62	38	100
Rural	72	28	100
Metro 50 Lac plus	59	41	100
Ahmadabad	61	39	100
Bangalore	61	39	100
Chennai	56	44	100
Delhi	60	40	100
Hyderabad	60	40	100
Kolkata	58	42	100
Mumbai	60	40	100
Pune	60	40	100
Mean	59.44	40.56	

Source: DOT compiled data, TARI & Telecom Statistic India 2019.

Chart No-5: Distribution of Internet user by Age group in India as on Dec 2019 (in % age)

Source: DOT compiled data, TARI & Telecom Statistic India 2019.

Table No-4: Distribution of Internet user by Age group in India as on Dec 2019 (in % age)

	Age 12-15	16-19	20-29	30-39	40-49	Above 50	Total
All India	14	18	34	19	9	6	100
Urban	12	14	34	21	11	8	100
Rural	15	21	37	17	7	3	100
Metro 50 Lac plus	10	12	33	22	13	10	100
Ahmadabad	11	13	32	23	14	07	100
Bangalore	05	10	40	25	12	08	100
Chennai	08	11	33	24	13	11	100
Delhi	12	13	30	21	13	11	100
Hyderabad	07	13	36	23	11	10	100
Kolkata	11	13	32	20	14	10	100
Mumbai	10	11	33	22	13	11	100
Pune	09	11	36	23	12	09	100
Total	83	107	300	203	115	87	
Mean	9.22	11.89	33.33	22.56	12.78	9.67	

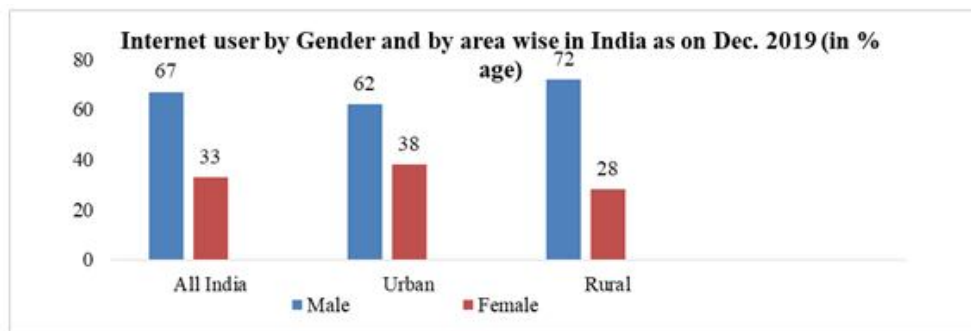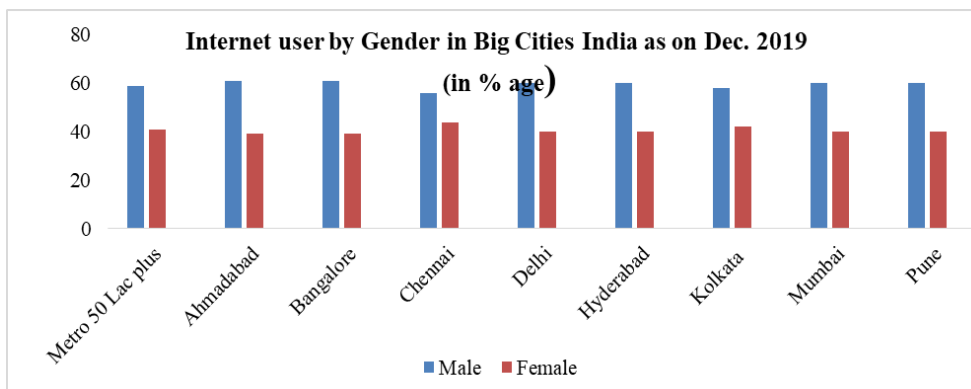**Source:** DOT compiled data & Telecom Statistic India 2019.

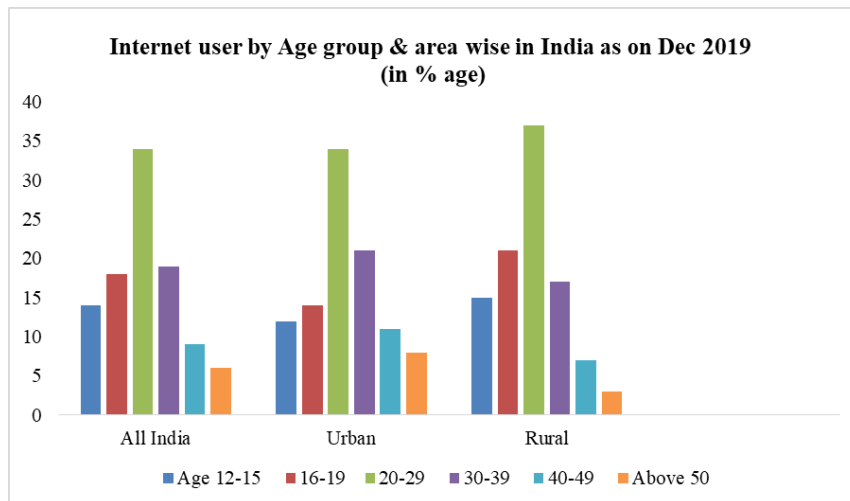Chart No-6: Distribution of Internet user by Age group in Big Cities in India as on Dec 2019 (in %age)

Source: DOT compiled data, TARI & Telecom Statistic India 2019.

Table no 4 shows that highest percentage (33.33) of internet user comes from the age group 20-29 years in all India, urban area and rural areas. While minimum percentage (9.22) of internet user comes from the age group 12-15 years. It shows that 2.22, 11.89, 33.33, 22.26, 12.78 and 9.67 present people who are using internet in India's comes from the age group 12-15, 16-19, 20-29, 30-39, 40-49, and above 50 years respectively.

Chart No-7: Frequency of Internet users in India as on Dec 2019 (in % age)

Source: DOT compiled data, TARI & Telecom Statistic India 2019.

Table No-5: Frequency of Internet users in India as on Dec 2019 (in % age)

	Every Day	4-5 Day in Week	1-3 Day in Week	Once a Week	Less often than Once a Week	Total
All India	65	04	11	07	13	100
Urban	73	04	09	05	09	100
Rural	57	04	13	09	17	100

Source: DOT compiled data, TARI& Telecom Statistics India 2019

Table no 5 shows that 65, 73 & 57 percent internet user in 2019 belong from all India, urban and rural areas that are using internet daily basis respectively. While 4-5 days in a week internet user is 4 percent in all India, urban and rural areas. While once in a week internet user 7, 5 & 9 percent comes from the all India, urban and rural

area respectively. Once in a week internet user percentage is 13, 9 & 17 percent belong from all India, urban and rural area respectively. It shows the areas disparity in India.

Table No-6: Distribution of Internet user by in Big Cities by Cause in India as on Dec 2019 (in % age)

	Social Network/ Cheat	Entertainment	Watching/ reading News	e-mail
Metro 50 Lac plus	92	88	42	42
Ahmadabad	90	88	28	40
Bangalore	91	90	47	47
Chennai	90	86	45	46
Delhi	93	89	42	41
Hyderabad	90	88	32	44
Kolkata	90	85	34	30
Mumbai	93	88	48	42
Pune	95	89	50	41
Total	91.56	87.89	40.89	41.44

Source: DOT compiled data, TARI & Telecom Statistic India 2019.

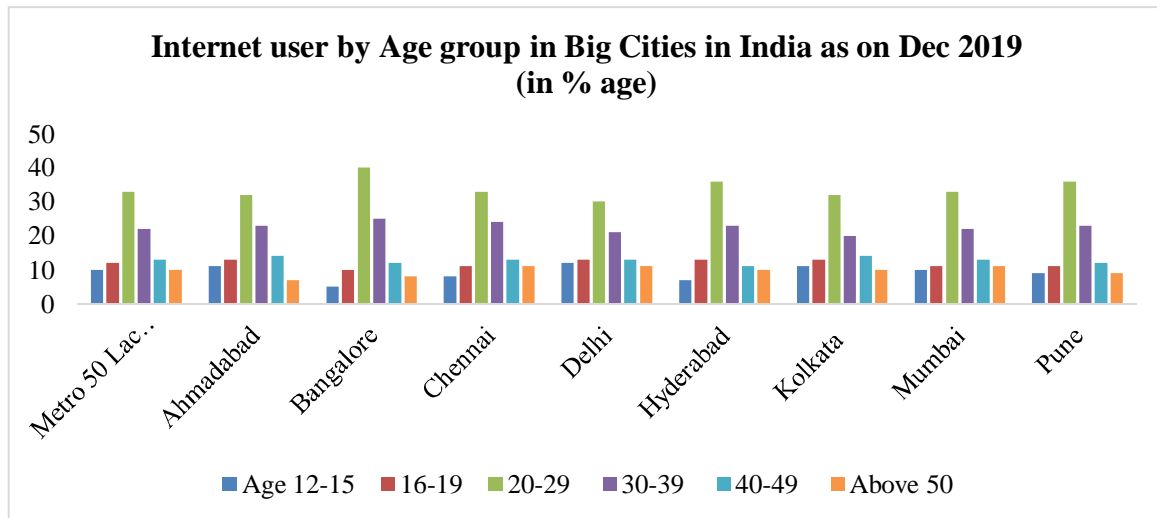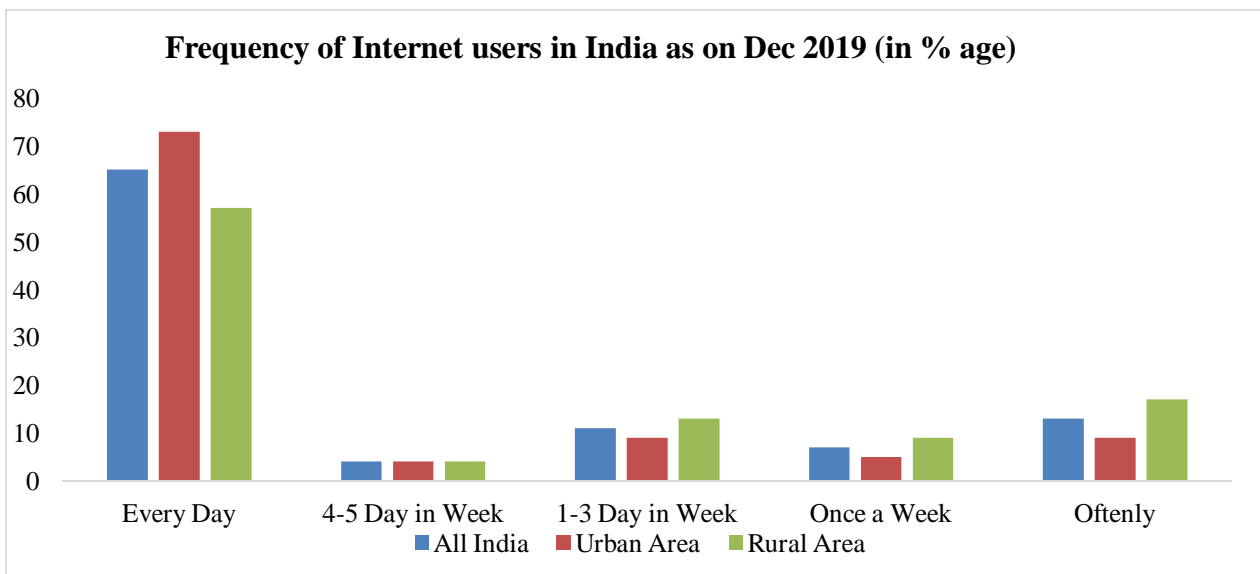Chart No-8: Distribution of Internet user by in Big Cities by Cause in India as on Dec 2019 (in % age)
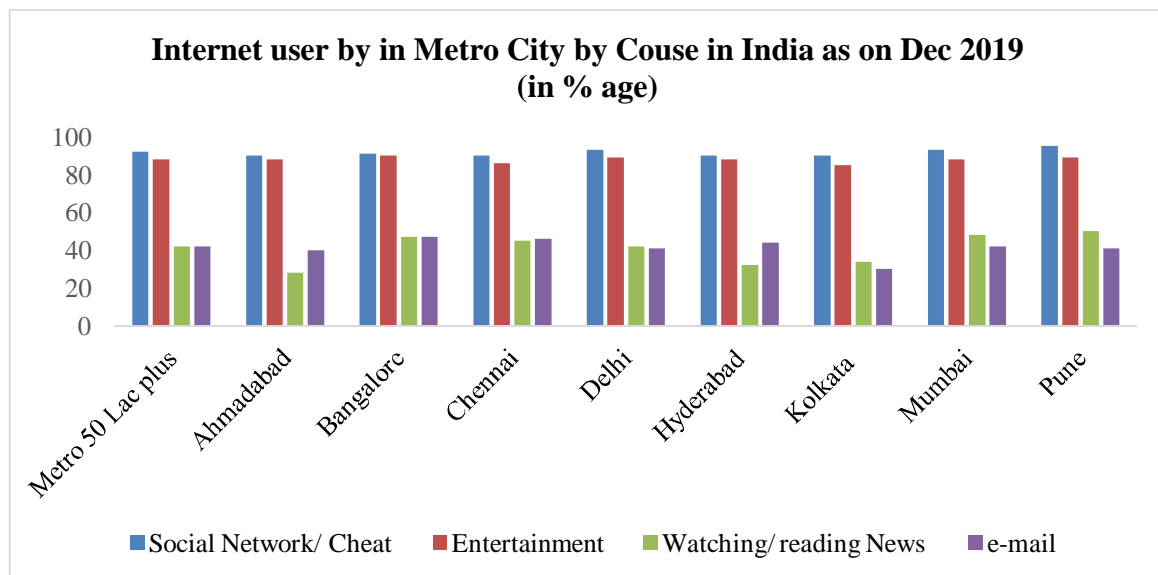
Source: DOT compiled data, TARI & Telecom Statistic India 2019.

Table no 6 depicts that in 2019 in big cities 91.56, 87.89, 40.89 and 41.44 percent people are using the internet for social cheat, entertainment, reading news and e-mail respectively.

RESULT AND DISCUSSION

Hypothesis Testing

H1: Face-book user growth in India is related to Internet user growth.

Correlation is significant 0.992 at the 0.01 levels (2-tailed) between face-book and internet subscription rate. Correlation value shows significant correlation. Hence proving the above, stating that Face-book user growth rate is dependent of Internet growth.

H2: Social Network user growth in India is related to Internet user growth.

Correlation is significant 0.995 at the 0.01 levels (2-tailed) between internet subscription rate and social network subscription rate. Correlation value shows significant correlation. Hence proving the above, stating that Social Network user growth rate is dependent of Internet growth.

H3: Face-book user growth in India is also related to Social Network user growth.

Correlation is significant 0.986 at the 0.01 levels (2-tailed) between social network and face-book user. Correlation value shows significant correlation. Hence proving the above, stating that Social Network user growth rate is also dependent of Face-book user growth.

In view of the correlation examination done above, we have noticed significance relation between specific factors. The results show that mobile internet, face-book and social network users indicating more significance on Internet. As we discussed before in introduction, the internet facility can improve their riches and wellbeing in an appropriate manner. Anyway there is some ailing in web advancement in India. There are different reasons for not utilizing the internet service by people. The reasons are absence of information on Internet, absence of infrastructure and convictions (genuine beliefs). Majority of female can't get to web since they don't have internet connections at home. Improper electricity supply is also a main reason that makes people unable to access internet.

CONCLUSION

The calculated correlation value shows us significant positive correlation between Mobile Internet Subscribers and Face-book & Social Network subscribers. It also shows the same positive vale between Social Network subscribers and Face-book that means there is correlation between them. India is a very fast growing market for the latest technology offerings. It has a huge potential for internet growth. Contribution of rural population and female in rural as well as urban are very less. Demand of such people has also played vital role in the growth of Indian economy during the CRONA-19 and slows down of world economy. As we have observed the upward trend in the growth of internet access rate, creating social networking application in Hindi and regional languages will enable greater growth of India. Getting the Web-series for women, special application for students and teen-ager in their mother tongue is necessary; Internet could be a driver for immense business growth. Work from Home and online teaching and online coaching classes, special apps for students and professionals also play a dominant role in the growth and frequency of internet in India. Indian government as well as IT researchers ought to perceive this as potential and they should require exertion to manufacture applications and good infrastructure to Indian population.

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HEXAVALENT CHROMIUM: TOXIC AND GENOTOXIC EFFECTS AND ITS BIOREMEDIATION STRATEGIES IN TANNERY EFFLUENT

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ABSTRACT

A silver-colored heavy metal Chromium (Cr) which exhibits different oxidation states (-2 to +6) has physical properties like being lustrous, brittle, odorless and, tasteless. Hexavalent chromium [Cr(VI)], considered as harmful, potentially toxic compound of Cr that imparts rigorous hazard to humans besides plants, including the entire environment. Being an extensive metal, it has many industrial uses such as electroplating, leather tanning, pigments etc. It is a major concern to us as it is non-biodegradable in nature, the chemical treatment leads to production of pollutants. Tanneries are very well-known contributors for Cr(VI) pollution in the territory. This situation leads to an immense risk to living organism survival and commotion of ecological balance. Conventional techniques to administer Cr(VI) pollution through physical and chemical methods are expensive, require high maintenance and generate subsequent secondary solid residues which are non-biodegradable in environment and are cumbersome to treat. Consequently, biological treatment is often regarded as the substitute method employing microorganisms for detoxifying Cr(VI) polluted sites in the environment.

