A Case Study on the Role of Techno Incubators in Promoting Techno based Small and Medium Enterprises in Sri Lanka

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Abstract: The main objective of this research is to study the role and the contribution of the techno-incubators to promote techno based Small and Medium Scale Enterprises (SMEs) in Sri Lanka. Literature survey shows that proper incubator process and techno-SME start-up eco-system can reduce the mortality of the techno-SME start-ups. The main methodology of this research is primary data collection through sample survey of seventy one techno-SME entrepreneurs supplemented by interviews with key stake holders. The results show that lack of strong techno-SME promoting national eco-system, inconsistencies in selection process for the techno-incubator facilities, the services offered and the business support given by the techno-incubators are not in-line with incubatees current requirements. In general, incubator authorities need more focus on business support services and appropriate skills development for techno businesses.

Keywords: Techno-incubation, Small and Medium Scale Enterprises; SMEs, Technology Management, Innovation, Techno-Entrepreneurship, Sri Lanka.

1.0 Introduction

New technology-based firms (NTBFs) are important contributors to nation's economy as major source of innovation, business development and growth and new jobs. The terms like enterprise centre, business incubator, business technology centre, technology incubator and techno-innovation centre are generally used, creating challenges in distinguishing between incubators that support new small and medium scale entrepreneurship (SMEs) start-ups in general and more technology specific incubators which deal with problems associated with the start-up of technology-oriented SMEs. (Handbook of Research on Techno-Entrepreneurship- Francois Therin, 2013). To help create and grow a new start-up, business incubation can be used as a tool of economic development. Business incubation is defined as a business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services (Kathleen, 2006). Smilor and Gill (1986) recognized, "A technology-incubating program as an innovative system designed to assist entrepreneurs in the development of new technology-based firms, both start-ups and fledglings. It seeks to effectively link talent, technology, capital and know-how to leverage entrepreneurial talent in order to accelerate the development of new companies, and thus speed the commercialization of technology".

Business incubator helps business start-ups by providing various support services such as seed funding, mentoring, process/ product development support, networking opportunities and access to the services of expertise, etc. (Sherman and Chappell, 1998). Techno incubators are playing a significant role to promote techno base of SME's from seeding start-ups to turning them to become successful and stable companies. This study tries to explore the role of techno incubators in promoting techno base SMEs in Sri Lanka.

2.0 Research Objective

The scope of the study has been narrowed down to Techno Incubators in Sri Lanka which promote techno base SMEs. In this context this paper addresses the following three objectives:

- To explore the current situation of techno incubators in Sri Lanka.
- To analyze the role of techno incubators in promoting techno based SMEs in Sri Lanka.
- To recommend policies and strategies to promote Sri Lankan techno based SMEs through techno incubators to sustainable growth path.

3.0 Some Techno Incubator Experiences in Sri Lanka

3.1 Disrupt Unlimited

The Brandix Group is the largest exporter of apparel in Sri Lanka. In Feb 2014, The Group invested US$1 million setting up Disrupt Unlimited, a seed Accelerator. The Brandix Group currently owns shares in this new venture. The Accelerator is currently run by three employees. The Brandix Group provided physical space for the Accelerator in exchange for monthly rental. The Incubates however are not located within this physical space but are stationed within the Strategic Business Units (SBU's) of the Brandix Group. Incubates do not pay rental for locating within the SBUs. US$ 15,000 – 50,000 is provided as seed funding for the development of the project. The Accelerator has limited itself to its domain expertise in apparel, textiles and accessories

thereby differentiating itself from its competition. While some incubators, such as Y-Combinator are run on a model of 'probability of success', Disrupt Unlimited focuses its energy and resources on a small number of companies to ensure their success.

3.2 Rubber products and process development incubator

The SIL-UOM rubber products and process development incubator was established in February 2011 as an initiative between the University of Moratuwa, Samson International PLC and Samson Compound Pvt Ltd – subsidiary companies of the DSI Group. THE DSI Group of companies are leading rubber product exporters in Sri Lanka. UNI Consultancies acted as administrative body in this alliance.

3.3 Orion's Nest

Orion City, a premier IT-Park housing global companies was established in 2008. It is set on 16 acres of land in Colombo and has a projected investment of US$500million over a 5-10 year period. Virtusa, Emphasis, Pearson, Synergix and Sri Lankan airlines are among the companies that have chosen to operate here. The facilities offered here include "an underground telecommunication system with a multi-server, high speed Asynchronous Transfer Mode (ATM) backbone, high-speed point-to-point international and domestic digital leased lines and broadband switching capability that enables speed" (38). Orion's Nest, an incubation facility for start-ups was set up within Orion City.

3.4 Conceptnursery.com

This technology incubator was established in 2001, as a joint venture between the Sri Lanka Institute of Information Technology, Media Solutions, Peoples Venture Investment Company and Prudential Holdings with the aim of facilitate growth of the ICT industry and sustaining competitiveness through R&D. USAID provided a vast amount of exposure and guidance when setting up the incubator. The incubator is located alongside the SLIIT University in Malabe.

4.0 Methodology

A scientific manner of planning, executing, and discussing important results is essential for doing any study, regardless of which fields are being investigated, such as managerial and social fields. Therefore, this chapter defines the theoretical framework, population samples, instrument, data collection procedures and the techniques of data analysis for examining the role of techno incubators in promoting techno base SMEs in Sri Lanka.

4.1 Conceptual framework

Real Options Driven Theory is used to measure the performance of the techno incubator. This illustrates universal business incubation model and can be used for techno incubators. In short, it is structured as black-box: inputs of the process, process activities, and outputs of the process. The theory presented by Hackett and Dilts (2004b) defines that the performance of the techno incubator depends on its incubate selection criteria, mentoring and business support given by the incubator and the resources provided. Based on that formula mentioned Techno Incubation Performance formula is generated as under:

$$TIP = (SC + M\&BA + RP)$$

Where:
TIP = techno incubation performance
SP = selection criteria
M&BA = mentoring and business support (networking with Angel networks, marketing, etc.)
RP = resources provided (i.e. business space, internet, etc.)

This theory argues that the success of a techno incubator is directly related to tenant's selection, assistance quality given by the incubator and the availability of the financial resources to service to the tenant. Selection refers to the decisions taken by Incubator management to accept/ reject a project for the incubator. Business support is the training activities conducted by incubator to develop the incubate. Mediation means process used by incubator to connect with the incubatee and to the outside world i.e. venture capital providers/Angel networks/ etc. Graduation is related to exit policies, i.e. decisions concerning under what circumstances incubatee should leave the incubator. These factors are further divided into variables and each and every variable has indicators to measure that.