Keywords: Bioremediation; hexavalent chromium; tannery; toxicity; trivalent chromium; bioreduction; biotransformation

Graphical abstract
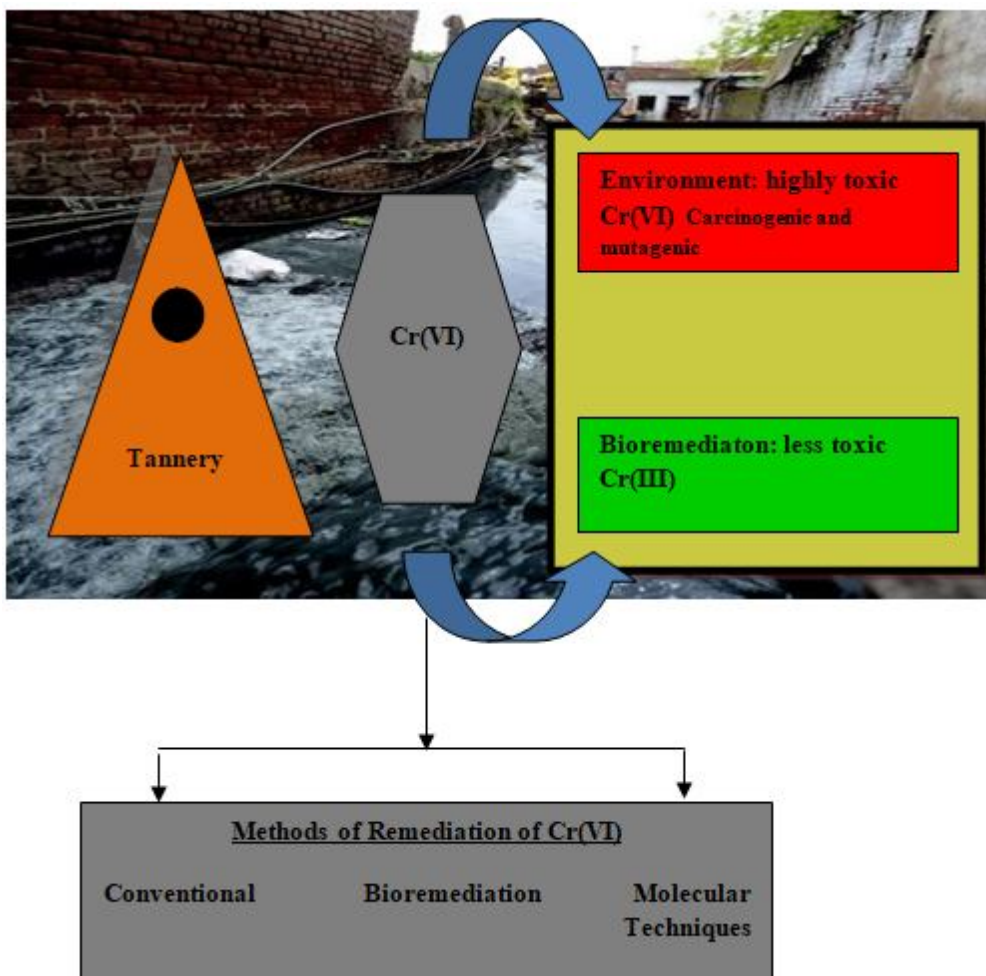
INTRODUCTION

Tanneries construct a severe hazard to the environment by producing a significant amount of toxic heavy metal-containing solid waste. Leather tanning is an essential procedure in tanneries that leads to accumulation of chromium compounds in the environment. Annually, leather tanning upscale huge chromium compound waste

approximately about 600,000 tones, with concentration of Cr ranging between 2,000 and 5,000 mg/l in liquid state (Altaf et al. 2008). Consequently, there is a need to treat tannery waste which is released directly in natural streams, water bodies, adjoining landmasses and sewerage systems need prior removal where Cr concentration limit in drinking water is 0.05 mg/L. Due to such inappropriate dumping, seepage and poor storage, Cr is one of the major intermittent contaminant detected at environmental sites where waste is disposed off (Thacker et al. 2006). Chromium was first discovered by Louis Nicholas Vauquelin as an element ($PbCrO_4$) which along with molybdenum and tungsten belongs to the (VI-B) transition group in modern periodic table. Cr exists in various oxidation state with a variety of range from -2 to +6, but Cr(III) and Cr(VI) are the most universal Cr compounds. Cr(VI) is listed along with the mainstream toxic form of Cr as it has high solubility in water, strong oxidation potential, rapid permeability through bacterial membrane. Cr has also been reported as one of the 17 chemicals that are highly toxic by the Agency for Toxic Substances and Diseases Registry (ATSDR) and is marked by the United States Environmental Protection Agency (U.S.E.P.A) (Maqbool et al. 2015) by the United States Environmental Protection Agency (U.S.E.P.A) (Maqbool et al. 2015) as grade 'A' human carcinogen. Cr(VI), a conventional occupational carcinogen allied with cancer of nasal part, lungs and sinus cancer is also very well reported. Cr(VI) is considered to be occupational carcinogen by National Institute of Occupational Safety and Health (NIOSH). Cr(VI) on release into the environment by tanneries and its exposure causes serious health problems such as allergies related to skin, nausea, diarrhea, vomiting, brain damage, placental accumulation, impaired development of fetus, and premature mammals death (Pattanapipitpaisal et al. 2001. Some other reports have enlightened with its effect on plants such as photosynthetic impairment and death, causes discoloration of leaves, alterations in metabolism, poor seed germination, disrupts genetic processes, root growth becomes stunted.

Fig. 1 Sources of Cr containing compounds in the environment

Earlier studies highlighted the reduction of Cr(VI) with the help of microcosms and ample diversity of bacteria such as *Bacillus* sp. (Camargo et al. 2003), *Pseudomonas* sp., *Exiguobacterium* sp. (Alam and Malik 2008), *Staphylococcus aureus*, *Pediococcus pentosaceus* (Cheung and Gu 2007)*, Pantoea* sp., *Stenotrophomonas maltophilia*, and *Aeromonas* sp.(Alam and Ahmad 2012) under anaerobic and aerobic environment or may be both. The reduction mechanism has been acquired by bacteria in response to Cr contaminated environmental surroundings and stress. The bacteria which are resistant to Cr can perform bio-reductions for long duration in environment (Gadd 2010). In heavy metal-contaminated environment, Cr resistant bacteria endure swift mutations to develop resistance against Cr(VI) which further help them in reduced Cr(VI) uptake passing through the sulfate transport pathway present in the bacterial membranes, due to the structural similarity between these molecules (Silver and Phung 2005), while vulnerable organisms can become insensitive by mutation or by incorporating the genetic information which encodes for the resistance (Kummerer 2004).

Among the various approaches for Cr(VI) bioremediation, microbe oriented bioremediation strategies are proven to be the most useful and effective approach (Ruggaber and Talley 2006). Microbes generally endure several bioremediation techniques like bioaccumulation, enzymatic reduction, formation of biofilm, biosorption and biotransformation. Even though there comes situation when the bioremediation approach adopted by the microbes do not optimally diminish serious chromium contamination due to huge quantity of Cr(VI), at that particular time the strains can be manipulated to optimism. The microbial strains can be enhanced from their wild type by means of genetic engineering techniques, Recombinant DNA Technology (RDT) to manipulate the genes involved actively in bioremediation, due to increased intensity of Cr(VI) contamination (Rao et al. 2010). With the aim to use these techniques to improve the microbial resistance by manipulating the genes and bioremediation capability of microbes in deeply Cr contaminated sites, we need to be on familiar terms with the molecular aspect behind the bioremediation approaches which is utilized by the microbes for the detoxification of heavy metals contamination found in the environment.

Different Source of Cr contamination in environment and methods used for remediation:

In environment there are several sources of Cr contamination by various industries. Some waste effluent a treated before their discharge in the environment but some industries directly drains off their waste effluents without prior treatment. Below is the list (Table I) of industrial sources of Cr in the environment along with the Cr compound which are released and their health effects.

Table I: Sources of Chromium pollution in the environment

Industrial Source	Cr compound released	Health effects
Tanneries	Chromate triacetate, ammonium dichromate, lead dichromate	Edema, chrome ulcer, discoloration of teeth
Paint and ink industries	zinc chromate, barium chromate, potassium dichromate, calcium chromate, lead chromate	Sinus, nasal and lung cancer
Photographic emulsions	Chromium sulphate	DNA destruction, gene alteration
Electroplating industry	Chromic acid	Chromosomal aberrations and ulcers
Wood industry	Chromium trioxide	Perforated nasal septum and respiratory problems
Metallurgy industry	Chromium carbide	Binds to beta chain of hemoglobin producing genotoxic effects
Textile industry	Chromium acetate, chromium nitrate	Alterations in bioelectric and involuntary action of cardiac muscles
Refractory industry	Magnesium chromate, iron chromite	Irritation in the gastric tract
Plastic manufacturing industry	Calcium chromate, sodium chromate, potassium dichromate, barium chromate	Microcytic and hypochromic anemia
Alloy steel industry	Potassium dichromate, ammonium dichromate, sodium chromate, potassium dichromate	Pulmonary congestion, immunological disorders like increased serum immunoglobulin
Corrosion resistant coating industry	Zinc chromate, Chromium trioxide, calcium chromate, barium chromate, strontium chromate, sodium chromate	Reduced WBC count, irritation in the gastric tract and reduced functional activities of spleen lymphocytes

Table II: List of available techniques for Cr detoxification

| Physical	Chemical	Biological
Adsorption	Hydrogen sulfide (H_2S)	Biosorption
Ionic exchange	Sodium dithionite ($Na_2S_2O_4$)	Bio reduction
Membrane filtration	Sodium metabisulfite ($NaHSO_3$)	Bioaccumulation

Electrodialysis	Calcium polysulfide (CaS$_5$)	Biomineralization
Reverse Osmosis	Ferrous sulfate (FeSO$_4$)	Extracellular precipitation
Electro-kinetics	Calcium metabisulfite (CaHSO$_3$)	

Trivalent and hexavalent Cr

Cr(III) is the dominating oxidation state of Cr in the environment also existing in living organisms. Cr(III) is regarded as an vital nutrient required by humans for the normal energy metabolism (Pechova and Pavlata 2007). Chromodulin found in human beings is a Glucose Tolerance Factor (GTF). An adequate daily intake of Cr(III) in adults is of 50-200µg/day according to the National Academy of Sciences. On an average, in United States adults take a predictable 60-80µg/day of Cr(III) in food.

Cr(VI) is the second most stable oxidation state of Cr. In acidic medium Cr(VI) acts as a dominating oxidizing agent. Cr(VI) exists in various forms like dichromate ($Cr_2O_7^{2-}$), hydrochromate ($HCrO_4^-$), and chromate (CrO_4^{2-}) in suspension. Various forms of Cr is dependent on the range of pH. Chromate mainly exists at a neutral or basic pH and when the pH reaches 6-6.2 or further more acidic then Cr(VI) exits as hydrochromate form. Thus Cr (VI) is considered to be soluble in aqueous media and a powerful oxidizing agent. Dichromate ($Cr_2O_7^{2-}$) is the strongest oxidizing species of Cr(VI). Cr(VI) reacts with DNA and other components found in cells resulting in carcinogenic, mutagenic and teratogenic effects and is also found to be exceptionally nauseating as well as fatal for human health. Prolonged contact with Cr(VI) also arise irritation in the eyes and disorders of the respiratory system. Cr(VI) can rapidly and easily pass through the biological membranes and subsequently can react with intercellular nucleic acids and proteins (Mishra and Bhargava 2016). Thus Cr(VI) is reported to have very hazardous and lethal effects on cell organelles, nucleic acids and proteins (Horitsu et al. 1978). Cr(VI) can be reduced to non-toxic Cr(III) but when industries dispose off Cr(VI) containing compounds at higher level and concentration then, this reducing capacity of environment is decreased and thus this toxic Cr(VI) can persist in the environment for a prolonged duration and keep on acting as an environmental noxious waste. The reduction state formula for Cr(VI) is:

$Cr_2O_7^{2-} + 14H_3O^+ + 6e \rightarrow 2Cr_3^+ + 21H_2O$

$Cr_2O_4^{2-} + 4H_2O + 3e \rightarrow Cr(OH)_3 + 5OH^-$
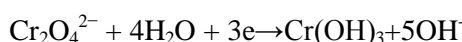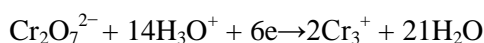
Chromate Reductase

Cr resistant bacteria are very well identified to catalyze the reduction of highly toxic Cr(VI) to less toxic Cr(III) with the help of various chromate reductase enzymes. Chromium resistant bacteria and chromate reductases have already gathered wealthy attention for their impending use in microbe assisted bioremediation. Chromate reductases play a major role in Cr(VI) reduction process which involves electron transfer from donors to Cr(VI) and then generating Reactive Oxygen Species (ROS) simultaneously (Pradhan et al. 2016).

The chromate reductases are divided into three categories on the basis of process involved in electron transfer to Cr(VI) and ROS generation: Tight cromate reductase- these chromate reductases tightly maintains its obligator two electron transfer characteristics. In step one Cr(VI) reduction without redox cycling and generation of ROS is stoichiometric and minimal like YieF of *Escherichia coli* (*E. coli*) (Ackerley et al. 2004), semi-tight chromate reductases like NfsA of *E. coli* and ChrR of *Pseudomonas putida* (*P. putida*) transfers over 25% of the NADH electrons to generate ROS and forms transient Cr(V) during Cr(VI) reduction. The single electron chromate reducer LpDH is involved in generating large and continual amount of Cr(V) and 60% of NADH electron are directly transferred to ROS as reducing Cr(VI). YieF and ChrR are foremost soluble chromate reductases that belongs to the superfamily flavodoxin in which the cofactor is the electron transport chain is flavin mononucleotide (FMN) (Ackerley et al. 2004).

With the development of molecular biology techniques like Reverse Transcription (RT) Polymerase Chain Reaction (PCR), cloning and expression etc. the expression and transcription information regarding bacterial chromate reductases were revealed with respect to Cr(VI) reduction. RT-PCR analysis in *Arthrobacter sp.* FB24 have shown that a chromate resistance gene is specifically induced in response to chromate transcription expression levels of many genes which were in association with the stress level of chromate (Henne et al. 2009).

Table III: Microbes and the genes/ proteins involved in Cr (VI) biodegradation

S.no.	Microorganisms	Genes/proteins involved	Reference
1	*Vibrio harveyi*	Nfs A/ Nfs B	Kwak et al. 2003
2	*Pseudomonas denitrificans*	Fer B	Viti et al. 2014
3	*Pseudomonas aeruginosa*	ChrA	Cervantes and

			Silver1992
4	*Alcaligenes eutrophus*	ChrA	Cervantes and Silver1992
5	*E. coli*	Nem A	Robins et al. 2013
6	*Pseudomonas putida*	YieF ChrR	Barak et al. 2006
7	*Bacillus cereus* SJ1	chromate transport operon, chrIA1	He et al. 2010
8	*Serratia* sp.	ChrT	Deng et al. 2018
9	*Klebsiella pneumonia* and *Raoultella ornithinolytica*	FMN reductase genes	Deng et al. 2018
10	*Enterobacter cloacae* B2-DHA	ChrR and chrA	Aminur et al. 2017
11	*Stenotrophomonas maltophilia*	ChrR	Baldiris et al. 2018
12	*Thermoanaerobacter thermohydrosulfuricus* Strain BSB-33	NAD(H) nitrite reductase Quinone oxidoreductase Superoxide dismutase	Bhattacharya et al. 2015
13	*Shewanella oneidensis*	Mtr A, Mtr B, Mtr C and Omc A	Belchik Belchik et al. 2011
14	*Saccharomyces cerevisiae*	Protein kinase CK2	Johnson et al. 2016

Toxicological effects of Cr(VI)

Cr(VI) can penetrate through skin in the human body and also in animals by dermal absorption, ingestion through food or by inhalation to our respiratory system. Exposure to Cr(VI) that occurs occupationally is generally through simply by dermal contact or inhalation of Cr compounds although the population gets exposed to Cr(VI) by consuming Cr contaminated food and water via food chain. Cr can show its toxicological impact on the site of contact or can also be transported to other parts of human and animal body (Levis and Bianchi 1982). Cr compounds are used in a range of industrial application like in tanneries, refineries, paint and pigment industries, manufacturing of thermonuclear weapons, automobiles, electroplating and metallurgies (Ataabadi et al. 2015; Ilias et al. 2011; Allegretti et al. 2006). Being a heavy metal, Cr does not get degraded easily rather it contaminates the environment by accumulating in it and its compound leads to different toxic effects by entering the food chain. Cr(VI) contamination in the environment and its exposure can cause severe health issues for instance skin rashes and lesions, accumulation in placenta, gastric tract irritation, impairment in development of fetus, decreased spermatogenesis, diarrhea, vomiting, gene mutations, brain damage, premature death in mammals, DNA damage, chromosomal aberrations, nasal and sinus cancer are also associated with Cr exposure through inhalation, perforation and ulceration of nasal septum (Pattanapipitpaisal et al. 2001). Cr(VI) can be easily absorbed by the dermal layer of body and can act directly on the surface of skin. Cr compounds absorbed by the lungs from the circulatory system of the body gets excreted with the help of liver and kidney. Absorption of Cr compounds in kidney occurs through the venal cortex and later on released out of the body during urination (Wedeen and Qian 1991).