4.2 Research Hypotheses

Following hypothesis are defined for this research study to check whether these relationships are applicable to study the role of techno incubators to promote techno-SMEs in Sri Lanka.

1- Hypothesis 1:

$H1_0$: There is no significant relationship between the techno-based SME start-up eco-system and the selection criteria of the techno base SMEs for the techno incubator.

$H1_1$: There is a significant relationship between the Techno-based SME start-up Eco-system and the selection criteria of the techno base SMEs and services offered in the techno incubator.

2- Hypothesis 2:

$H2_0$: There is no significant relationship between the techno-based SME start-up eco-system and the services offered and the business support given by the techno incubator.

$H2_1$: There is a significant relationship between the techno-based SME start-up eco-system and the services offered and the business support given by the techno incubator.

3- Hypothesis 3:

$H3_0$: There is no significant relationship between the techno-based SME start-up eco-system and the infrastructure facilities provided by the techno incubator.

$H3_1$: There is a significant relationship between the techno-based SME start-up eco-system and the infrastructure facilities by the techno incubator.

4- Hypothesis 4:

$H4_0$: There is no significant relationship between the techno-based SME start-up eco-system and the graduation and exit criteria of the techno base SMEs from the techno-incubator.

$H4_1$: There is a significant relationship between the techno-based SME start-up eco-system and the graduation and exit criteria of the techno base SMEs from the techno-incubator.

5- Hypothesis 5:

$H5_0$: There is no significant relationship between the commercial success of the techno-based SME start-up and the selection criteria of the techno base SMEs for the techno incubator.

$H5_1$: There is a significant relationship between the commercial success of the techno-based SME start-up and the selection criteria of the techno base SMEs for the techno incubator.

6- Hypothesis 6:

$H6_0$: There is no significant relationship between the commercial success of the techno-base SME start-up and the services offered and the business support given by the techno incubator.

$H6_1$: There is a significant relationship between the commercial success of the techno-base SME start-up and the services offered and the business support given by the techno incubator.

7- Hypothesis 7:

$H7_0$: There is no significant relationship between the commercial success of the techno-base SME start-up and infrastructure facilities provided by the techno incubator.

$H7_1$: There is a significant relationship between the commercial success of the techno-base SME start-up and infrastructure facilities provided by the techno incubator.

8- Hypothesis 8:

$H8_0$: There is no significant relationship between the commercial success of the techno-base SME start-up and graduation and exit criteria of the techno base SMEs from the techno-incubator.

$H8_1$: There is significant relationship between the commercial success of the techno-base SME start-up and graduation and exit criteria of the techno base SMEs from the techno-incubator.

4.3 Conceptualization of Variables

Conceptualization is the process by which researcher define what is being attempted to study as precisely as possible. . In this study four main independent variables, moderating variable and dependent variable are identified as shown in the conceptual model.

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4.3.1 Extraneous Variable

Techno-base SME start-up eco-system
- Techno-base SME promotion
- Position of the techno incubator as a tool of techno-base SME start-ups
- Regulations to promote techno-base SME
- Regulations to promote techno-base SME start-ups through techno-incubators

4.3.2 Independent Variable

Selection criteria of the techno base SMEs for the techno-incubator
- Viability of the techno-base SME start-up
- Competence of the Incubatee

Services offered and the business support given by the techno incubator.
- Techno-incubator configuration
- Incubatee capacity building
- Capital sources
- Product & process development support

- Business introduction support at early stages of the business

Infrastructure provided by the techno incubator
- Facilities provided by the techno-incubator

Graduation and exit criteria of the techno base SMEs from the techno-incubator
- Graduation and exit criteria from the techno-incubator

4.3.3 Dependent Variables

Commercial success of the techno-base SME start-up
- Incubator success
- Incubatee outcome stat

4.4 Operationalisation of Variables

Operationalisation of variables refers to the process of figuring out how to measure the concepts based on its variables (moderating, independent and dependent variables) by finding a measurable, quantifiable and valid index of indicators. Indicators for the each variable are founded on literature reviewed.

Table 3.1: Operationalisation of variables

Variable type	No	Concept	Variable	Indicator/s	Source	Measurement
EV	1	Techno-SME start-up eco system	Techno-SME promotion	Techno entrepreneurship awareness	Colin Mason & Ross Brown, (2014)	Likert
				Techno entrepreneurship training / education	Colin Mason & Ross Brown, (2014)	Likert
				Techno entrepreneurship mentoring / couching	Colin Mason & Ross Brown, (2014)	Likert
				Start-up financing (debt /equity)	Colin Mason & Ross Brown, (2014)	Likert
				Network initiatives for Techno-base SMEs	Colin Mason & Ross Brown, (2014)	Likert
			Position of the techno incubator as a tool of techno-SME start-up	Encourage (by government /corporate sector) techno-SME start-ups through techno-incubators	Sharma,(2014)	Likert
				Encourage (by government /corporate sector) techno-SME start-ups through techno-incubators	Sharma,(2014)	Likert
				Encourage (by government /corporate sector) the public-private partnerships in techno-incubation creation	Sharma,(2014)	Likert
				Equal distribution of techno-incubators across geography	Sharma,(2014)	Likert
			Regulations to promote techno-SMEs	Ease of techno-base SME registration process	Sharma,(2014)	Likert
				Tax free period for Techno-SME start-ups	Sharma,(2014)	Likert
				Competition policies to promote techno-SMEs	Sharma,(2014)	Likert
				Technology policies to promote techno-SMEs	Sharma,(2014)	Likert
			Regulations to promote techno-base SME start-ups through techno incubators	Ease of engagement process of techno-SME start-ups with techno-incubators	Sharma,(2014)	Likert
				Tax free period for techno-base SME start-ups coming through techno-incubators	Sharma,(2014)	Likert
				Tax reductions to angel investors who invest in incubators	Sharma,(2014)	Likert
				Tax reductions in importing equipment for techno-incubators	Sharma,(2014)	Likert
				Technology policies	Sharma,(2014)	Likert

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I	2	Selection criteria of the techno-SMEs for the techno incubator	Selection criteria of the techno-SMEs for the techno incubator is based on	Business idea	Bergek & Norrman, (2008)	Likert
				Entrepreneur	Bergek & Norrman, (2008)	Likert
				Technology industry	Bergek & Norrman, (2008)	Likert
			Viability of the techno SME start-up	Comprehensive business plan	Sharma, (2014)	Likert
				Marketability of the product	Sharma, (2014)	Likert
				Fast growth potential	Sharma, (2014)	Likert
				Sustainability	Halcyon, (2015)	Likert
				Job creation potential	Sharma, (2014)	Likert
				Local ownership	Sharma, (2014)	Likert
			Competence of the incubate	Industry knowledge	Campbell, Kendrick, & Samuelson (1985) Nacu & Avasilcai,(2013)	Likert
				Technology management skills	Oakey (2003)	Likert
				Business management skills	Oakey (2003)	Likert
				Techno-entrepreneur skills	Nicholas & Armstrong, (2003)	Likert
				Required resource level for the start-up	Campbell, Kendrick, & Samuelson, (1985)	Likert
				Incubatee' s capabilities on required resources	Campbell, Kendrick, & Samuelson, (1985)	Likert
	3	Services offered and the business support is given by the techno incubator	Techno incubator configuration	Techno-incubator incubator- Landlord model	Lalkaka, (2011) Chandra & Silva, (2012)	Likert
				Techno-incubator configuration-Equity base model	Lalkaka, (2011) Chandra & Silva, (2012)	Likert
				Techno-incubator configuration - Sponsor Funding based model	Lalkaka, (2011) Chandra & Silva, (2012)	Likert
			Capital sources	By government banks	Lalkaka, (2007)	Likert
				By private banks/ financial companies	Lalkaka, (2007)	Likert
				By venture creations	Lalkaka, (2007)	Likert
				By angel networks	Lalkaka, (2007)	Likert
				By government grants	Lalkaka, (2007)	Likert
			Product and process development support	Techno-expertise support	Hackett &Dilts, (2004)	Likert
				Access to R&D institutions/ universities	Sharma,(2014)	Likert
				Product/ process innovation support	Gregor Harter, Klaus Hölbling, Steffen Leistner, Lazarowich & Wojciechowski (2002).	Likert
				Technology development support	Costa-David, Malan, Lalkaka (2002)	Likert
				Technology evaluation support	Costa-David, Malan, Lalkaka (2002)	Likert
				Assistant to obtain/	Malecki &, Nijkamp	Likert

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				acquire patens and product license	(1988)	
			Business introduction support	Business needs diagnosis	Campbell, Kendrick, & Samuelson (1984)	Likert
				Business mentoring	Costa-David, Malan &Lalkaka (2002), Hackett &Dilts (2004)	Likert
				Assistant to finance/account management	Metibtikar, (2012)	Likert
				Assistant to general administration	Smilor, (1987)	Likert
				Market survey/ Marketing assistance	Sharma, (2014)	Likert
				Networking opportunities	Carter &Jones-Evans (2000), Carayannis. & Zedtwitz (2005)	Likert
				Other legal services (business registration, etc.)	Malecki & Nijkamp (1988), Smilor, (1987b).	Likert
				Incubatee capacity building	Costa-David, Malan, Lalkaka (2002)	Likert
I	4	Infrastructure facilities provided by the techno incubator	Facilities provided by the techno incubator	Office/ factory space below market rate	Abetti, (2004)	Likert
				Machinery workshops	Abetti, (2004)	Likert
				Telephones	Carayannis & Zedtwitz,(2005)	Likert
				Analytical service facility	Sharma, (2014)	Likert
				Internet	Carayannis & Zedtwitz,(2005)	Likert
				Meeting / conference room(s)	Carayannis & Zedtwitz,(2005)	Likert
				Vehicle parking space	Carayannis & Zedtwitz,(2005)	Likert
				Showcasing area/ Area for exhibits	Carayannis & Zedtwitz,(2005)	Likert
I	5	Graduation and exit criteria of the techno -SMEs from the techno-incubator	Graduation and exit criteria of the techno -SMEs from the techno-incubator	Acquisition of start-ups by large corporate	ISBA (2013)	Likert
				Start-up grows in size in terms of revenue	ISBA (2013)	Likert
				Start-up is able to develop an innovative technology	ISBA (2013)	Likert
				Start-up is able to raise angel investment/venture capital/private equity	ISBA (2013)	Likert
				Completion of the incubation period	Sharma, (2014)	Likert
				Due to closure of the start-up	Sharma, (2014)	Likert
D	6	Commercial success of the techno-SME start-up	Incubator success	Number of firms exiting the incubator	Allen and Weinberg (1988).	Likert
				Number of firms discontinuing incubator operations while still a tenant	Allen & Weinberg,(1988).	Likert

			Incubatee success	Graduated incubatee is surviving and growing profitably	Hackett & Dilts, (2004)	Likert
				Graduated incubatee is surviving and growing and it is on a path toward profitability	Hackett & Dilts, (2004)	Likert
				Graduated incubatee is surviving but it is not growing and it is not profitable or it is only marginally profitable	Hackett & Dilts, (2004)	Likert

Table 3.2: Population of the research

Group	Total Sample	Per SME
Techno-SME entrepreneurs	100	1

Table 3.3: Sample of the stakeholders of the techno-incubators

Group	Total Sample	Per Institution
Research Institutes- SME support divisions	8	2
Angle Networks	4	1
Venture Capital providers / Banks	5	1
Policy makers in Techno base SME promotion	4	N/A
Techno incubation facility providers	4	1
Expertise in techno incubation	4	1

4.5 Sample of the Study
Researcher has accessed the techno-SME data base of Techno Incubation Centre (TIC) in Pitipana, Homagama as summed up in Table 3.2. Stakeholders of the sample study are listed in Table 3.3.

4.6 Data Collection Method
More weight has been placed on face-to-face interviews with the techno- entrepreneurs and the other parties of the population of the research. Interviews are conducted through telephone, Skype and web surveys.

4.7 Data Analysis Method
The data was analysed by using Statistical Package for the Social Sciences (SPSS) to get the outcome of the result of descriptive statistics

5.0 Data analysis and discussion
This section presents the findings of the study as well as all the findings obtained through statistical analysis. This research is based on descriptive study and hypothesis testing. It begins with preparation, data screening, and profiles of respondents which give an idea of how the data looks like.

5.1 Characteristics of Respondents

Data collection was conducted among; Techno-SME entrepreneurs, Venture capital providers, Bankers, Policy makers in techno base SME promotion, Techno-incubation facility providers, Expertise in techno-incubation, Representatives of Research Institute SME support division. Majority of the techno entrepreneurs who participated to the survey were from information technology field. But there were significant numbers of the entrepreneurs from electronics & electrical, polymer-technology,

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nanotechnology, automobile, aeronautical (drones & autonomous aircrafts) sectors as well.