Baetjer in 1950, first person to evaluate the literature in the occurence of different types of cancer in the workers who were exposed to Cr compounds (Baetjer 1950). In 1948 Machle and Gregorius conducted the foremost epidemiological study on the lung cancer in the workers who were exposed to Cr compounds in United States in in 1445 workers of seven industries working in the extraction of chromates from ore. It exposed the death percentage resulted due to the respiratory system cancer was 21.8% whereas the predictable percentage was only 1.4% (Machle and Gregorius 1948). After that similar studies were performed in several countries and have observed a close relationship between exposure of chromium and lung cancer (Welling et al. 2015).

Cr(VI) absorption also results in mutagenic and genotoxic effects in living organisms. Genotoxicity mechanism of Cr(VI) is because there is a formation of Pentavalent Chromium [(Cr(V)] and Trivalent Chromium [(Cr(III)] as intracellular reducing products after its permeation in to the cell. Due to structural similarity to sulfate transport channel Cr(VI) is easily taken up by cells (Sugiyama 1992) and is reduced to its less toxic form Cr(III) by cellular reductants like glutathione, flavoenzymes, ascorbic acid, cytochrome P-450, riboflavin and glutathione reductase and then induce genotoxic effects (Bianchi et al. 1983). Cr(VI) also causes chromosomal abnormalities which results in DNA lesions and that is why Cr(VI) is also regarded as a strong clastogen, but itself it does not act as an active species that causes damage in DNA when it enters the cell through the sulfate

transport system as a tetrahedral anion which mimic sulphate and phosphate (Sugden and Steams 2000) and then gets reduced to Cr(III).
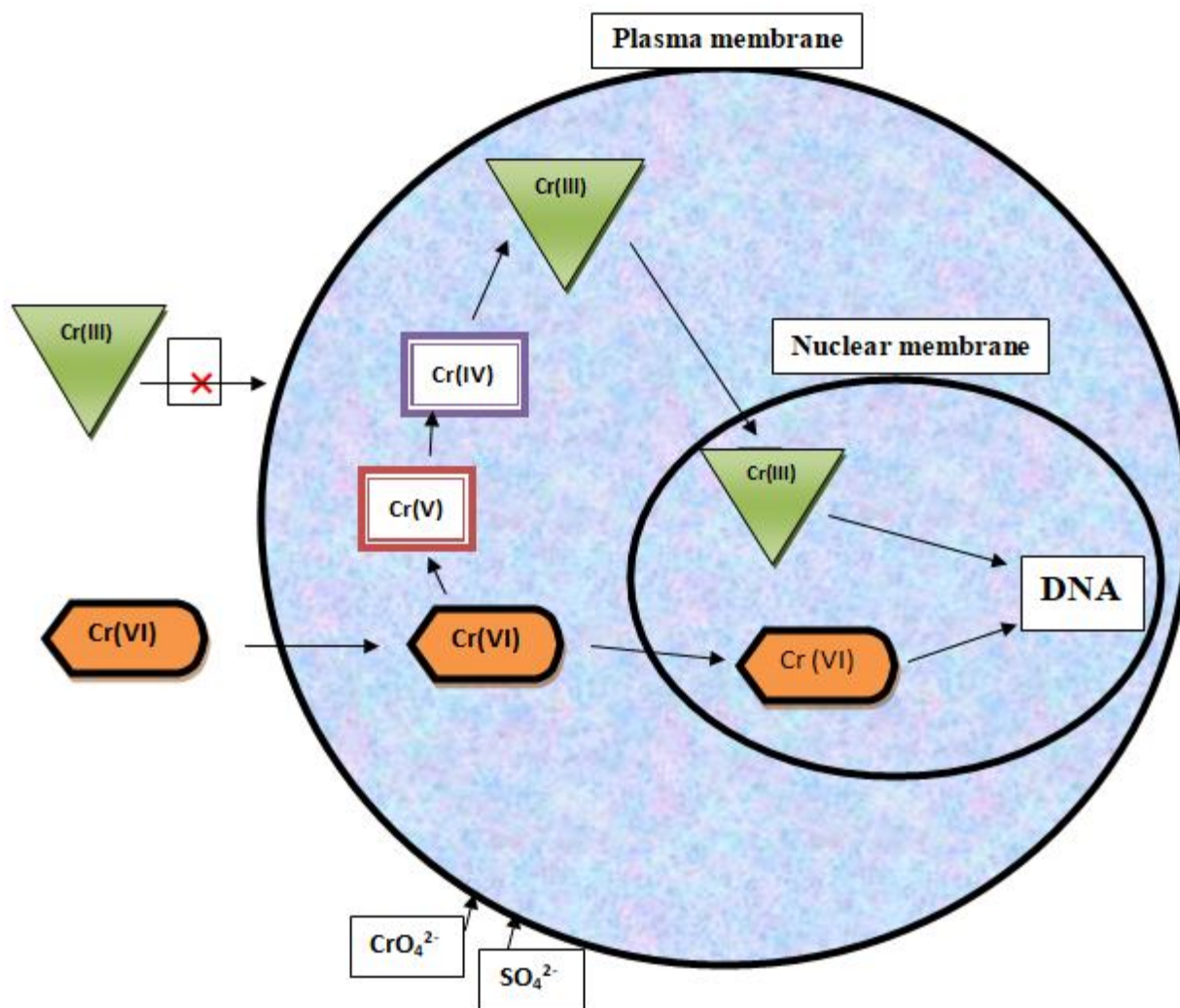

Fig. 2 Flow of Cr compounds through sulfate transport pathway, reduction of highly toxic Cr(VI) to less toxic Cr(III) and their combined effect on DNA

Chromium toxicity in microorganisms and their bioremediation

In the tainted environment, microbes are exposed to highly toxic metals, heavy metals etc. that can either be beneficial or can also be detrimental for their development and growth depending on oxidation state of metal ions and their chemical and physical nature. Due to the activity of Cr in electron transport reaction in biological system, it is an essential nutrient for all living organisms. Microorganism are susceptible to both the excess availability and deficiency of the Cr compounds in the environment (Focardi et al. 2013; Silver 2001). Cr(VI) in microorganisms results in inhibited cell division, elongation of cell, enlarged cells which leads to inhibition of cell growth (Theodotou et al. 1976; Coleman 1988). Cr(VI) exposure to bacteria have shown altered changes in gram negative as well as gram positive bacteria like decrease in pathogenicity and growth inhibition. It is very well known that the transport of chromate ions in bacterial species across the cell membrane is through the sulfate uptake pathway. This transportation procedure via sulfate pathway was first demonstrated in *Salmonella typhimurium* (Dreyfuss 1964; Pardee et al. 1966), *E. coli* (Sirko et al. 1990), *Pseudomonas fluorescence* (Ohtake et al. 1987)[l] and *Alkaligenes eutrophus* (Nies et al. 1989). In biological systems, Cr toxicity is mainly dependent upon the oxidation state of Cr and its cellular localization. The most toxic and harmful form of Cr is Cr(VI) for microorganisms a Cr(VI) can very easily enter the cytoplasm of bacteria and can exert toxic effects rather Cr(III) is considered less toxic as a consequence of its inability to flow through the cell membrane as well as its insolubility in water (Katz and Salem 1993; Verma et al. 2001). It has been observed that free radicals are formed in the cytoplasm as Cr(VI) reduces to lower its oxidation state to Cr(V) which results in genotoxic effects as well as oxidative damage to DNA (Kawanishi et al. 1986; Shi and Dalal 1990). Earlier it has also been reported that Cr(III) can also generate toxic effects as it has the ability to bind to the phosphates found in DNA (Kortenkamp et al. 1991; Plaper et al. 2002). Once Cr(VI) enters the cell it reacts with reducing

compounds like cysteine, FADH2, pentoses, NAD(P)H, and antioxidants such as glutathione and ascorbate and hence produces unstable intermediates like free radicals, Cr(V), and Cr(IV). These intermediates cause oxidative damage to DNA and proteins forming a range of DNA-Protein crosslinks, DNA-DNA crosslinks and DNA lesions (Nickens et al. 2010). However Cr(V), Cr(IV) and free radicals are short lived intermediates but they act as a principal source of Cr(VI) mediated carcinogenesis (Salnikow and Zhitkovich 2008) as well as apoptosis (Ye et al. 1999). Cr(V) is also very well known to generate free radicals to a large extent in chemical solutions, for instance hydroxyl radicals and superoxide which are collectively referred to as Reactive Oxygen Species (ROS). Binding of Cr compounds to active sites of alkaline phosphatase leads to inactivation f the enzyme and hence causes interruption in metabolism of microorganisms. Cr has also been reported to have deleterious effects on bacterial membrane structure and function by ligands binding like cysteinyle and phosphate and histidyl group of proteins.

Physical and chemical techniques are feasible and help metal recuperation, whereas some of the procedures are not that effective and thus cannot be used daily as they are expensive procedures to carry out, requires high energy and cannot synthesize the secondary pollutants. Most of these procedures work efficiently when there is a presence of high concentration of metal. For the promotion of sustainable and economic method for heavy metal removal the disadvantages of physical and chemical methods are needed to be considered. For typical cleanup technologies bioremediation seems to be a high-quality alternative. Bioremediation is the effective procedure which can eliminate heavy metal pollutants from the living bodies. For metal bioremediation the usage of microbial techniques, comprises of great ability to eliminate heavy metals depends upon its less cost and less secondary waste generating technique. Hence, bioremediation is seen to be an effective methodology for eliminating Chromium from polluted environment in an eco-friendly and economical manner.

Involving living life forms for the reduction of toxic compounds metals into less toxic compounds is called bioremediation. A heavy metal reduced in quality or value can be hold back to its unique state apart from any optional contamination. Remediation capacity is shown by life forms involving microorganisms, organisms, yeast, green growth, and plants. However essentially microbes and parasites have been shown very effective in remediation. Bioremediation is the focus due to its less operational cost, less energy requirement, and there are no ecological and well-being risks, moreover it can be reused. Most often microorganism intake metal as a supplement or source to convince their developmental necessity. Non-harmful mixes such as CO_2 or CH_4, water and biomass are formed by catalyst catalyzed pathway, when micro-organisms use these synthetics through a trademark. The important boundaries playing an important role in the success of bioremediation technique are: Contaminants chemical nature and its behavior, amount of moisture needed, its shape, nourishing condition, hydrogeology, and soil pH, polluted site of microbial group, temperature.

Different techniques are opted by microorganisms to live in contaminated sites like bioreduction, bioaccumulation, biosorption and biotransformation for elimination of pollutant into less toxic nature. Bioremediation involves different mechanisms. It has been estimated as better development over traditional processes for elimination of Cr(VI) from contaminated environment. The change of toxic form of metals to less toxic form is termed as bioreduction. Pollutants like heavy metals are positively joined to the dead, inert, or live biomass surface in physiochemical process of biosorption. Certain biomass exhibits characteristics where impurities combine to the membrane surface construction which leads to the formation of a chemical bond. In the same way, bioaccumulation based on metabolism, is an active mechanism operated by respiration energy of living organisms and within the cell the Cr(VI) is mounted. Biotransformation is another expected system for removing the toxicity of Cr(VI) at polluted industrial site. Further characterized as the conversion of Cr(VI) to Cr(III) which involves in biological system for different mechanisms. Wong and Trevors (Wong and Trevors 1988) has reported the toxic effects of Cr in algae and bacteria. In past as well there has been a lot of facts that describes the reduction of Cr(VI) by means of bacteria for instance *Bacillus* sp. (Camargo et al. 2003), *Stenotrophomonas maltophilia*, *Staphylococcus aureus*, *Exiguobacterium* (Alam and Malik 2008), *Pantoea* sp., *Aeromonas* sp. (Alam and Ahmad 2012) under both the conditions anaerobic and aerobic. The detoxification of Cr(VI) to Cr(III) was first reported in *Pseudomonas* sp., the bacterial characteristics which have the capability to reduce and resist Cr(VI) under various conditions was reported in the 1979 (Tebo and Obraztsova 1998; Megharaj et al. 2003).

Table IV: Bioremediation of Cr(VI) using bacteria.

S. no.	Microorganism	Isolation Site	Mechanism of Cr Removal	Reference
1	*Bacillus circulans*	Treated tannery effluent	Bioaccumulation, Biosorption	Srinath et al. 2002

2	*Acinetobacter junii*	Chromite mine	Reduction	Mrudula et. al. 2012
3	*Acinetobacter* sp.	Tannery waste effluent	Reduction	Srivastava et al. 2007
4	*Bacillus megaterium*	Treated tannery waste	Bioaccumulation, Biosorption	Srinath et al. 2002
5	*Bacillus coagulans* (live cells)	Treated tannery effluent	Biosorption	Srinath et al. 2002
6	*Bacillus coagulans* (dead cells)	Treated tannery waste	Biosorption	Srinath et al. 2002
7	*Bravibacterium* sp. (live cells)	Tannery waste effluent	Bioreduction	Faisal and Hasnain 2004
8	*Arthrobacter oxydans*	Basalt rock	Bioreduction	Asatiani et al. 2004
9	*Providencia* sp.	Chromium contaminated chemical industrial site	Bioreduction	Thacker et al.
10	*Bacillus coagulans*	Electroplating waste discharge contaminated soil	Biotransformation	Philip et al. 1998
11	*Pannonibacter phragmitetus*	Steel-alloy industry	Reduction	Chai et al. 2009
12	*Enterococcus casseliflavus*	Tannery waste effluent	Biosorption	Saranraj et al. 2010
13	*Ochrobactrum* sp.	Electroplating industry	Bioreduction	Chen et al. 2016
14	*Corynebacterium Paurometabolum*	Culture collection bank	Bioreduction	Divyasree et al. 2016
15	*Cellulosimicrobium funkei* AR6	Tannery effluent irrigated soil	Biosorption, Bioaccumulation & Reduction	Karthik et al. 2016
16	*Acinetobacter baumannii*	Crude oil	Bioreduction	Sathishkumar et al. 2016
17	*Pseudomonas stutzeri*	Crude oil	Biosorption	Sathishkumar et al. 2016

CONCLUSION

Presently, the pattern of uncontrollable and uneven discharge of waste from industries containing Cr compounds has altered the natural flow in environment and has led to an alarming situation and a major concern. At this point there is a spectacular surge in exploiting bioremediation using microorganisms for the detoxification of the toxic compounds that are contaminating the environment. Apart from bioremediation strategies there exists many physical and chemical methods that are used to detoxify Cr(VI) but unfortunately they results in producing secondary pollutants which are non-biodegradable in environment. Also, the physical and chemical methods are expensive, require high maintenance and are not eco-friendly. Till now the bioremediation technique using microorganism is completely culture-dependent technique and it has been estimated that over 99% of microbes in environment are yet uncultured. Our knowledge is completely laboratory based attained in the unusual and artificial environment of growing microorganisms optimally in artificial media without ecological context.

Now the time has come when we should switch to culture-independent technique like metagenomics. In recent years the metagenomic strategies has been considered as a novel approach in genome analysis. This method can access the potential reservoir of novel chromium reducing genes in both cultured and uncultured microbial communities. Although prolonged, metagenomics is the most powerful approach that offer potential to discover novel genes through the expression of genes from uncultured and unknown bacteria. In this field we can work upon a community of microorganisms rather than exploring just the cultured microbes in the artificial laboratory conditions. Metagenomic strategy basically consists of recovering and understanding the complete metagenomic DNA from a specific environment. Sequencing technologies have also improved in the recent years. These technologies are useful in screening of the uncultured microorganisms by comparing the novel sequences with the already known sequences which can be helpful in understanding the novel genes and

enzymes with opening more potential for industrial application. By exploring novel genes, enzymes, organisms we can gather excess of knowledge regarding the mechanism and genes working upon the reduction of highly toxic Cr(VI) to less toxic forms and can also detect the allelic variations in genes involved in reduction of Cr compounds.

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EXISTENCE RESULT FOR FUZZY SOLUTION FOR NONLINEAR IMPULSIVE FUNCTIONAL NEUTRAL INTEGRODIFFERENTIAL EQUATION IN n -DIMENSIONAL FUZZY VECTOR SPACE

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ABSTRACT

In this paper, we devoted to study the Existence Result for Fuzzy Solution for Nonlinear Impulsive Functional Neutral Integrodifferential Equation in n- dimensional vector space $(\mathbb{E}_{\mathbb{N}})^n$ by using Banach fixed point theorem.

Keywords : Neutral functional integrodifferential equation, fuzzy sets, fuzzy number, fuzzy solution, fixed point.