5.2 Reliability

The reliability and the validity of the indicators and the variables were checked before using them to confirm whether the indicators were capable enough to measure variables. For measuring reliability, Cronbach's Alpha is used to measure the reliability.

5.2.1 Techno- SME start-up eco-system

There are four variables with eighteen indicators to measure the techno- SME start-up eco-system. The

which is higher than 0.50. , hence it is acceptable.

reliability of the four main variables is analyzed separately.

Table 4.2: Reliability statistics for the techno-SME promotion

Cronbach's Alpha	N of Items
.742	5

Combined reliability of the five indicators in Table 4.3 shows Alpha value of 0.742 in Table 4.2

Table 4.3: Total statistics for indicators of the techno-SME promotion

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Techno-SME promotion_1	9.62	6.610	.558	.677
Techno-SME promotion_2	9.68	7.165	.312	.777
Techno-SME promotion_3	9.79	6.655	.556	.678
Techno-SME promotion_4	9.79	5.855	.722	.608
Techno-SME promotion_5	10.08	7.536	.427	.723

5.2.2 Position of the techno incubator as a tool of techno- SME start-ups

There are four indicators to measure the position of the techno incubator as a tool of techno- SME start-ups. Results of the reliability analysis are shown in Table 4.4.

Table 4.4: Reliability statistics for the position of the techno incubator as a tool of techno- SME start-ups

Cronbach's Alpha	N of Items
.856	4

5.2.3 Regulations to promote techno-SMEsII

There are four indicators to measure the regulations to promote techno-SMEs. Result of the reliability analysis is shown in Table 4.5

Table 4.5: Reliability statistics for the regulations to promote techno-SMEs

Cronbach's Alpha	N of Items
.623	4

5.2.4 Regulations to promote techno-based SME start-ups through techno-incubators

There are five indicators to measure the regulations to promote techno-based SME start-ups through techno-incubators. Results of the reliability analysis is shown in Table 4.6

Table 4.6: Reliability statistics for the regulations to promote techno-based SME start-ups through techno-incubators

Cronbach's Alpha	N of Items
.853	5

5.3 Selection criteria of the techno- SMEs for the techno-incubator

There are three main variables to measure the selection criteria of the techno- SMEs for the techno-incubator. Each variable analyzed separately for reliability and validity.

5.3.1 Selection criteria of the techno-start-ups

There are three indicators to measure selection criteria of the techno-start-ups. Reliability is checked and results are shown in the table 4.7. According to the Alpha value, it shows a low reliability.

Table 4.7: Reliability statistics for the selection criteria of the techno-start-ups

Cronbach's Alpha	N of Items
.446	3

Item total statistic showed that by removing second indicator, the reliability will increases. After removing the second indicator, reliability is analyzed and the Table 4.8 shows high reliability.

Table 4.8: Reliability statistics for the selection criteria of the techno-start-ups (removing second indicator)

Cronbach's Alpha	N of Items
.828	2

5.3.2 Viability of the techno- SME start-up

There are six indicators to measure the validity of the techno-SME start-ups. Reliability is checked and results are shown in the Table 4.9.

Table 4.9: Reliability statistics for the validity of the techno-SME start-ups

Cronbach's Alpha	N of Items
.586	6

Above analysis also showed that by removing fifth indicator the Alpha value is increased. Further reliability was checked by removing indicator three, indicator six and indicator one to get a higher value of Alpha. as shown in the Table 4.10

Table 4.10: Reliability statistics for the validity of the techno-SME start-ups (final result)

Cronbach's Alpha	N of Items
.802	2

5.3.3 Competence of the Incubatee

There are six indicators to measure the competence of the incubatee. Reliability is checked and results are shown in the Table 4.11.

Table 4.11 Reliability statistics for the competence of the incubatee

Cronbach's Alpha	N of Items
.583	6

5.4 Services offered and the business support given by the techno-incubator.

To measure the "Services offered and the business support given by the techno-incubator.", four variables are used. Reliability and the validity is analyzed for all of them.

5.4.1 Techno-incubator configuration

There are three indicators are used to measure the techno-incubator configuration. Reliability analysis for them is shown in the Table 4.12.

Table 4.12: Reliability statistics for indicators of the techno-incubator configuration

Cronbach's Alpha	N of Items
.469	3

5.4.2 Capital sources

There are five indicators are used to measure the capital sources. Reliability analysis for them is shown in Table 4.13.

Table 4.13: Reliability statistics for indicators of the capital sources

Cronbach's Alpha	N of Items
.882	5

Reliability analysis shows the alpha value of 0.882 with high reliability. Factor analysis is conducted for these indicators and which is shown in Table 4.14.

Table 4.14: Total variance explained for the indicators of the capital sources

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.406	68.112	68.112	3.406	68.112	68.112
2	.980	19.602	87.714			
3	.324	6.476	94.190			
4	.206	4.123	98.312			
5	.084	1.688	100.000			

5.4.3 Product & process development support

There are five indicators are used to measure the product & process development support. Reliability analysis for them is shown in the Table 4.15.

Table 4.15: Reliability statistics for indicators of the product & process development support

Cronbach's Alpha	N of Items
.928	6

Table 4.16: Item-total statistics for indicators of the product & process development support

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Product & process development support_1	15.93	13.066	.865	.925
Product & process development support_3	16.20	14.218	.802	.937
Product & process development support_4	16.03	12.999	.905	.918
Product & process development support_5	15.83	12.857	.867	.925
Product & process development support_6	15.73	13.942	.788	.939

Above analysis in the table 4.16 shows the alpha value of 0.943 with high reliability.

5.4.4 Business introduction support at early stages of the business

There are eight indicators are used to measure the business introduction support at early stages of the business. Reliability analysis is shown in the Table 4.17. .

Table 4.17: Reliability statistics for indicators of the business introduction support at early stages of the business

Cronbach's Alpha	N of Items

.902	8

5.4.5 Infrastructure facilities provided by the techno incubator

There are eight indicators are used to measure the infrastructure facilities. Reliability analysis is shown in Table 4.18.

Table 4.18: Reliability statistics for indicators of the infrastructure facilities

Cronbach's Alpha	N of Items
.911	8

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5.4.6 Graduation and exit criteria of the techno - SMEs from the techno-incubator

There are six indicators are used to measure the graduation and exit criteria of the techno –SMEs. Reliability analysis for them is shown in Table 4.19.