1. INTRODUCTION

In various fields of engineering and physics, many problems that are related to linear viscoelasticity, nonlinear elasticity have mathematical models and are described by the problems of differential or integral equations or integrodifferential equations. Integrodifferential equations are encountered in many areas of science and technology. Many authors have studied several concepts of fuzzy systems. Diamond and K. Balachandran [1] proved the fuzzy solution for nonlinear functional neutral integrodifferential equations for the following system:

$$\frac{d}{dt}\big(x(t) - \mathfrak{h}(t, x_t)\big) = \mathbb{A}\, x(t) + \int_0^t \mathfrak{f}(t, x_t)dt \, , \qquad t \in \mathbb{J} = [0, \mathbb{T}]$$

$$x(0) = \varphi(t), \tag{1.1}$$

where $x(\cdot)$ is nonempty compact interval-valued functions on $\mathbb{E}^1$. Radhakrishnan, Nagarajan and Narayanamoorthy [2] proved the existence results for the nonlinear first order fuzzy neutral integrodifferential equations. Kwun and Park [3] proved the existence of fuzzy optimal for the nonlinear fuzzy differential system with nonlocal initial condition in $(\mathbb{E}_{\mathbb{N}})^n$ by using Kuhn-Tucker theorems. Fuzzy integrodifferential equations are a field of interest, due to their applicability to the analysis of phenomena with memory where imprecision is inherent. Balasubramaniam and Muralisankar [4] proved the existence and uniqueness of fuzzy solutions for the semilinear fuzzy integrodifferential equation with nonlocal initial condition. They considered the semilinear one-dimensional heat equation on a connected domain (0,1) for material with memory. In one-dimensional fuzzy vector space $(\mathbb{E}_{\mathbb{N}})^n$, Park et al. [5] proved the existence and uniqueness of fuzzy solution for nonlinear functional neutral integrodifferential equations. In [6], Kwun et al. proved the existence and uniqueness of fuzzy solutions for the semilinear fuzzy integrodifferential equations by using successive iteration. In [7], Kwun et al. investigated the continuously initial observability for the semilinear fuzzy integrodifferential equations. Bede and Gal [8] studied almost periodic fuzzy-number-valued functions. Gal and N'Guerekata [9] studied almost automorphic fuzzy-number-valued functions. In this paper, we study the the existence and uniqueness of fuzzy solution for nonlinear functional neutral integrodifferential equations with impulsive condition in n – dimensional :

$$\frac{d}{dt}\big(x_i(t) - \mathfrak{h}(t, x_{i_t})\big) = \mathbb{A}_i x_i(t) + \int_0^t k\Big(t, \mathfrak{s}, x_{i_t}(\mathfrak{s})\Big)d\mathfrak{s} + \mathfrak{f}_i\big(t, x_{i_t}\big), \quad on \; \mathbb{E}_{\mathbb{N}}^i,$$

$$x_i(0) = \varphi(t)_i \tag{1.3}$$

$$\Delta x(t_k) = \mathbb{I}_k\big(x(t_k^-)\big)$$

where $\mathbb{A}_i : [0, \mathbb{T}] \to \mathbb{E}_{\mathbb{N}}^i$ is fuzzy coefficient, $\mathbb{E}_{\mathbb{N}}^i$ is the set of all upper semicontinuously convex fuzzy numbers on $\mathbb{R}$ with $\mathbb{E}_{\mathbb{N}}^i \neq \mathbb{E}_{\mathbb{N}}^i (i \neq j), \mathfrak{f}_i : [0, \mathbb{T}] \times \mathbb{E}_{\mathbb{N}}^i \to \mathbb{E}_{\mathbb{N}}^i$ is a nonlinear regular fuzzy function, $\mathfrak{g}_i : \mathbb{E}_{\mathbb{N}}^i \to \mathbb{E}_{\mathbb{N}}^i$ is a nonlinear continuous function, $\mathfrak{h}_i : [0, \mathbb{T}] \times \mathbb{E}_{\mathbb{N}}^i \to \mathbb{E}_{\mathbb{N}}^i$ is a nonlinear continuous function, $\Delta x(t_k) = x(t_k^+) - x(t_k^-)$ and $\mathbb{I}_k \in \mathbb{C}(\mathbb{E}_n, \mathbb{E}_n)$ are continuous functions. $\mathbb{G}(t)$ is $n \times n$ continuous matrix such that $d\mathbb{G}(t)x_i/dt$ is continuous for $x_i \in \mathbb{E}_{\mathbb{N}}^i$ and $t \in [0, \mathbb{T}]$ with $\|\mathbb{G}(t)\| \leq k, \; k > 0,$ and $x_{0_i} \in \mathbb{E}_{\mathbb{N}}^i$ is initial value. In this paper we study the existence and uniqueness of fuzzy solutions for neutral functional differential equations. Our approach rests on the Banach fixed point theorem. $(\mathbb{E}^n : [0, \mathbb{T}])$.

2. PRELIMINARIES

A fuzzy set of $\mathbb{R}^n$ is a function $u : \mathbb{R}^n \to [0,1]$. For each fuzzy set u, we denote by $[u]^\theta = \{x \in \mathbb{R}^n : u(x) \geq \theta\}$, for any $\theta \in [0,1]$, its θ - level set. Let u, v be fuzzy sets of $\mathbb{R}^n$. It is well known that $[u]^\theta = [v]^\theta$ for each $\theta \in [0,1]$ implies $u = v$.

Let $\mathbb{E}^n$ denote the collection of all fuzzy sets of $\mathbb{R}^n$ that satisfies the following conditions:

1) u is normal, that is, there exists an $x_0 \in \mathbb{R}^n$ such that $u(x_0) = 1$;

2) u is fuzzy convex, that is, $u(\lambda x + (1 - \lambda)y) \geq min\{u(x), u(y)\}$ for any $x, y \in \mathbb{R}^n$,

$0 \leq \lambda \leq 1$;

3) $u(x)$ is upper semicontinuous, that is, $u(x_0) \geq \overline{lim}_{k \to \infty} u(x)$ for any

$x_k \in \mathbb{R}^n$ $(k = 0,1,2,....)$ x_k ,

4) u_0 is compact.

We call $u \in \mathbb{E}^n$ an n - dimension fuzzy number. Wang et al. [10] defined n- dimensional fuzzy vector space and investigated its properties.

For any $u_i \in \mathbb{E}$, $i = 1, 2, \ldots, n$, we call the ordered one-dimension fuzzy number class

$u_1, u_2, \ldots, u_n$ (i.e., the Cartesian product of one-dimension fuzzy number $u_1, u_2, \ldots, u_n$) an n-dimension fuzzy vector, denote it as $\underbrace{u_1, u_2, \ldots, u_n}$, and call the collection of all n –dimension fuzzy vectors (i.e., the Cartesian product $\overline{\mathbb{E} \times \mathbb{E} \times \cdots \times \mathbb{E}}$) n -dimensional fuzzy vector space,

and denote it as $(\mathbb{E})^n$.

Definition 2.1 [10]. If $u \in \mathcal{L}\mathbb{E}^n$, and $[u]^\theta$ is a hyper rectangle, that is, $[u]^\theta$ can be represented by $\prod_{i=1}^n [u_{il}^\theta, u_{ir}^\theta]$, that is $[u_{1l}^\theta, u_{1r}^\theta] \times [u_{2l}^\theta, u_{2r}^\theta] \times \ldots \times [u_{nl}^\theta, u_{nr}^\theta]$, for very $\theta \in [01]$, where $[u_{il}^\theta, u_{ir}^\theta] \in \mathbb{R}$ with $[u_{il}^\theta \leq u_{ir}^\theta]$ when $\theta \in [01], i = 1, 2, \ldots, n$, then we all u is a fuzzy n -cell number. We denote the collection of all fuzzy n-cell numbers by $\mathcal{L}(\mathbb{E}^n)$.

Theorem 2.2 [10]. *For any $u \in \mathcal{L}\mathbb{E}^n$ with $[u]^\theta = \prod_{i=1}^n [u_{1l}^\theta, u_{1r}^\theta]$ ($\theta \in [0,1]$), there exists a unique $(u_1, u_2, \ldots u_n) \in (\mathbb{E})^n$ such that $[u_i]^\theta = [u_{il}^\theta, u_{ir}^\theta]$ ($i = 1, 2, \ldots, n$, and $\theta \in [0,1]$),*

Conversely, for any $(u_1, u_2, \ldots u_n) \in (\mathbb{E})^n$ with $[u_i]^\theta = [u_{il}^\theta, u_{ir}^\theta]$ ($i = 1, 2, \ldots, n$, and $\theta \in [0,1]$), there exists a unique $u \in \mathbb{E}^n$ such that $[u]^\theta = \prod_{i=1}^n [u_{1l}^\theta, u_{1r}^\theta]$ ($\theta \in [0,1]$)

Note 1 [10] Theorem 2.2 indicates that fuzzy u - cell numbers and n - dimension fuzzy vectors an represent each other, so $\mathcal{L}(\mathbb{E}^n)$ and $\mathbb{E}^n$ may be regarded as identity. If $(u_1, u_2, \ldots u_n) \in (\mathbb{E})^n$ is the unique n - dimension fuzzy vector determined by $u \in \mathcal{L}(\mathbb{E}^n)$, then we denote $u = u_1, u_2, \ldots u_n$. Let $(\mathbb{E}_\mathbb{N}^i)^n = \mathbb{E}_\mathbb{N}^1 \times \mathbb{E}_\mathbb{N}^2 \times \ldots \mathbb{E}_\mathbb{N}^n$, $\mathbb{E}_\mathbb{N}^i (i = 1, 2, \times, n)$, . be fuzzy subset of $\mathbb{R}$. Then $(\mathbb{E}_\mathbb{N}^i)^n \subseteq (\mathbb{E})^n$.

Definition 2.3 [9]. The complete metric $d_\mathbb{H}$ on $(\mathbb{E}_\mathbb{N}^i)^n$ is defined by

$d_\mathbb{H}(u, v) = \sup_{0 < \theta \leq 1} d_\mathbb{H}([u]^\theta [v]^\theta)$

$$\sup_{0 < \theta \leq 1} \max_{0 \leq i \leq 1} \{|u_{il}^\theta - v_{il}^\theta|, |u_{ir}^\theta - v_{ir}^\theta|\}$$

For any $u, v \in (\mathbb{E}_\mathbb{N}^i)^n$, which satisfies $d_\mathbb{H}(u + w, v + w) = d_\mathbb{H}(u, v)$.

Definition 2.4. Let $u, v \in \mathbb{C}[0, \mathbb{T}] : (\mathbb{E}_\mathbb{N}^i)^n$, then $\mathbb{H}_1(u, v) = \sup_{0 < t \leq \mathbb{T}} d_\mathbb{H}(u(t), v(t))$

Definition 2.5 [10]. The derivative $x'(t)$ of a fuzzy process $x \in (\mathbb{E}_\mathbb{N}^i)^n$ is defined by

$$x'(t) = \prod_{i=1}^n [(x_{il}^\theta)'(t), (x_{ir}^\theta)'(t)]$$

provided that the equation defines a fuzzy $x'(t) \in (\mathbb{E}_\mathbb{N}^i)^n$

Definition 2.6 [10]. The fuzzy integral $\int_a^b x(t) \, dt, a, b \in [0, \mathbb{T}]$ is defined by

$$[\int_{a}^{b} \mathfrak{x}(t)\, dt]^{\theta} = \prod_{i=1}^{n} [\int_{a}^{b} (\mathfrak{x}_{il}^{\theta})(t)\, dt, \int_{a}^{b} (\mathfrak{x}_{ir}^{\theta})(t)\, dt]$$

provided that the Lebesgue integrals on the right-hand side exist.

Lemma: 1 [2] If $a, b \in (\mathbb{E}_{\mathbb{N}})^{n}$, then for $\theta \in (0,1]$,

$$[a + b]^{\theta} = [\, a_{l}^{\theta} + b_{l}^{\theta}, a_{r}^{\theta} + b_{r}^{\theta}\,]$$

$$[ab]^{\theta} = [\min\{a_{i}^{\theta} b_{i}^{\theta}\}, \max\{a_{i}^{\theta} b_{i}^{\theta}\}], (i, j = l, r)$$

$$[a - b]^{\theta} = [\, a_{l}^{\theta} - b_{l}^{\theta}, a_{r}^{\theta} - b_{r}^{\theta}\,]$$

Lemma: 2 [2] Let $\left[a_{l}^{\theta}, b_{l}^{\theta}\right]$, $0 < \theta \leq 1$, be a given family of nonempty intervals. If

$[a_{l}^{\eta}, b_{l}^{\eta}] \subset [\, a_{l}^{\theta}, b_{l}^{\theta}]$ for all $0 < \theta \leq \eta$

$[\lim_{k \to \infty} a_{l}^{\theta_{k}}, \lim_{k \to \infty} a_{r}^{\alpha_{k}},] = [a_{l}^{\theta}, a_{r}^{\theta}]$,

whenever (θ_{k}) k is a nondecreasing sequence converting to $\theta \in [0,1]$, then the family $[a_{l}^{\theta}, a_{r}^{\theta}]$. $0 < \theta \leq 1$ are the θ - level sets of a fuzzy number $a \in (\mathbb{E}_{\mathbb{N}})^{n}$.

Let $\mathfrak{x}$ be a point in $\mathbb{R}^{n}$ and $\mathbb{A}$ be a nonempty subsets of $\mathbb{R}^{n}$. We define the Hausdroff separation of $\mathbb{B}$ from $\mathbb{A}$ by

$$d(\mathfrak{x}, \mathbb{A}) = \inf\{\|x - a\| : a \in \mathbb{A}\}$$

Now let $\mathbb{A}$ and $\mathbb{B}$ be nonempty subsets of $\mathbb{R}^{n}$. We define the Hausdroff separation of $\mathbb{B}$ from $\mathbb{A}$ by $d_{\mathbb{H}}^{*}(\mathbb{B}, \mathbb{A}) = \sup\{d(b, \mathbb{A}) : b \in \mathbb{B}\}$.

In general,

$$d_{\mathbb{H}}^{*}(\mathbb{A}, \mathbb{B}) \neq d_{\mathbb{H}}^{*}(\mathbb{B}, \mathbb{A})$$

We define the Hausdroff distance between nonempty subsets of $\mathbb{A}$ and $\mathbb{B}$ of $\mathbb{R}^{n}$ by

$$d_{\mathbb{H}}(\mathbb{A}, \mathbb{B}) = \max\{d_{\mathbb{H}}^{*}(\mathbb{A}, \mathbb{B}), d_{\mathbb{H}}^{*}(\mathbb{B}, \mathbb{A})\}$$

This is now symmetric in $\mathbb{A}$ and . Consequently,

1. $d_{\mathbb{H}}(\mathbb{A}, \mathbb{B}) \geq 0$ with $d_{\mathbb{H}}(\mathbb{A}, \mathbb{B}) = 0$ if and only if $\overline{\mathbb{A}} = \overline{\mathbb{B}}$;

2. $d(\mathbb{A}, \mathbb{B}) = d(\mathbb{B}, \mathbb{A})$;

3. $d_{\mathbb{H}}(\mathbb{A}, \mathbb{B}) \leq d_{\mathbb{H}}(\mathbb{A}, \mathbb{C}) + d_{\mathbb{H}}(\mathbb{C}, \mathbb{B})$;

for any nonempty subsets of $\mathbb{A}$, $\mathbb{B}$ and C of $\mathbb{R}^{n}$. The Hausdroff distance is a metric, the Hausdroff metric.

The supremum metric d_{∞} on $\mathbb{E}^{n}$ is defined by

$d_{\infty}(\mathfrak{x}, \mathfrak{y}) = \sup\{d_{\mathbb{H}}([\mathfrak{x}]^{\theta}, [\mathfrak{y}]^{\theta}) : \theta \in (0,1]\}$ for all $\mathfrak{x}, \mathfrak{y} \in \mathbb{E}^{n}$

and θ is obviously metric on E^{n}.

The supremum metric $\mathbb{H}_{1}$ on $\mathbb{C}(\mathbb{J}, \mathbb{E}^{n})$ is defined by

$\mathbb{H}_{1}(\mathfrak{x}, \mathfrak{y}) = sup\{d_{\infty}(\mathfrak{x}(t), \mathfrak{y}(t) : t \in \mathbb{J}, for\ all\ \mathfrak{x}, \mathfrak{y} \in \mathbb{C}(\mathbb{J} : \mathbb{E}^{n})\}$.

3. EXISTENCE AND UNIQUENESS
In this section we consider the existence and uniqueness of the fuzzy solution for (1.3). We define

$\mathbb{A} = (\mathbb{A}_{1}, \mathbb{A}_{2}, \dots, \mathbb{A}_{n}), \mathfrak{x} = (\mathfrak{x}_{1}, \mathfrak{x}_{2}, \dots, \mathfrak{x}_{n}), \mathfrak{f} = (\mathfrak{f}_{1}, \mathfrak{f}_{2}, \dots, \mathfrak{f}_{n}), \mathfrak{u} = (\mathfrak{u}_{1}, \mathfrak{u}_{2}, \dots, \mathfrak{u}_{n}), \mathfrak{y} = (\mathfrak{y}_{1}, \mathfrak{y}_{2}, \dots, \mathfrak{y}_{n})$,
(3.1)

Then $\mathbb{A}, \mathfrak{x}, \mathfrak{f}, \mathfrak{y} \in (\mathbb{E}_{\mathbb{N}}^{i})^{n}$ Instead of equation, we consider the following fuzzy integrodifferential equations in $(\mathbb{E}_{\mathbb{N}}^{i})^{n}$:

$\frac{d}{dt}\left(\mathfrak{x}(t) - \mathfrak{y}(t, \mathfrak{x}_{s}(t))\right) = \mathbb{A}\mathfrak{x}(t) + \int_{0}^{t} k(t, s, \mathfrak{x}_{t}(s))ds + + \mathfrak{f}(t, \mathfrak{x}_{s}(t))$, $t \in \mathbb{J} = [0, \mathbb{T}]$ (3.2)

$\mathfrak{x}(0) = \varphi(t)$ (3.3)

$$\Delta\big(\mathfrak{x}(t_k)\big) = \mathbb{I}_k\big(\mathfrak{x}(t_k^-)\big) \qquad\qquad (3.4)$$

where $\mathbb{A}\colon \mathbb{J} \to (\mathbb{E}_\mathbb{N}^i)^n$ is fuzzy coefficient, $\mathbb{E}_\mathbb{N}^i$ is the fuzzy set of all upper semicontinuous, convex, normal fuzzy numbers on $\mathbb{R}$ with $\mathbb{E}_\mathbb{N}^i \ne \mathbb{E}_\mathbb{N}^i$, $\mathfrak{f}\colon \mathbb{J} \times (\mathbb{E}_\mathbb{N}^i)^n \to (\mathbb{E}_\mathbb{N}^i)^n$, $\mathfrak{h}\colon \mathbb{J} \times (\mathbb{E}_\mathbb{N}^i)^n \to (\mathbb{E}_\mathbb{N}^i)^n$, are all nonlinear continuous functions are all satisfies the global Lipschitz conditions,

(H1) The nonhomomogeneous term $\mathfrak{f}\colon \mathbb{J} \times \mathbb{E}_\mathbb{N} \to \mathbb{E}_\mathbb{N}$ is continuous function and satisfies a global Libschitz

$$d_\mathbb{H}\left(\left[\mathfrak{f}\big(\mathfrak{s},\mathfrak{x}_\mathfrak{s}(\mathfrak{s})\big)\right]^\theta, \left[\mathfrak{f}\big(\mathfrak{s},\mathfrak{y}_\mathfrak{s}(\mathfrak{s})\big)\right]^\theta\right) \le \delta_\mathfrak{f} d_\mathbb{H}\big([\mathfrak{x}_\mathfrak{s}(\mathfrak{s})]^\theta, [\mathfrak{y}_\mathfrak{s}(\mathfrak{s})]^\theta\big)$$

(H2) The nonlinear function $\mathfrak{h}\colon \mathbb{J} \times \mathbb{E}_\mathbb{N} \to \mathbb{E}_\mathbb{N}$ is continuous function and satisfies the global Lipschitz condition

$$d_\mathbb{H}\left(\left[\mathfrak{h}\big(\mathfrak{s},\mathfrak{x}_\mathfrak{s}(\cdot)\big)\right]^\theta, \left[\mathfrak{h}\big(\mathfrak{s},\mathfrak{y}_\mathfrak{s}(\cdot)\big)\right]^\theta\right) \le \delta_\mathfrak{h} d_\mathbb{H}\big([\mathfrak{x}_\mathfrak{s}(\cdot)]^\theta, [\mathfrak{y}_\mathfrak{s}(\cdot)]^\theta\big)$$

(H3) The nonhomomogeneous term $k\colon \mathbb{J} \times \mathbb{J} \times \mathbb{E}_\mathbb{N} \to \mathbb{E}_\mathbb{N}$ is continuous function and satisfies a global Libschitz

$$d_\mathbb{H}\left(\left[k\big(\mathfrak{s},\mathfrak{x}_\mathfrak{s}(\mathfrak{s})\big)\right]^\theta, \left[k\big(\mathfrak{s},\mathfrak{y}_\mathfrak{s}(\mathfrak{s})\big)\right]^\theta\right) \le \delta_k d_\mathbb{H}\big([\mathfrak{x}_\mathfrak{s}(\mathfrak{s})]^\theta, [\mathfrak{y}_\mathfrak{s}(\mathfrak{s})]^\theta\big)$$

(H4) The nonhomomogeneous $\Delta\mathfrak{x}(t_k) = \mathfrak{x}(t_k^+) - \mathfrak{x}(t_k^-)$ and $\mathbb{I}_k \in \mathbb{C}(\mathbb{E}_\mathbb{N}, \mathbb{E}_\mathbb{N})$ is continuous function and satisfies a global Libschitz

$$d_\mathbb{H}\left(\left[\mathbb{I}_k\big(\mathfrak{s},\mathfrak{x}_\mathfrak{s}(t)\big)\right]^\theta, \left[\mathbb{I}_k\big(\mathfrak{s},\mathfrak{y}_\mathfrak{s}(t)\big)\right]^\theta\right) \le \delta_\mathbb{I} d_\mathbb{H}\big([\mathfrak{x}_\mathfrak{s}(t)]^\theta, [\mathfrak{y}_\mathfrak{s}(t)]^\theta\big)$$

for all $\mathfrak{x}(\cdot), \mathcal{y}(\cdot) \in (\mathbb{E}_\mathbb{N}^i)^n$ and $\delta_\mathfrak{f}, \delta_\mathfrak{h}, \delta_k$ and $\delta_\mathbb{I}$ are positive.

Definition 3.1. The fuzzy process $\mathfrak{x}\colon \mathbb{J} \to (\mathbb{E}_\mathbb{N}^i)^n$ with θ - level set $[\mathfrak{x}(\mathfrak{s})]^\theta = \prod_{i=1}^n [\mathfrak{x}_i]^\theta = \prod_{i=1}^n [\mathfrak{x}_{il}{}^\theta, \mathfrak{x}_{ir}{}^\theta]$ is a fuzzy solutions of the equations without

nonhomogeneous term if and only if

$$\big(\mathfrak{x}_{ik}^\theta\big)'(t) = \min \mathbb{A}_{ik}^\theta \left[\mathfrak{x}_{ik}^\theta(t) + \int_0^t \mathbb{S}(t-\mathfrak{s})\mathfrak{x}_{ik}^\theta(\mathfrak{s})\eth\mathfrak{s}\right]\colon k = \mathrm{I}, \mathrm{r},$$

$$\big(\mathfrak{x}_{ik}^\theta\big)'(t) = \min \mathbb{A}_{ik}^\theta \left[\mathfrak{x}_{ik}^\theta(t) + \int_0^t \mathbb{S}(t-\mathfrak{s})\mathfrak{x}_{ik}^\theta(\mathfrak{s})\eth\mathfrak{s}\right]\colon k = \mathrm{I}, \mathrm{r},$$

For the sequel, we need the following assumptions:

(H5) $\mathbb{S}(t)$ is the fuzzy number satisfying for $\mathfrak{y} \in (\mathbb{E}_\mathbb{N}^i)^n$, $\big(\frac{\eth}{\eth t}\big)\mathbb{S}(t)\mathfrak{y} \in \mathbb{C}^1\big(\mathbb{J}\colon (\mathbb{E}_\mathbb{N}^i)^n\big) \cap C\big(\mathbb{J}\colon (\mathbb{E}_\mathbb{N}^i)^n\big)$ the equation

$$\left(\frac{d}{dt}\right)\mathbb{S}(t)\mathfrak{y} = \mathbb{A}\left[\mathbb{S}(t)\mathfrak{y} + \int_0^t \mathbb{S}(t-\mathfrak{s})\,\mathbb{S}(\mathfrak{s})\mathfrak{y}\,ds\right]$$

$$= \mathbb{S}(t)\mathbb{A}\mathfrak{y}\int_0^t \mathbb{S}(t-\mathfrak{s})\mathbb{A}\,\mathbb{S}(\mathfrak{s})\mathfrak{y}\,ds, \quad t \in \mathbb{J}, \qquad\qquad (3.7)$$

Where

$$[\mathbb{S}(t)]^\theta = \prod_{i=1}^n [\mathbb{S}_i(t)]^\theta = \prod_{i=1}^n [\mathbb{S}_{il}^\theta(t), \mathbb{S}_{il}^\theta(t)], \qquad\qquad (3.8)$$

and $\mathbb{S}_{ij}^\theta(t)$ $(j = \mathrm{I}, \mathrm{r})$ is continuous with $\big|\mathbb{S}_{ij}^\theta(t)\big| \le c, c > 0$, for all $t \in \mathbb{J} = [0, \mathbb{T}]$

(H6) $c\{\mathfrak{h}(1 + \mathbb{T} + c\mathbb{T}) + k\mathbb{T}(1 + c\mathbb{T})\} < 1$.

In view of Definition 3.1 and (H5), 3.3 can be expressed as

$$\mathfrak{x}(t) = \mathbb{S}(t)[\varphi(t) - \mathfrak{h}(0, \varphi(t))] + \mathfrak{h}(t - \mathfrak{x}_\mathfrak{s}(t)) + \int_0^t \mathbb{S}(t-\mathfrak{s})\,\mathbb{A}\mathfrak{h}\big(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})\big)ds + \int_0^t \mathbb{S}(t-\mathfrak{s})\,\mathfrak{f}\big(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})\big)ds$$

$$+ \sum_{0 < t_k < t} \mathbb{S}(t - t_k)\,\mathbb{I}_k\big(\mathfrak{x}(t_k^-)\big),$$

$$\mathfrak{x}(0) = \varphi(t). \qquad\qquad (3.9)$$

Theorem 3.2. *Let* $\mathbb{T} > 0$. If hypotheses (H5) - (H6) are hold, then for every $\varphi(t) \in (\mathbb{E}_\mathbb{N}^i)^n$, (3.9) have a unique fuzzy solution $\mathfrak{x} \in \mathbb{C}([0, \mathbb{T}]\colon (\mathbb{E}_\mathbb{N}^i)^n$.

Proof. For each $\mathfrak{x}_\mathfrak{s}(t) \in (\mathbb{E}^i_\mathbb{N})^\mathfrak{n}$ and $t \in \mathbb{J} = [0, \mathbb{T}]$, define $\mathbb{G}_0 \mathfrak{x}_\mathfrak{s}(t) \in (\mathbb{E}^i_\mathbb{N})^\mathfrak{n}$ by

$$\mathbb{G}_0 \mathfrak{x}_\mathfrak{s}(t) = \mathbb{S}(t)[\varphi(t) - \mathfrak{h}(0, \varphi(t))] + \mathfrak{h}(t - \mathfrak{x}_\mathfrak{s}(t)) + \int_0^t \mathbb{S}(t-\mathfrak{s})\, \mathbb{A}\mathfrak{h}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s}))d\mathfrak{s} + \int_0^t \mathbb{S}(t-\mathfrak{s})\, \mathfrak{f}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s}))d\mathfrak{s}$$

$$+ \sum_{0 < t_k < t} \mathbb{S}(t - t_k)\, \mathbb{I}_k(\mathfrak{x}(t_k^-)) \qquad t \in \mathbb{J} = [0, \mathbb{T}]$$

Thus, $\mathbb{G}_0 \mathfrak{x}_\mathfrak{s} : [0, \mathbb{T}] \to (\mathbb{E}^i_\mathbb{N})^\mathfrak{n}$ is continuous, so $\mathbb{G}_0$ is a mapping from $\mathbb{C}([0, \mathbb{T}] : (\mathbb{E}^i_\mathbb{N})^\mathfrak{n}$ into itself. By Definitions 2.3 and 2.4, some properties of $\mathfrak{d}_\mathbb{H}$, and inequalities (3.4) and (3.5), we have following inequalities. For $\mathfrak{x}, \mathfrak{y} \in \mathbb{C}([0, \mathbb{T}] : (\mathbb{E}^i_\mathbb{N})^\mathfrak{n}$

$$d_\mathbb{H}([(\mathbb{G}_0 \mathfrak{x}_\mathfrak{s}(t)]^\theta, [[(\mathbb{G}_0 \mathfrak{y}_\mathfrak{s}(t)]^\theta)$$

$$= d_\mathbb{H}\Bigg(\Bigg[\mathbb{S}(t)[\varphi(t) - \mathfrak{h}(0, \varphi(t))] + \mathfrak{h}(t - \mathfrak{x}_\mathfrak{s}(t)) + \int_0^t \mathbb{S}(t-\mathfrak{s})\, \mathbb{A}\mathfrak{h}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s}))d\mathfrak{s} + \int_0^t \mathbb{S}(t-\mathfrak{s})\, \mathfrak{f}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s}))d\mathfrak{s}$$

$$+ \sum_{0 < t_k < t} \mathbb{S}(t - t_k)\, \mathbb{I}_k(\mathfrak{x}(t_k^-))\Bigg]^\theta,$$

$$\Bigg[\mathbb{S}(t)[\varphi(t) - \mathfrak{h}(0, \varphi(t))] + \mathfrak{h}(t - \mathfrak{y}_\mathfrak{s}(t)) + \int_0^t \mathbb{S}(t-\mathfrak{s})\, \mathbb{A}\mathfrak{h}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))d\mathfrak{s} + \int_0^t \mathbb{S}(t-\mathfrak{s})\, \mathfrak{f}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))d\mathfrak{s}$$

$$+ \sum_{0 < t_k < t} \mathbb{S}(t - t_k)\, \mathbb{I}_k(\mathfrak{y}(t_k^-))\Bigg]^\theta\Bigg)$$

$$= \max_{1 \le i \le n}\Bigg\{\Big|\mathbb{S}^\theta_{i\mathfrak{l}}(t)\Big(\varphi(t) - \mathfrak{h}^\theta_{i\mathfrak{l}}(0, \varphi(t))\Big) + \mathfrak{h}^\theta_{i\mathfrak{l}}(t - \mathfrak{x}_\mathfrak{s}(t)) - \mathfrak{h}^\theta_{i\mathfrak{l}}(t - \mathfrak{y}_\mathfrak{s}(t))\Big|, \Big|\mathbb{S}^\theta_{i\mathfrak{r}}(t)\Big(\varphi(t) - \mathfrak{h}^\theta_{i\mathfrak{r}}(0, \varphi(t))\Big)$$

$$+ \mathfrak{h}^\theta_{i\mathfrak{r}}(t - \mathfrak{x}_\mathfrak{s}(t)) - \mathfrak{h}^\theta_{i\mathfrak{r}}(t - \mathfrak{y}_\mathfrak{s}(t))\Big|\Bigg\}$$

$$+ \int_0^t \max_{1 \le i \le n}\Big\{\big|\mathbb{S}^\theta_{i\mathfrak{l}}(t-\mathfrak{s})\big|\big|\mathbb{A}^\theta_{i\mathfrak{l}}\big|\big|\mathfrak{h}^\theta_{i\mathfrak{l}}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})) - \mathfrak{h}^\theta_{i\mathfrak{l}}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))\big|, \big|\mathbb{S}^\theta_{i\mathfrak{r}}(t-\mathfrak{s})\big|\big|\mathbb{A}^\theta_{i\mathfrak{r}}\big|\big|\mathfrak{h}^\theta_{i\mathfrak{r}}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})) - \mathfrak{h}^\theta_{i\mathfrak{r}}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))\big|\Big\} d\mathfrak{s}$$

$$+ \int_0^t \max_{1 \le i \le n}\Big\{\big|\mathbb{S}^\theta_{i\mathfrak{l}}(t-\mathfrak{s})\big|\big|\mathfrak{f}^\theta_{i\mathfrak{l}}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})) - \mathfrak{f}^\theta_{i\mathfrak{l}}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))\big|, \big|\mathbb{S}^\theta_{i\mathfrak{r}}(t-\mathfrak{s})\big|\big|\mathfrak{f}^\theta_{i\mathfrak{r}}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})) - \mathfrak{f}^\theta_{i\mathfrak{r}}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))\big|\Big\} d\mathfrak{s}$$

$$+ \max_{1 \le i \le n}\Bigg\{\sum_{0 < t_k < t} \big|\mathbb{S}^\theta_{i\mathfrak{l}}(t - t_k)\big|\big|(\mathbb{I}_k)^\theta_{i\mathfrak{l}}(\mathfrak{x}(t_k^-)) - (\mathbb{I}_k)^\theta_{i\mathfrak{l}}(\mathfrak{y}(t_k^-))\big|, \sum_{0 < t_k < t} \big|\mathbb{S}^\theta_{i\mathfrak{r}}(t - t_k)\big|\big|(\mathbb{I}_k)^\theta_{i\mathfrak{r}}(\mathfrak{x}(t_k^-)) - (\mathbb{I}_k)^\theta_{i\mathfrak{r}}(\mathfrak{y}(t_k^-))\big|\Bigg\}$$

$$\le \delta_\mathfrak{s} \max_{1 \le i \le n}\Bigg\{\Big|\Big(\varphi(t) - \mathfrak{h}^\theta_{i\mathfrak{l}}(0, \varphi(t))\Big) + \mathfrak{h}^\theta_{i\mathfrak{l}}(t - \mathfrak{x}_\mathfrak{s}(t)) - \mathfrak{h}^\theta_{i\mathfrak{l}}(t - \mathfrak{y}_\mathfrak{s}(t))\Big|, \Big|\Big(\varphi(t) - \qquad \mathfrak{h}^\theta_{i\mathfrak{r}}(0, \varphi(t))\Big)$$