Table 4.19: Reliability statistics for the graduation and exit criteria of the techno –SMEs

Cronbach's Alpha	N of Items
.574	6

5.4.7 Commercial success of the techno-SME start-up

There are two variables under commercial success of the techno-SME start-up.

5.4.7.1 Incubator success

There are two indicators used to measure the incubator success. Reliability analysis is shown in Table 4.20.

Table 4.20: Reliability statistics for the incubator success

Cronbach's Alpha	N of Items
.083	2

5.4.7.2 Incubatee success

There are three indicators are used to measure the incubatee success. Reliability analysis is shown in Table 4.21.

Table 4.21: Reliability statistics for the incubatee success

Cronbach's Alpha	N of Items
.465	3

5.5 Hypothesis Testing

5.5.1 Hypothesis testing for Techno-SME start-up ecosystem and processes in techno-incubators

There are four hypothesizes for techno-SME start-up ecosystem and processes in techno-incubators.

1- Hypothesis 1:

$H1_0$: There is no significant relationship between the techno-based SME start-up eco-system and the selection criteria of the techno base SMEs for the techno incubator.

$H1_1$: There is a significant relationship between the Techno-based SME start-up Eco-system and the selection criteria of the techno base SMEs and services offered in the techno incubator.

Table 4.22: Variable for hypothesis testing for selection criteria of the techno base SMEs

	Variables	SPSS Variable Name	Measure
Independent	Techno-SME start-up eco-system	TICeco_1	Scale
Dependent	Selection criteria of the techno base SMEs	Selection_2	Scale

Since this analysis consisted of scale data regression analysis is used to check the significant of the variables. According to the analysis, p-value for techno-based SME start-up eco-system is 0.144. For testing it is used the 0.05 significant level at 95% confident interval. The value of this variable is higher than the significant level. Because of that the null hypothesis cannot be rejected. There is no significant relationship between the techno-based SME start-up eco-system (Policies and Strategies to promote techno-incubators for SMEs) and the selection criteria of the techno base SMEs for the techno incubator.

2- Hypothesis 2:

$H2_0$: There is no significant relationship between the techno-based SME start-up eco-system and the services offered and the business support given by the techno incubator.

$H2_1$: There is a significant relationship between the techno-based SME start-up eco-system and the services offered and the business support given by the techno incubator.

Table 4.23: Variable for hypothesis testing for the services offered and the business support given by the techno incubator.

	Variables	SPSS Variable Name	Measure
Independent	Techno-SME start-up eco-system	TICeco_1	Scale
Dependent	Services offered by the techno incubator.	Serivicesoff_3	Scale

According to the analysis, p-value for techno-based SME start-up eco-system is 0.272. For testing it is used the 0.05 significant level at 95% confident interval. The value of this variable is higher than the significant level. Because of that the null hypothesis cannot be rejected. There is no significant relationship between the techno-based SME start-up eco-system (Policies and Strategies to promote techno-incubators for SMEs) and the services offered and the business support given by the techno incubator.

3- Hypothesis 3:

$H3_0$: There is no significant relationship between the techno-based SME start-up eco-system and the infrastructure facilities provided by the techno incubator.

$H3_1$: There is a significant relationship between the techno-based SME start-up eco-system and the infrastructure facilities by the techno incubator.

Table 4.24: Variable for hypothesis testing for the infrastructure facilities provided by the techno incubator.

	Variables	SPSS Variable Name	Measure
Independent	Techno-SME start-up eco-system	TICeco_1	Scale
Dependent	Infrastructure facilities provided by the techno incubator.	Inf_44	Scale

According to the analysis, p-value for techno-based SME start-up eco-system is 0.018. For testing it is used the 0.05 significant level at 95% confident interval. The value of this variable is lower than the significant level. Because of that the null hypothesis can be rejected. There is a significant relationship between the techno-based SME start-up eco-system (Policies and Strategies to promote techno-incubators for SMEs) and the infrastructure facilities provided by the techno incubator.

4- Hypothesis 4:

$H4_0$: There is no significant relationship between the techno-based SME start-up eco-system and the graduation and exit criteria of the techno base SMEs from the techno-incubator.

$H4_1$: There is a significant relationship between the techno-based SME start-up eco-system and the graduation and exit criteria of the techno base SMEs from the techno-incubator.

Table 4.25: Variable for hypothesis testing for the graduation and exit criteria of the techno base SMEs from the techno-incubator.

	Variables	SPSS Variable Name	Measure
Independent	Techno-SME start-up eco-system	TICeco_1	Scale
Dependent	Graduation and exit criteria of the techno base SMEs from the techno-incubator.	Gardexit_55	Scale

According to the analysis, p-value for techno-based SME start-up eco-system is 0.030. For testing it is used the 0.05 significant level at 95% confident interval. The value of this variable is lower than the significant level. Because of that the null hypothesis can be rejected. There is a significant relationship between the techno-based SME start-up eco-system (Policies and Strategies to promote techno-incubators for SMEs) and the graduation and exit criteria of the techno base SMEs from the techno-incubator.

5.5.2 Hypothesis testing for the processes in techno-incubators and commercial success of the techno-based SME start-up

There are four hypothesizes for processes in techno-incubators and the commercial success of the techno-based SME start-up.

5- Hypothesis 5:

$H5_0$: There is no significant relationship between the commercial success of the techno-based SME start-up and the selection criteria of the techno base SMEs for the techno incubator.

$H5_1$: There is a significant relationship between the commercial success of the techno-based SME start-up and the selection criteria of the techno base SMEs for the techno incubator.

6- Hypothesis 6:

$H6_0$: There is no significant relationship between the commercial success of the techno-base SME start-up and the services offered and the business support given by the techno incubator.

$H6_1$: There is a significant relationship between the commercial success of the techno-base SME start-up and the services offered and the business support given by the techno incubator.

7- Hypothesis 7:

$H7_0$: There is no significant relationship between the commercial success of the techno-based SME start-up and infrastructure facilities provided by the techno incubator.

$H7_1$: There is a significant relationship between the commercial success of the techno-based SME start-up and infrastructure facilities provided by the techno incubator.

8- Hypothesis 8:

$H8_0$: There is no significant relationship between the commercial success of the techno-based SME start-up and graduation and exit criteria of the techno base SMEs from the techno-incubator.

$H8_1$: There is significant relationship between the commercial success of the techno-based SME start-up and graduation and exit criteria of the techno base SMEs from the techno-incubator.