$$+ \mathfrak{h}^\theta_{i\mathfrak{r}}(t - \mathfrak{x}_\mathfrak{s}(t)) - \mathfrak{h}^\theta_{i\mathfrak{r}}(t - \mathfrak{y}_\mathfrak{s}(t))\Big|\Bigg\}$$

$$+ \mathbb{M}_\mathbb{A}\delta_\mathfrak{s} \int_0^t \max_{1 \le i \le n}\Big\{\big|\mathfrak{h}^\theta_{i\mathfrak{l}}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})) - \mathfrak{h}^\theta_{i\mathfrak{l}}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))\big|, \big|\mathfrak{h}^\theta_{i\mathfrak{r}}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})) - \mathfrak{h}^\theta_{i\mathfrak{r}}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))\big|\Big\} d\mathfrak{s}$$

$$+ \delta_\mathfrak{s} \int_0^t \max_{1 \le i \le n}\Big\{\big|\mathfrak{f}^\theta_{i\mathfrak{l}}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})) - \mathfrak{f}^\theta_{i\mathfrak{l}}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))\big|, \big|\mathfrak{f}^\theta_{i\mathfrak{r}}(\mathfrak{s}, \mathfrak{x}_\mathfrak{s}(\mathfrak{s})) - \mathfrak{f}^\theta_{i\mathfrak{r}}(\mathfrak{s}, \mathfrak{y}_\mathfrak{s}(\mathfrak{s}))\big|\Big\} d\mathfrak{s}$$

$$+ \delta_\mathfrak{s} \max_{1 \le i \le n}\Bigg\{\sum_{0 < t_k < t} \big|(\mathbb{I}_k)^\theta_{i\mathfrak{l}}(\mathfrak{x}(t_k^-)) - (\mathbb{I}_k)^\theta_{i\mathfrak{l}}(\mathfrak{y}(t_k^-))\big|, \sum_{0 < t_k < t} \big|(\mathbb{I}_k)^\theta_{i\mathfrak{r}}(\mathfrak{x}(t_k^-)) - (\mathbb{I}_k)^\theta_{i\mathfrak{r}}(\mathfrak{y}(t_k^-))\big|\Bigg\}$$

$$\leq \delta_{\mathsf{s}}\, d_{\mathbb{H}}\left(\left[\left(\varphi(t) - \mathfrak{h}(0, \varphi(t)) + \mathfrak{h}(t - \mathfrak{x}_{\mathsf{s}}(t))\right), \left(\varphi(t) - \mathfrak{h}(0, \varphi(t)) + \mathfrak{h}(t - \mathfrak{y}_{\mathsf{s}}(t))\right)\right]^{\theta}\right)$$

$$+ \mathbb{M}_{\mathbb{A}}\delta_{\mathsf{s}}\int_0^t \eth_{\mathbb{H}}\left(\left[\mathfrak{h}(\mathsf{s}, \mathfrak{x}_{\mathsf{s}}(\mathsf{s})), \mathfrak{h}(\mathsf{s}, \mathfrak{y}_{\mathsf{s}}(\mathsf{s}))\right]^{\theta}\right) d\mathsf{s}$$

$$+\delta_{\mathsf{s}}\int_0^t d_{\mathbb{H}}\left(\left[\mathfrak{f}(\mathsf{s}, \mathfrak{x}_{\mathsf{s}}(\mathsf{s})), \mathfrak{f}(\mathsf{s}, \mathfrak{y}_{\mathsf{s}}(\mathsf{s}))\right]^{\theta}\right) d\mathsf{s}+ \qquad\qquad +\delta_{\mathsf{s}}\sum_{0<t_k<t} d_{\mathbb{H}}\left(\left[(\mathbb{I}_k)^{\theta}_{\text{il}}\left(\mathfrak{x}(t_k^-)\right), (\mathbb{I}_k)^{\theta}_{\text{il}}\left(\mathfrak{y}(t_k^-)\right)\right]^{\theta}\right)$$

$$\leq (\delta_{\mathsf{s}}\delta_{\mathfrak{h}})\, d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right) + \mathbb{M}_{\mathbb{A}}\delta_{\mathsf{s}}\delta_{\mathfrak{h}}\int_0^t d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right) d\mathsf{s}$$

$$+\delta_{\mathsf{s}}\delta_{\mathfrak{f}}\int_0^t d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right) d\mathsf{s} + \delta_{\mathsf{s}}\delta_{\mathbb{I}}\, d_{\mathbb{H}}[\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}$$

$$\leq \delta_{\mathsf{s}}(\delta_{\mathfrak{h}} + \delta_{\mathbb{I}})\, d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right) + \delta_{\mathsf{s}}(\mathbb{M}_{\mathbb{A}}\delta_{\mathfrak{h}} + \delta_{\mathfrak{f}})\int_0^t d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right) d\mathsf{s}$$

$$= \Delta_1\, d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right) + \Delta_2\int_0^t d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right) \eth\mathsf{s} \tag{3.11}$$

Where, $\Delta_1 = \delta_{\mathsf{s}}(\delta_{\mathfrak{h}} + \delta_{\mathbb{I}})$ and $\Delta_2 = \delta_{\mathsf{s}}(\mathbb{M}_{\mathbb{A}}\delta_{\mathfrak{h}} + \delta_{\mathfrak{f}})$

Therefore,

$$d_{\infty}(\mathbb{G}_0\mathfrak{x}_{\mathsf{s}}(t), \mathbb{G}_0\mathfrak{y}_{\mathsf{s}}(t)) = \sup_{\theta\in[0,1]} d_{\mathbb{H}}([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta})$$

$$\leq \Delta_1 \sup_{\theta\in[0,1]} d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right) + \Delta_2 \sup_{\theta\in[0,1]}\int_0^t d_{\mathbb{H}}\left([\mathfrak{x}_{\mathsf{s}}(t)]^{\theta}, [\mathfrak{y}_{\mathsf{s}}(t)]^{\theta}\right)$$

$$\leq \Delta_1\, d_{\mathbb{H}}\left(\mathfrak{x}_{\mathsf{s}}(t), \mathfrak{y}_{\mathsf{s}}(t)\right) + \Delta_2\int_0^t d_{\mathbb{H}}\left(\mathfrak{x}_{\mathsf{s}}(t), \mathfrak{y}_{\mathsf{s}}(t)\right) d\mathsf{s} \tag{3.12}$$

Hence

$$\mathbb{H}_1(\mathbb{G}_0\mathfrak{x}_{\mathsf{s}}(t), \mathbb{G}_0\mathfrak{y}_{\mathsf{s}}(t)) = \sup_{t\in\mathbb{J}=[0,b]} d_{\mathbb{H}}\left(\mathbb{G}_0\mathfrak{x}_{\mathsf{s}}(t), \mathbb{G}_0\mathfrak{y}_{\mathsf{s}}(t)\right)$$

$$\leq \Delta_1 \sup_{t\in\mathbb{J}=[0,b]} d_{\mathbb{H}}\left(\mathfrak{x}_{\mathsf{s}}(t), \mathfrak{y}_{\mathsf{s}}(t)\right) + \Delta_2\int_0^t \sup_{t\in\mathbb{J}=[0,b]} d_{\mathbb{H}}\left(\mathfrak{x}_{\mathsf{s}}(t), \mathfrak{y}_{\mathsf{s}}(t)\right) dt$$

$$\leq \Delta_1\mathbb{H}_1\left(\mathfrak{x}_{\mathsf{s}}(t), \mathfrak{y}_{\mathsf{s}}(t)\right) + \Delta_2\mathbb{T}\mathbb{H}_1\left(\mathfrak{x}_{\mathsf{s}}(t), \mathfrak{y}_{\mathsf{s}}(t)\right)$$

$$\leq (\Delta_1 + \Delta_2\mathbb{T})\mathbb{H}_1\left(\mathfrak{x}_{\mathsf{s}}(t), \mathfrak{y}_{\mathsf{s}}(t)\right) \tag{3.13}$$

Then by hypothesis $\mathbb{G}_0$ is a contraction mapping. By Using the Banach fixed point theorem, equations (3.2) - (3.4) have a unique fixed point $\mathfrak{x} \in \mathbb{C}\left(\mathbb{J} : \mathbb{E}_{\mathbb{N}}^{\mathfrak{i}}\right)$

4. EXAMPLE

Consider the fuzzy solution of the nonlinear impulsive fuzzy integrodifferential equation of the form:

$$\frac{d}{dt}\left(\mathfrak{x}(t) - 2t\mathfrak{x}(t + \mathfrak{h})^2\right) = 2\mathfrak{x}(t) + 2t\mathfrak{x}(t + \mathfrak{h})^2, \quad t \in \mathbb{J} = [0, \mathbb{T}]$$

$\mathfrak{x}(0) = \varphi(t) = 7 \in (\mathbb{E}_{\mathbb{N}}^{\mathfrak{i}})^{\mathfrak{n}}$

$\Delta\mathfrak{x}(t_k) = \mathbb{I}_k\mathfrak{x}(t_k) = \dfrac{1}{\mathbb{I}_k\mathfrak{x}(t_k)}$. Then θ - level set of fuzzy number 7 is

$[7]^{\theta} = [\theta + 6, 8 - \theta]$ for $\theta \in [0,1]$

Let $\int_0^t k(t, \mathsf{s}, \mathfrak{x}_t(t))d\mathsf{s} = 7t\mathfrak{x}(t + \mathfrak{h})^2, f(t, \mathfrak{x}_t(t)) = 7t\mathfrak{x}(t + \mathfrak{h})^2,$

Then θ - level set of $\int_0^t k(t, \mathsf{s}, \mathfrak{x}_t(t))d\mathsf{s} = 7t\mathfrak{x}(t + \mathfrak{h})^2$ is

$$[\int_0^t k(t,s,x_t(t))ds]^\alpha = [7tx(t+\hbar)^2]^\theta = t[7]^\theta[x(t+\hbar)^2]^\theta$$

$$= t[\theta+6,8-\theta][(x_{il}^\theta(7))^2,(x_r^\theta(7))^2]$$

$$= t[(\theta+6)x_{il}^\theta(t+\hbar))^2,(8-\theta)(x_{ir}^\theta(t+\hbar))^2] \quad \text{where } [x(t)]^\theta = [(x_{il}^\theta(t+\hbar),(x_{ir}^\theta(t+\hbar)],$$

$$[7]^\theta = [\theta+6,8-\theta]\text{for } \theta \in [0,1] \text{ and } \theta \text{ - level set of } f(t,x_t(t)) \text{ is}$$

$$[f(t,x_t(t))]^\theta = [7tx(t+\hbar)^2]^\theta = t[7]^\theta[x(t+\hbar)^2]^\theta$$

$$= t[\theta+6,8-\theta][(x_{il}^\theta(7))^2,(x_{ir}^\theta(7))^2] = t[(\theta+6)(x_{il}^\theta(7))^2,(8-\theta)(x_{ir}^\theta(7))^2]$$

$$\text{where } [x(t)]^\theta = [x_{il}^\theta(7),(x_{ir}^\theta(7)],[7]^\theta = [\theta+6,8-\theta] \text{ for } \theta \in [0,1]$$

and θ - level set of $\mathbb{I}(x(t))$ is $\quad [\mathbb{I}(x(t_k))]^\theta = [\frac{1}{1+\mathbb{I}(x(t_k))}]^\theta \quad = [\frac{1}{1+\mathbb{I}(x_l^\theta(t_k))},\frac{1}{1+\mathbb{I}(x_r^\theta(t_k))}]$, Thus

$$d_{\mathbb{H}}([\mathbb{I}(x(t_k))]^\theta,[\mathbb{I}(x(t_k))]^\theta) = d_{\mathbb{H}}([\frac{1}{1+\mathbb{I}(x_l^\theta(t_k))},\frac{1}{1+\mathbb{I}(x_r^\theta(t_k))}])$$

$$= d_{\mathbb{H}}([\frac{1}{1+\mathbb{I}(x_{il}^\theta(t_k))},\frac{1}{1+\mathbb{I}(x_{ir}^\theta(t_k))}],[\frac{1}{1+\mathbb{I}(\eta_{il}^\theta(t_k))},\frac{1}{1+\mathbb{I}(\eta_{ir}^\theta(t_k))}])$$

$$\leq_k^{max}\left\{|\frac{1}{1+\mathbb{I}(x_{il}^\theta(t_k))}-\frac{1}{1+\mathbb{I}(\eta_{il}^\theta(t_k))}|,|\frac{1}{1+\mathbb{I}(x_{ir}^\theta(t_k))}-\frac{1}{1+\mathbb{I}(\eta_{ir}^\theta(t_k))}|\right\}$$

$$\leq_k^{max}\left\{|\frac{(u_q^\theta(t_k))-(\eta_{il}^\theta(t_k))}{(1+\mathbb{I}(x_{il}^\theta(t_k)))(1+\mathbb{I}(\eta_{il}^\theta(t_k))})|,|\frac{(x_{ir}^\theta(t_k))-(v_r^\theta(t_k))}{(1+I(u_r^\theta(t_k)))(1+\mathbb{I}(\eta_{ir}^\theta(t_k))})|\right\}$$

$$\leq_k^{max}\left\{\frac{|(x_{il}^\theta(t_k))-(\eta_{il}^\theta(t_k))|}{(1+|(x_{il}^\theta(t_k))|)(1+|(\eta_{il}^\theta(t_k))|)},\frac{|(x_{ir}^\theta(t_k))-(v_r^\theta(t_k))|}{(1+|(u_r^\theta(t_k))|)(1+|\eta_{ir}^\theta(t_k))|})\right\}$$

$$= \delta_{\mathbb{I}}^{max}{}_k\{|(x_{il}^\theta)-(\eta_{il}^\theta)|,|(x_{ir}^\theta)-(\eta_{ir}^\theta)|\} = \delta_{\mathbb{I}}\, d_{\mathbb{H}}([x]^\theta,[x]^\theta)$$

where $\delta_{\mathbb{I}} = \frac{1}{(1+x_{ir}^\theta(t_k))(1+\eta_{ir}^\theta(t_k))}$

$$d_{\mathbb{H}}([f(t,x_t(t))]^\theta,[f(t,x_t(t)]^\theta) = d_{\mathbb{H}}(t[\theta+6,8-\theta][(x_{il}^\theta(t+\hbar))^2,(x_{ir}^\theta(t+\hbar))^2],$$

$$t[\theta+6,8-\theta][(\eta_{il}^\theta(t+\hbar))^2,(\eta_{ir}^\theta(t+\hbar))^2])$$

$$= tmax\{(\theta+6)|(x_{il}^\theta(t+\hbar))^2-(\eta_{il}^\theta(t+\hbar))^2|,(8-\theta)|(x_{ir}^\theta(t+\hbar))^2-(\eta_{ir}^\theta(t+\hbar))^2|\}$$

$$= tmax\{(\theta+6)|x_{il}^\theta(t+\hbar)+\eta_{il}^\theta(t+\hbar)||x_{il}^\theta(t+\hbar)-\eta_{il}^\theta(t+\hbar)|,(8-\theta)\mathbb{I}_{ir}^\theta(x_{ir}^\theta(t_k))$$
$$+\eta_{ir}^\theta||x_{ir}^\theta(t+\hbar)-\eta_{ir}^\theta(t+\hbar)|\}$$

$$\leq (8-\theta)t|x_{ir}^\theta(t+\hbar)+\eta_{ir}^\theta(t)|max\{|x_{il}^\theta(t+\hbar)-\eta_{il}^\theta(t+\hbar)|,|x_{ir}^\theta(t+\hbar)-\eta_{ir}^\theta(t+\hbar)|\}$$

$$\leq (8-\theta)b|x_{ir}^\theta(t+\hbar)+\eta_{ir}^\theta(t+\hbar)|max\{|x_{il}^\theta(t+\hbar)-\eta_{il}^\theta(t+\hbar)|,|x_{ir}^\theta(t+\hbar)-\eta_{ir}^\theta(t+\hbar)|\}$$

$$\leq 8\mathbb{T}|x_{ir}^\theta(t+\hbar)+\eta_{ir}^\theta(t+\hbar)|max\{|x_{il}^\theta(t+\hbar)-\eta_{il}^\theta(t+\hbar)|,|x_{ir}^\theta(t+\hbar)-\eta_{ir}^\theta(t+\hbar)|\}$$

$$= \delta_f\, d_{\mathbb{H}}([x(t+\hbar)]^\theta,[x(t+\hbar)]^\theta) \quad \text{where } \delta_f = 8\mathbb{T}|x_{ir}^\theta(t+\hbar),\eta_{ir}^\theta(t+\hbar)|$$

$$d_{\mathbb{H}}([\int_0^t k(t,s,x_t(s))ds]^\alpha,[\int_0^t k(t,s,\eta_t(s))ds]^\theta)$$

$$= d_{\mathbb{H}}(t[\theta+6,8-\theta][(x_{il}^\theta(t+\hbar))^2,(x_{ir}^\theta(t+\hbar))^2],t[\theta+6,8-\theta][(\eta_{il}^\theta(t+\hbar))^2,(\eta_{ir}^\theta(t+\hbar))^2])$$

$$= tmax\{(\theta+6)|(x_{il}^\theta(t+\hbar))^2-(\eta_{il}^\theta(t+\hbar))^2|,(8-\theta)|(x_{ir}^\theta(t+\hbar))^2-(\eta_{ir}^\theta(t+\hbar))^2|\}$$

$$= tmax\{(\theta+6)|x_{il}^\theta(t)+\eta_{il}^\theta(t+\hbar)||x_{il}^\theta(t+\hbar)-\eta_{il}^\theta(t+\hbar)|,(8-\theta)x_{ir}^\theta(t+\hbar)+\eta_{ir}^\theta(t+\hbar)||x_{ir}^\theta(t)-\eta_{ir}^\theta(t+\hbar)|\}$$

$$\leq (8-\theta)t|x_{ir}^\theta(t+\hbar)+\eta_{ir}^\theta(t+\hbar)|max\{|x_{il}^\theta(t+\hbar)-\eta_{il}^\theta(t+\hbar)|,|x_{ir}^\theta(t+\hbar)-\eta_{ir}^\theta(t+\hbar)|\}$$

$$\leq (8-\theta)\mathbb{T}|x_{ir}^\theta(t+\hbar)+\eta_{ir}^\theta(t)|max\{|x_{il}^\theta(t+\hbar)-\eta_{il}^\theta(t+\hbar)|,|x_{ir}^\theta(t+\hbar)-\eta_{ir}^\theta(t+\hbar)|\}$$

$$\leq 8\mathfrak{b}|\mathfrak{x}_{i\mathfrak{r}}^{\theta}(t + \mathfrak{h}) + \mathfrak{y}_{i\mathfrak{r}}^{\theta}(t + \mathfrak{h})|max\{|\mathfrak{x}_{i\mathfrak{l}}^{\theta}(t + \mathfrak{h}) - \mathfrak{y}_{i\mathfrak{l}}^{\theta}(t + \mathfrak{h})|, |\mathfrak{x}_{i\mathfrak{r}}^{\theta}(t + \mathfrak{h}) - \mathfrak{y}_{i\mathfrak{r}}^{\theta}(t + \mathfrak{h})|\}$$

$$= \delta_k \mathbb{T} \, d_{\mathbb{H}}([\mathfrak{x}(t + \mathfrak{h})]^{\theta}, [\mathfrak{y}(t + \mathfrak{h})]^{\theta}) \quad \text{where } \delta_k = 8\mathbb{T}|\mathfrak{x}_{i\mathfrak{r}}^{\theta}(t + \mathfrak{h}), \mathfrak{y}_{i\mathfrak{r}}^{\theta}(t + \mathfrak{h})|$$

Since $\mathfrak{f}, \mathfrak{h}, k$ and $\mathbb{I}_k$ satisfy a global Lipschitz condition, from Theorem 3.2, the impulsive fuzzy neutral functional integrodifferential equation has a unique fuzzy solution.

5. CONCLUSION

In this paper, by using the concept of fuzzy number in $(\mathbb{E}_{\mathbb{N}})^{\mathfrak{n}}$, we study the existence for the nonlinear impulsive fuzzy neutral integrodifferential equation in $(\mathbb{E}_{\mathbb{N}})^{\mathfrak{n}}$ and find the sufficient conditions for the equation (3.2) - (3.4).

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DETERMINATION OF ANTIMICROBIAL ACTIVITY OF FIVE ETHNOMEDICINAL PLANTS OF SEONI DISTRICT, MADHYA PRADESH AGAINST HUMAN PATHOGENIC BACTERIA

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ABSTRACT

Ethnomedicinal plants have been used since centuries to fight infections. These medicinal plants possess novel drug compounds that show activity against microbial pathogens. Seoni district is rich in biological diversity and a wide variety of plants of ethnomedicinal value are observed in the region. The tribal population residing in the region depends on these plants to cure different ailments. In the present study, we determine the antimicrobial potential of aqueous and ethanolic extracts of five ethnomedicinal plants belonging to Seoni district, Madhya Pradesh. Aqueous and ethanolic extracts of Dhatura (*Dhatura metel*), Sadapushpa (*Catharanthus roseus*), Gudhal (*Hibiscus rosasinensis*), Nagfani (*Opuntia dillenii*) and Neem (*Azadirachta indica*) were screened against gram positive and gram negative bacterial strains, *Escherichia coli* and *Staphylococcus aureus*. The antibacterial activity of the selected plant extracts was checked using agar disc diffusion method. The ethanolic extracts of the ethnomedicinal plants depicted prominent activity compared to the aqueous extracts. Also, significant activity was observed against *S. aureus* in comparison to *E. coli*. Ethanolic extracts of *A. indica* and *C. roseus* showed potential antibacterial activity against the bacterial pathogens compared to the other ethnomedicinal plants. Thus, bioactive compounds isolation from these plants can lead to the development of novel antibacterial drugs.

Keywords: Ethnomedicinal plants, antibacterial activity, Seoni district, Ethanolic extract, bioactive compounds.

DUAL SOLUTIONS FOR THE UNSTEADY FLOW OF MHD HYBRID NANOFLUID OVER A FLAT/SLANDERING SURFACE

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ABSTRACT

The pivotal objective of this research is to address the boundary layer analysis of two-dimensional unsteady hybrid-nanofluid flow over a flat/slandering surface. Thermal radiation and magnetohydrodynamic analysis are featured in this work. Nonlinear differential equations representing flow expressions are numerically solved using Runge-Kutta method with shooting technique. Then, a complete discussion of the influences of the flow regime on several thermo fluidic parameters is presented. The outcome of the present study is that velocity field lines are grown due to the strengthening of unsteadiness parameter. The significant outcome of the current investigation is that increment in magnetic and nanoparticle volume fraction ϕ_1 parameters decline the skin friction. Furthermore, it is shown that when the radiation and nanoparticle volume fraction ϕ_1 are improved, the heat transfer rate triggers considerable evolution. The obtained results of this model closely match with those available in the literature as a limiting situation.

Keywords: Slandering stretching sheet, hybrid-nanofluid, thermal radiation, MHD, slip effects.

GREEN ECONOMY: A STUDY ON ITS ROLE IN SUSTAINABLE DEVELOPMENT

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ABSTRACT

Environmental Protection, Renewable Energy and Goals of Sustainable Development has been overarching the entire world today. There are continuing concerns over global economic and environmental development.

Intensified by recent prolonged global energy, food and financial crises are underscored by continuous warnings from global scientists, that the society is in danger of transgressing a number of planetary boundaries or ecological limits.

Today Government is taking initiative to lead their nations out of these related crises, whilst also taking into account the ecological limits and green economy. The emergence of issues relating to green environment, ecology and other related concerns focused our attention on the role of "Green Economy".

To correlate with these issues, the present paper emphasizes on the growing relevance of green economy in the present scenario. In this paper, the importance of green economy, role of government and the relevance of green economy towards sustainable development is emphasized.

Key Terms: Environment, Ecology, Government, Sustainable Development and Green Economy.

AMALGAM ILLOGICAL CONTROLLER DESIGN FOR HEAT REDUCTION IN IGBT FOR POWER ELECTRONICS CONTROLLER

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ABSTRACT

Power electronics technology has been prompted by the need for efficient control of motors in industrial electric drives. Electric Vehicle is seen as a possible replacement for the automobile industry and to address the rising pollution, global warming, and depleting natural resources. Insulated Gate Bipolar Transistor (IGBT) is a most popular Device to deploy the power delivered to the motor of drive. These IGBTs are framed with modules while carrying electrical behavior literally generates a lot of heat during switching. This heat further develops and damages the IGBTs and its related components. Thus it is necessary to reduce the heat generated in the IGBT module and to prevent the failure of its components. The existing techniques analyze the causes of heat but do not control the heat production in the IGBT module. Therefore to reduce the heat generated in the IGBT module, this paper proposed a new design, an Amalgam Illogical Controller (AIC) which handles nonlinearity and provides a quick response. This controller is further tuned by Amended Moth System (AMS) to reduce heat consumption in the IGBT module with electrical parameters. This Amalgam Illogical Controller with Amended Moth System monitors the generation of heat in IGBT during the switching process and reduces that heat generated in the IGBT module in Electric Vehicle inverter. This proposed Technique efficiently tackles the issues in power electronics drive applications, especially in Electric Vehicles (EV). Thus proposed techniques of Amalgam Illogical Controller is greatly reduce heat consumption in the IGBT module and improve the reliability of IGBT under different mode of operations.

Keywords: Industrial Electric Drives, Electric Vehicle, Insulated Gate Bipolar Transistor, Amalgam Illogical Controller, Amended Moth System