Table 4.26: Variable for hypothesis testing for the commercial success of the techno-based SME

	Variables	SPSS Variable Name	Measure
Independent	Selection criteria of the techno base SMEs	Selection_2	Scale
	Services offered by the techno incubator.	Serivicesoff_3	Scale
	Infrastructure facilities provided by the techno incubator.	Inf_44	Scale
	Graduation and exit criteria of the techno base SMEs from the techno-incubator.	Serivicesoff_3	Scale
Dependent	Commercial success of the techno-base SME start-up	Commer_6	Scale

According to the analysis, p-value for Selection criteria of the techno base SMEs is 0.013 and the p-value for the services offered by the techno incubator. For testing it is used the 0.05 significant level at 95% confident interval. The value of this variable is lower than the significant level. Because of that both null hypothesis can be rejected.

There is a significant relationship between the commercial success of the techno-based SME start-up and the selection criteria of the techno base SMEs for the techno incubator. There is a significant relationship between the commercial success of the techno-based SME start-up and the services offered and the business support given by the techno incubator.

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Also according to the analysis, p-value for the infrastructure facilities provided by the techno incubator is 0.736 and the p-value for the graduation and exit criteria of the techno base SMEs from the techno-incubator is 0.225. For testing it is used the 0.05 significant level at 95% confident interval. The value of this variable is higher than the significant level. Because of that the null hypothesis cannot be rejected. There is no significant relationship between the commercial success of the techno-based SME start-up and infrastructure facilities provided by the techno incubator.

There is no significant relationship between the commercial success of the techno-based SME start-up and graduation and exit criteria of the techno base SMEs from the techno-incubator.

techno incubator. Getting funds from the angel networks, venture capital providers there are expectation mismatch between output of the incubator/ techno-SME start-up and the angel investor expectation. Technology updating and upgrading is an important factor for the sustainability of the techno-SME start-ups, so giving access to universities to expertise is very important to be aware about new technologies, new inventions, etc. In Sri Lanka, most of the techno-SMEs are followers and most techno-SMEs fail due to being late adapters of the technology because of lack of information. Links with universities and research organizations can fill that gap and techno-SMEs can become early adapters or pioneers of new technologies.

5.6 Summery of the hypothesis testing

Table 4.27: Summary of Hypothesis Testing for the commercial success of the techno-SME start-up

Variable	p-value	Relationship
Selection criteria of the techno base SMEs	0.013	Yes
Services offered by the techno incubator	0.005	Yes
Infrastructure facilities provided by the techno incubator	0.736	No
Graduation and exit criteria of the techno base SMEs from the techno-incubator	0.225	No

6.0   Conclusions and Recommendations

In the past 60 years Sri Lanka has been able to boast only 'one' world class initiative that achieved global market share –"LOADSATR". Most of the techno entrepreneur highly technical people and some are serial inventers. Although they are capable in the technology, majority of them do not have soft skills of general management, marketing and finance management. Due to that most of the techno start-ups are being closed down.   Therefore business mentoring should be one of the key services provided by the techno incubator.   Establishing proper selection mechanism for the techno-SME start-ups to the techno-incubators are more critical. That can be help full to select most suitable techno-start-ups for the available resources and the capabilities of the

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Challenges of High Production Cost of Garment Manufacturing Industry in Sri Lanka

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Abstract— **Sri Lankan's garment manufacturing industry is the most significant and dynamic contributor for Sri Lanka's economy. It was observed that there is a drastic drop in the growth rate of this industry due to high production cost compared to similar economies/industry in the world. Therefore, main objective of this research was examining the factors behind high production cost of garment manufacturing industry of Sri Lanka. For this purpose, four major players of Sri Lankan garment manufacturing industry were selected and named as case A, case B, case C and case D.**

Literature reviews revealed four main sections in garment manufacturing industry as cutting, production, packing and transportation. Based on that, four in-depth interviews were done with mangers of cutting unit, production unit, packing unit and logistics unit of each case. Also, documentary evidences were collected. Data were analyzed using NVivo10 software with a combination of theoretically derived codes and indigenous codes as the coding strategy.

Results of this study showed that the factors of high production cost such as Inability to maintain the 100% cut to ship ratio, Fabric utilization with lowest marker efficiency, Absenteeism of employers, learning curves, Insufficient Employee Training, and Ineffective communication without transparency. Lastly, this research provided several implications to aspiring managers and leaders as organizations are moving towards innovation.

Keywords—production cost, garment industry, cutting, production, packaging, logistics

I. INTRODUCTION

Sri Lankan garment manufacturing industry is the 3rd largest contributor to the Gross Domestic Product (GDP) of Sri Lanka for more than 20 years [1]. Further, it is the country's leading foreign exchange earner, where it accounts for approximately 60% of the exports of the country while generating more than one million direct and indirect employments [2]. Globalization of the industries has pressurized the manufacturing industry to operate on location-based manufacturing economies. This is supported by the policies of United States and European Union import policies too [2]. In location-based manufacturing economies, cost is a major determinant [3]. Even though Sri Lanka used to be in the top front of garment manufacturing, current economic situation in the country has badly affected this industry. Therefore, it is observed that the demand for Sri Lankan garments is going down while the demand for Bangladesh, Vietnam, India and Cambodia is rising [1]. Handful of Sri Lankan companies are still securing their demand position as they are competing on high quality. But the majority of the manufacturers are producing standard garments, where the competition is primarily based on price [1]. To face price-based competition, Sri Lanka should focus on becoming a cost leader with low cost of production. Yet, there is evidence that Sri Lankan garment manufacturers are facing high costs of production [2]. Other issues they face are identified as longer lead times, less flexibility, higher dependency on buying office and lack of innovativeness [2]. Making things worse for the industry, it is noticed that many large international garment buyers (around 20) have shifted their business from Sri Lanka into cheaper manufacturing destinations [1]. Meanwhile, Vietnam, Cambodia, Bangladesh, Pakistan, Indonesia, and Cambodia countries are emerging as lower cost producers with preferential access to US and EU markets [3][4]. Therefore, main objective of this study is to identify the factors behind the high cost of production and the extent to which those have impacted on raising the production cost. The researcher studies product life cycle of apparel industry through communication process, ordering process, transportation process, inventory management process, material handling process, manufacturing process, and warehouse management process. Objectives of the study are as follows;

- To identify the factors that has contributed to the high cost of production in the garment manufacturing industry in Sri Lanka.
- To critically review the cost theories to understand the various determinants of cost of production
- To evaluate the identified factors behind the high cost of production in Sri Lankan garment manufacturing industry with the light of reviewed cost related theories.

II. LITREATURE REVIEW

As mentioned earlier, the apparel industry positions as one of the most globalized industries in the world. Its supply chain combines merchandisers, buyers, suppliers, retailers, contractors, subcontractors, customers and many other parties [6]. Each player plays an important role in this supply chain network and employs a complex process. Due to this complex nature, unusual characteristics like short product life cycles, high volatility, low predictability and high impulsive purchasing are evident [6]. These reasons bring high stress to apparel vendors. Further, increased competition, globalization, dynamic nature and increased demand for variety, quality and service by the customers require the apparel vendors to be reliable and fast in delivery in a cost-effective manner. According to literature, main reason for the customers to switch from Sri Lankan apparel manufacturers is the cost [2]. Further, garment manufacturing organizations consist of three main sectors/units namely, cutting, sewing and finishing (packing) [6]. Therefore, it is important to examine the costs incurred in each sector/unit of garment manufacturing organizations.

For any business, determining the selling price and the profit is very important. In the past, manufacturing industry used a simple formula to calculate the selling price of a unit; Selling Price = Cost + Profit. In that stage, manufacturing industries did not pay much attention on the cost factor or the price as there were very few competitors. But with the increased competition at present buyers are very sensitive to the price. Therefore, companies try to find solutions as to how to survive in the global market without increasing selling price. Hence, the equation is changed to; Profit = Selling Price – Cost. This clearly express the way profit is calculated. Which implies that companies should pay more attention in controlling the costs to increase the profit.

A thorough literature review was conducted to study the different types of costs involved in the production process. Cost can be defined as the amount of expenses (actual or notional) incurred on or attributable to specified thing or activity. As per Institute of cost and work accounts (ICWA) India, cost is measurement in monetary terms of the amount of resources used for the purpose of production of goods or rendering services [7]. In managerial accounting and cost accounting, production costs are the direct materials, direct labor, and manufacturing overhead used to manufacture products. And it is also referred to as manufacturing costs, product costs, a manufacturer's inventorial costs, or the costs occurring in the factory. Another classification of production cost is as direct or indirect product costs. On one hand, direct materials and direct labor are direct product costs because they can be easily and economically traced to the products being manufactured. On the other hand, manufacturing overhead costs are indirect product costs because they are not easily or economically traceable directly to the products. Cost is discussed under three categories as direct costs (costs of material, labor, transport), indirect costs (overhead, design, sample, and administrative costs which are costs not directly linked to the specific product) and macro costs (taxes, quota fees, tariffs, infrastructure, other government policies or regulations) [8]. Also, production cost can be considered as the total sum of money required for the production of a specific quantity of output. In economics, cost of production has a special meaning. It is all of the payments or expenditures necessary to obtain the factors of production of land, labor, capital and management required to produce a commodity. It represents money costs which we want to incur in order to acquire the factors of production [9].

However, it is stated that; "The cost per unit of the garment produce in our country is considered as higher than our competitor's nations mainly due to lower output, inadequate training, lack of infrastructure etc. however now a days the awareness about these things has been increased among the exporters and they are trying to overcome these difficulties in order to fetch export orders." This statement refers to a different view of the cost in garment industry [9]. In accordance with that, many other scholars have also looked at the cost in garment industry in different conceptualizations.

One such conceptualization is the view of the cost in this industry as cut and make (CM) cost which is part of the production process. It is discussed related with the time as "cost per minute." As an example, in 1999 costs were listed as US$0.056 per minute in Cambodia, US$0.057 per minute in Vietnam, US$ 0.059 per minute in China, US$0.069 in Guatemala, up to US$0.171 per minute in the United States and US$ 0.267 per minute in Germany [8].

Another view is that the most of direct costs are beyond the control from the manufacturer and the controllable portion of the cost is the indirect cost. For an example; if the lead times are short the indirect costs incurred will be lower [10]. Further, manufacturing plants with new machines has a competitive edge over the other organizations as latest technologies ensure high quality standards, improved speed and there by control the production cost. One such technology used by manufacturing organizations is computer-aided design and manufacturing (CAD/CAM) [3]. Another cost saving mechanism is the backward integration such as in-house washing plant which has bleach, stone, acid, and normal washing facilities, in-house facilities for screen printing to meet specific needs of buyers and advanced multi head automatic embroidery machines [3]. Further, having a subordinate plant in same premises might enable the organization to reduce transposition costs and save time. Saman Kelegama has identified the lack of economies of scale as a source of high production costs [4].

In summary, literature identifies following factors as the sources of high production costs in garment manufacturing industry.

- Lack of resource
- Lack of Innovations
- Lack of Team Work
- Insufficient Employee Training
- Absenteeism of employers
- Fabric utilization with lowest marker efficiency
- Learning curves

These factors were used as the theoretical codes when the data analysis was conducted.

III. RESEARCH DESIGN AND METHODOLOGY

This is a qualitative study which follows an inductive approach [11]. Case study method is used to collect data through four cases selected from the Sri Lankan garment industry. Interviews, observations and document reviews were used to study the selected cases [12]. Researcher collected company profiles, bill of materials, invoices, purchase orders, measurement sheet, fabric inspection report, cut report, production report, inspection report, quality inspection reports, sample inspection reports, goods received notes, production plans, daily production amount sheets, line efficiency and defective reports, packing lists, order confirmation sheets and fabric allocation report…etc as documentary evidences.

In-depth face to face interviews were conducted in each case study company and all the interviews were tape recorded. Four units of each company was studied in detail through interviews, observation and documentary evidences. Analysis of the interview data began with their verbatim transcription. Amount of time involved in preparing the transcriptions was much greater than expected because the interviews were conducted in Sinhala and after transcribing, they were translated back into English. However, this practice made the researcher very familiar with the content of the transcripts. Data was analyzed using content analysis, a technique that offers new insights and increases the researcher's understanding of a particular phenomenon. The

approach to content analysis used here was thematic analysis, where the coding scheme was based on categories designed to capture the dominant themes present in the text [13].

Thematic analysis was conducted through the following steps. First, the researcher read through all transcriptions and took notes or marked ideas for coding. Second, initial codes were produced from the data. Codes identify a feature of data that appears interesting to the researcher and refer to element of the raw data or information that can be evaluated in a meaningful way regarding the phenomena. In the third and fourth step, different codes were sorted into potential themes and all the relevant coded data extracts were collated within the identified themes. Fifth step focused on refining and naming the themes. Final analysis and write-up of the thesis was the last step of this process. Moreover, at every stage, codes were subjected to modifications to ensure its appropriateness, accuracy and coherence.