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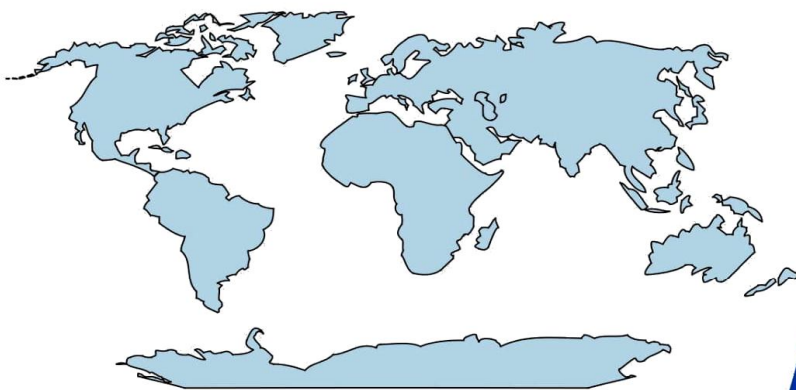
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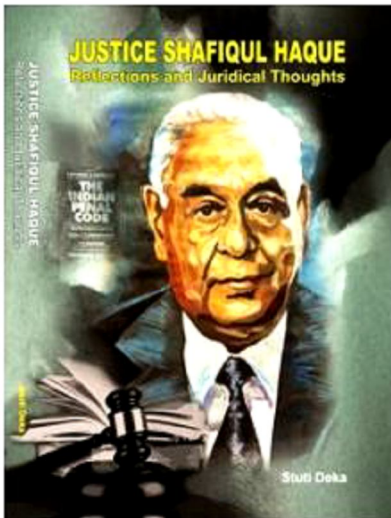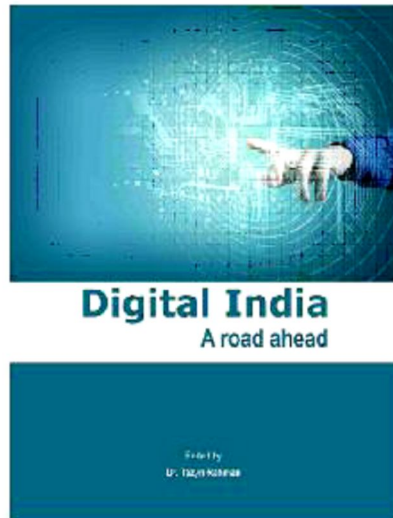
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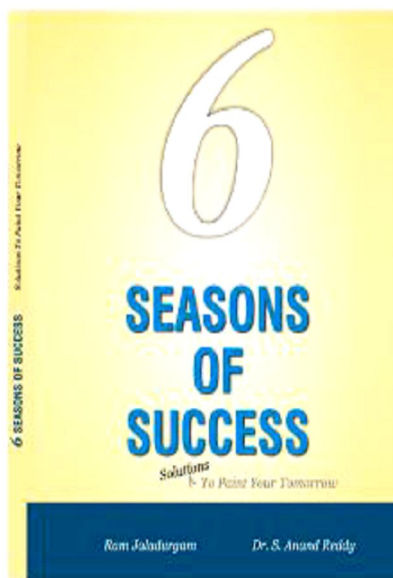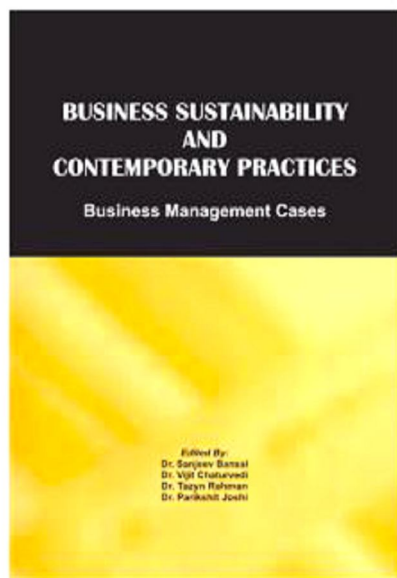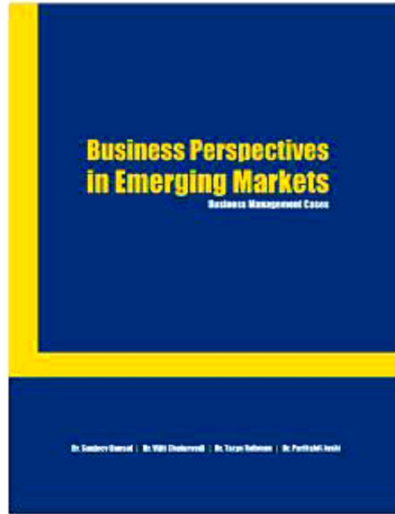
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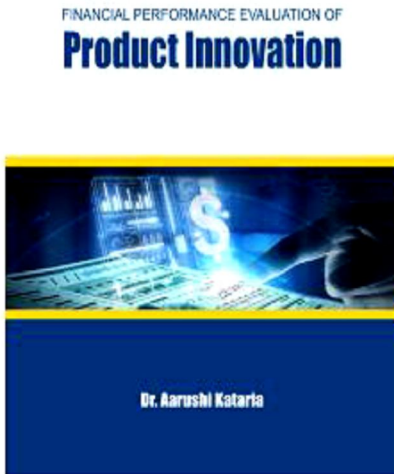
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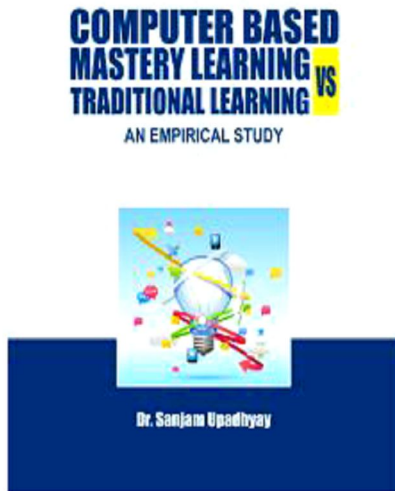
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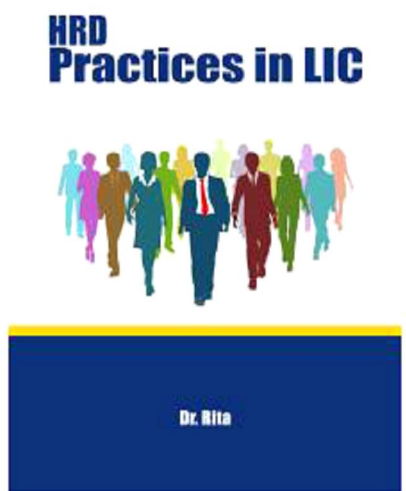
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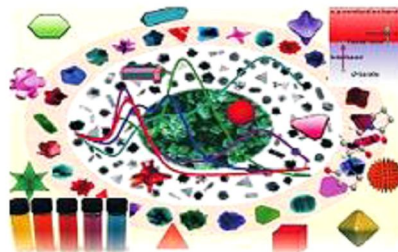
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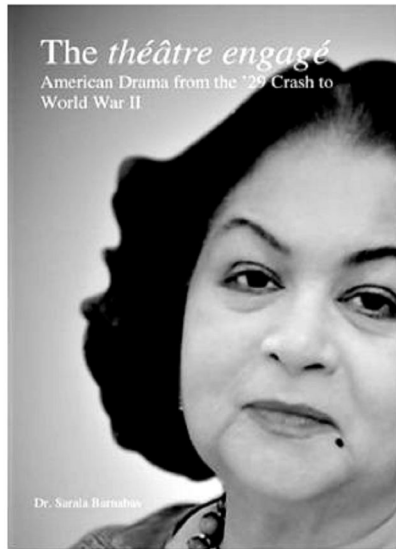
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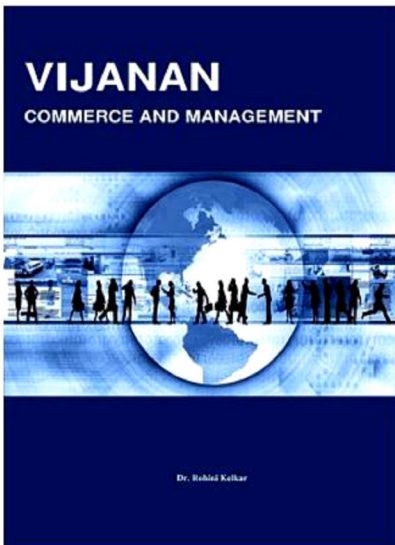
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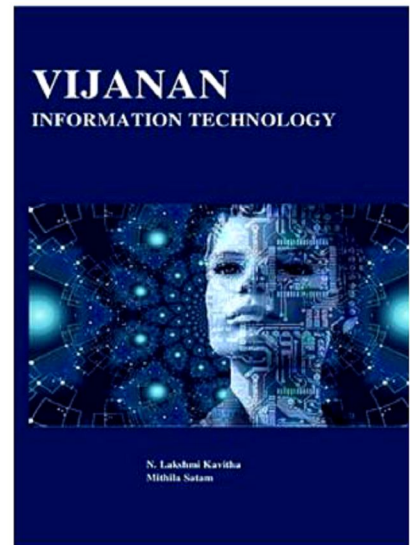
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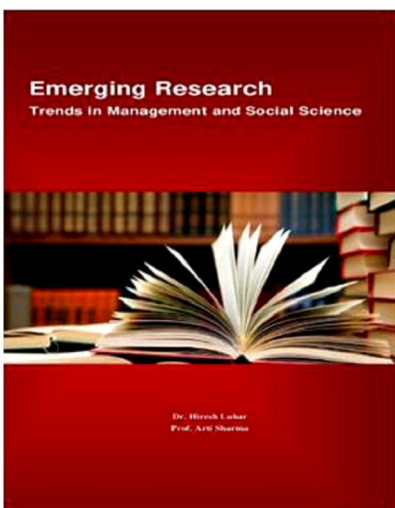
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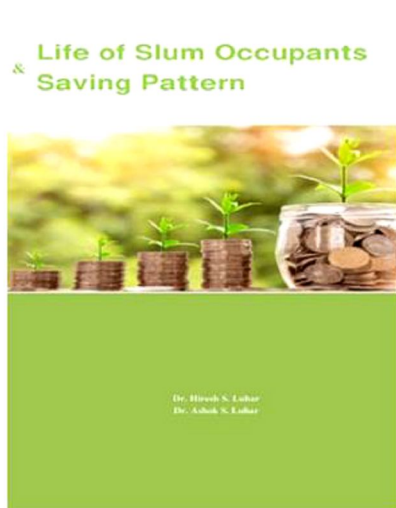
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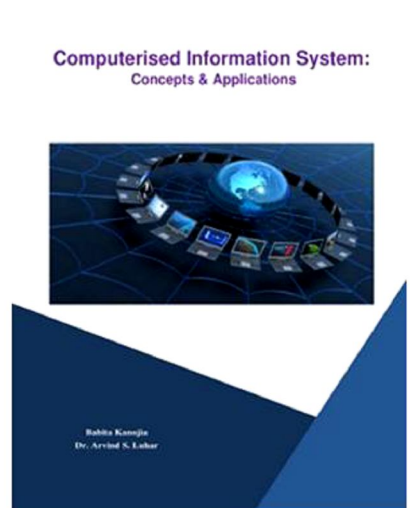
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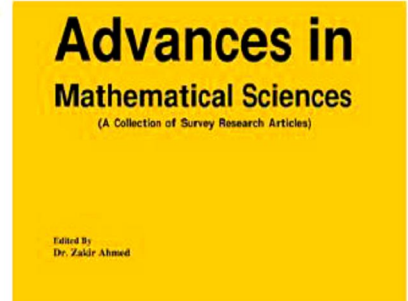
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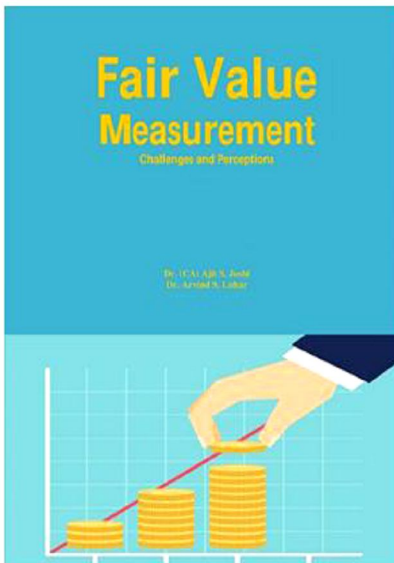
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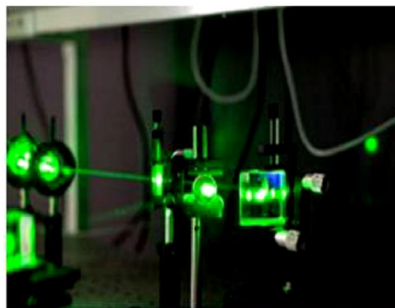
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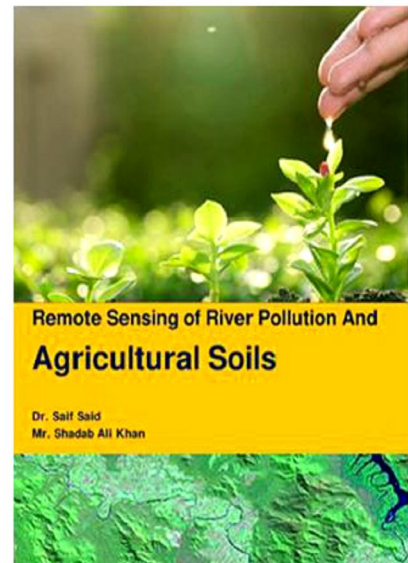
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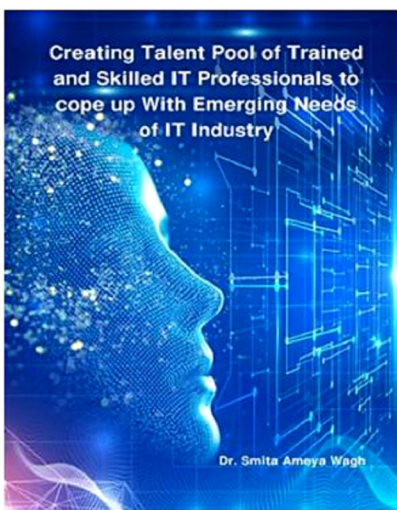
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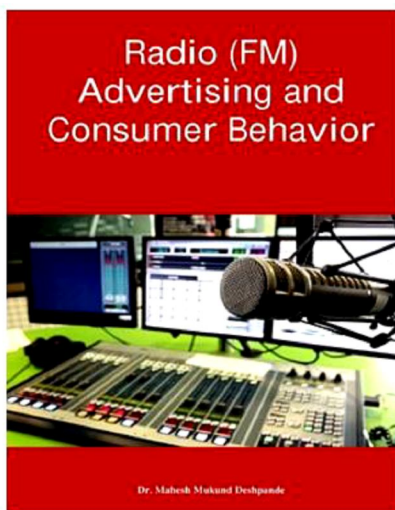
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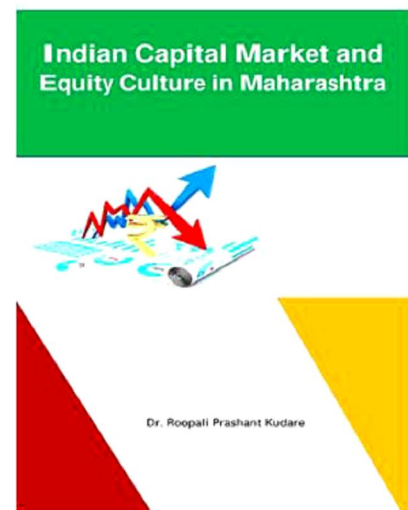
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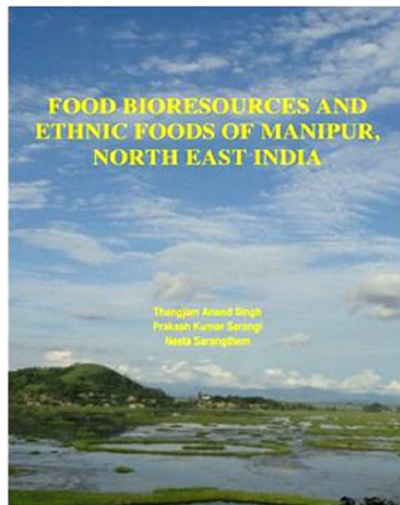
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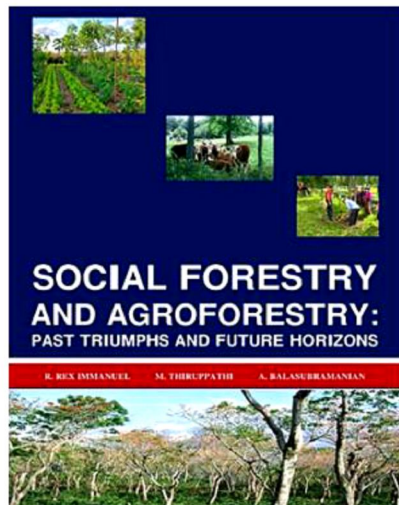
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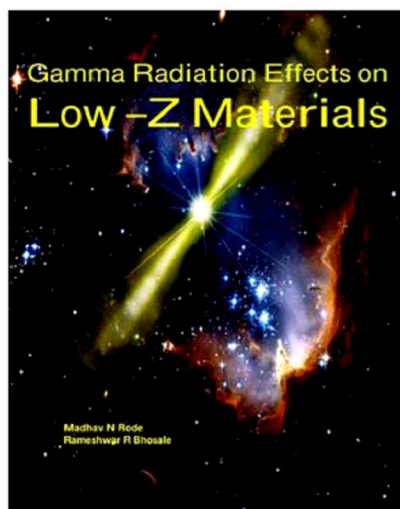
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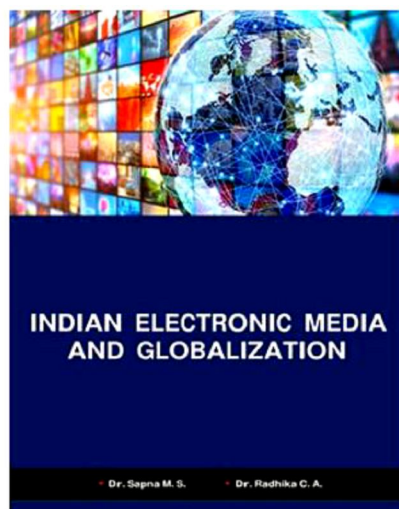
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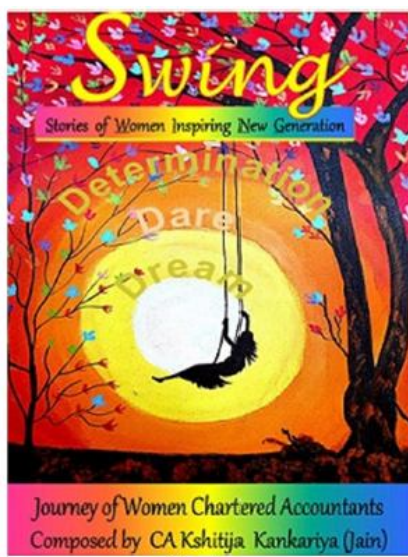
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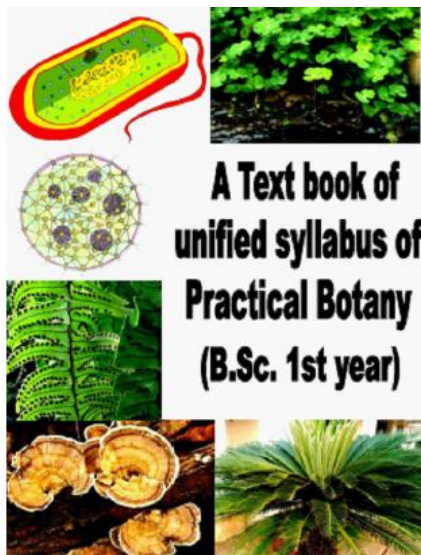INTER PERSONAL RELATIONSHIP   EFFECTIVE COMMUNICATION
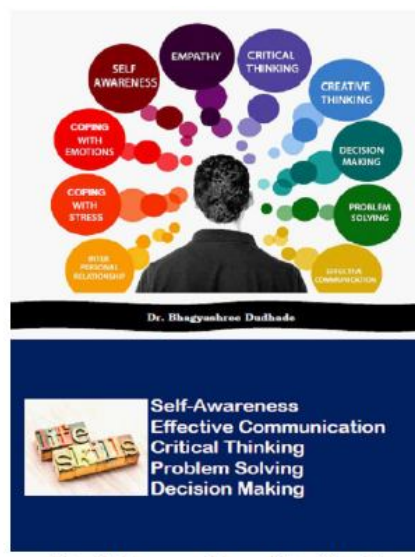
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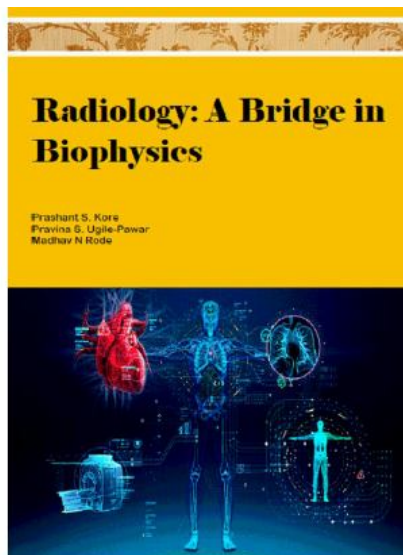Self-Awareness
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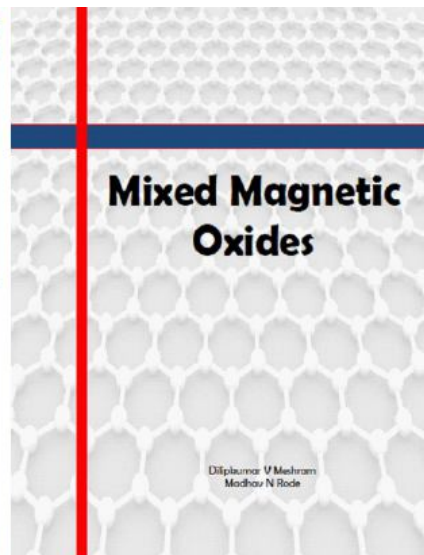A Text book of unified syllabus of Practical Botany (B.Sc. 1st year)

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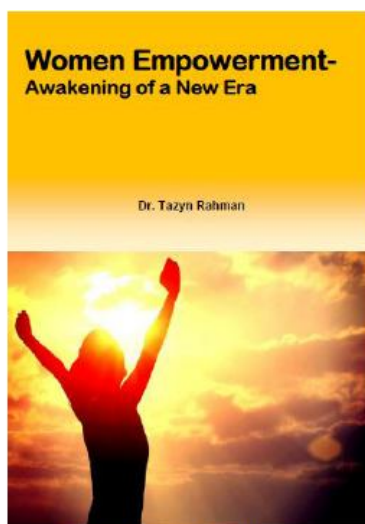
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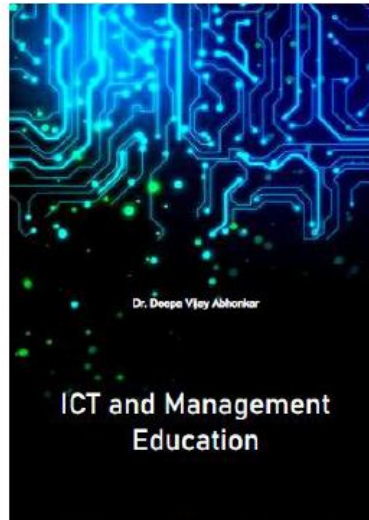International Migration
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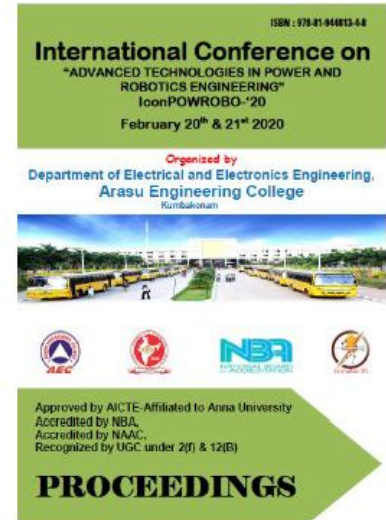Impact on Kerala Economy
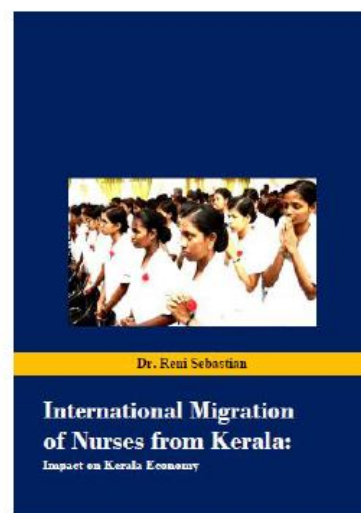
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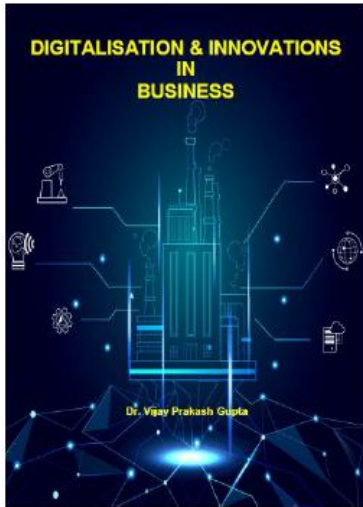
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