Four companies from the Sri Lankan Garment industry are selected for the study and those are named as Case A, B, C and D. Selected cases for the study are as follows;

A. Case A

Case "A" launched their first apparel factory is in 1980. This facility was expanded in 1982, manufactures some of the world's most sought-after seasonal collections, specializing in children's wear. Incorporated in 1980, Case A operates three plants in relatively close vicinity to each other, developing and manufacturing products for leading brands including M&S, Next, Nor Lanka & George.

This company has provided job opportunities for 25,000 employees with a turnover of 400 million US dollars. Manufacturing and exporting are the core business activities of Case Study A. It manufactures children's and woven wear with varies product range such as Jacket, Jogger, Tee, Sweat, Legging, Dress, Short, Dungaree... etc. It can manufacture within the fabric range of any types of checks, stripes, printed and plain material, woven, spandex, and wash garments as its machines are flexible with these types of fabric types. The major foreign markets are the UK and USA but it also exports to India and Middle East countries as well. Around 55% of its products are exported to USA and 30% to the UK. It does not have direct contacts with its buyer thus all the coordination with the buyer is carried out via the buying agent located in Sri Lanka. The remaining 15% of products are sent to India and Middle East countries. The majority of the raw materials are imported from China and Hong Kong. Case study A also works as a major player of garment manufacturing companies in Sri Lanka.

Four interviews were conducted at this company where the cutting manager, production manager; packing manager and transport (Logistic) manager were interviewed. Purchase orders, production plan, product specification sheets, bill of materials, invoices, in-process inspection report, daily production status report, CAD system marker development sheets, trim card and company profile were the documents collected from this company.

B. Case B

Case B was established in 1987 as a private limited company and currently its annual turnover is around 1.6 billion. Company B is positioned as one of the world's most recognized design to delivery solution providers in the realm of the apparel and textile manufacturing. It is also the largest apparel and textile manufacturer in South Asia. The organization is headquartered in Sri Lanka with 50 manufacturing facilities placed across 16 countries, with design locations placed in key style centers across the globe and over 88,000 people involved in its operation. The main export markets are UK, USA and Europe especially the M&S, Victoria Secret, Levis, Nike… etc. are its leading brands to its export markets.

Case Study B has been able to initiate and maintain direct contacts successfully with its foreign buyers. More than 65% of the raw material is imported mainly from China, Hong Kong. The lead time is between 90 to 120 days and it mainly works on the buyers designs whilst occasionally it offers its own designs for buyers.

Similar to Case A, four interviews were conducted with the cutting manager, production manager; packing manager and transport (Logistic) manager. The collected documents were production plan, technical specification sheets, bill of materials, order confirmation sheets, inline quality inspection reports, accessories inspection reports, fabric inspection reports, lay plan for costing, invoices, pre-cost sheets, local purchase orders, sample plan, trim cards, purchase orders and company profile.

C. Case C

It was founded in 1972 and presently employs 47,000 people with an annual turnover of around 750 million US dollars. Casualwear, Jeans, Sleepwear, Lounge, briefs and Bra are the main products of Case Study C. The company specializes in casual bottoms, intimate and active wear, woven and knitted fabrics. The most of its products are exported to the UK, and USA. Some of the products are exported to Germany and Canada.

It has been able to successfully establish direct contacts with its foreign buyers. Victoria Secret, M&S, Next, GAP is the main labels manufactured by Case Study C. China, India and Hong Kong are the main suppliers of raw material. Thread is taken by locally such as A&E and Coats. Textile plant of case study C provides more than 50% of the Group's woven fabric requirements. Also, it mostly manufactures knit garments as they are compatible with its range of machinery.

The relationship with these foreign suppliers is strong as they have been dealing with them since long time. Unless the buyer has a nominated supplier they deal with their usual suppliers for sourcing raw materials. The case study always plans to keep lead time less than 90 days when they are supplying fabric from their own plant.

Four interviews were taken from this case study as well, one interview with the cutting manager, production manager, finishing manager and transport manager (Logistic) for the purpose of collecting strong data. Cutting plan, production plan, finishing plan, trim card, quality inspection report, invoices, purchase orders, CAD system grading sheets, marker development sheets, fitting comments reports and company profile were the documents received from the Case Study C.

D. Case D

Case D began its business operations in 1990. This company employs 40,000 workers and annual turnover is 550 million US dollars. Case study D specializes in woven garments, including dresses, jackets, pants, skirts, shorts, blouses, nightwear and children's wear. Its main export markets are the EU and USA. It has direct contacts with its buyers in the UK and USA. Even though they have direct contact with UK and USA buyers, they are coordinating and getting orders from local buying office which is located in Sri Lanka. Dresses, jackets, pants, skirts, shorts, blouses, nightwear and children's wear are manufactured by this case study and the details of the orders including the design of the dress are received via email from the buying office.

This case study's lead time is around 90-120 days however it varies depending on the order size. Fabric is imported from the foreign suppliers nominated by the buyers from India, China, Korea and Pakistan. More than 80% of the raw material is imported mainly from China, Hong Kong and Taiwan. Case study D is producing leading brands such as M&S, Next, Ralph Lauren, Esprit, Chaps… etc.

Four interviews were carried out with this company with the cutting manager, production manager; packing manager and transport (Logistic) manager at the data collection phase. Cutting plan, production plan, finishing plan, trim card, quality inspection report, fitting comments reports and company profile were the documents received from this company.

IV. DATA ANALYSIS

Findings of the analysis are discussed under four main areas namely; cutting, production, packing and transport. Interview and documentary data analysis are presented under fifteen factors that emerged through the thematic analysis. Tree coding strategy was used with pre-coded and in-vivo themes emerged. Miles and Huberman data analysis stages were used reduce, display and draw conclusions [14]. Trustworthiness of data was also ensured through the criterion of truth value, refutation and transferability as recommended by Pedrosa et al,. [15]. Out of these factors, Inability to maintain the 100% cut to ship ratio, Plan unachievable production targets, Improper purchasing, Misuse transportation ways, Poverty of negotiation, Not managing overtime, Ineffective communication without transparency and Time wasting for double work were surprising factors which were not identified through the in-depth literature review. All the identified factors are presented below.

1. Inability to maintain the 100% cut to ship ratio

All the cases identified this gap and had their own interpretation to this gap. Even though every cutting department operates in full capacity, there is a low production capacity. It is noticed that all the cases are having a production capacity below the cutting capacity. Another aspect is, normally buyers will accept +2% or - 2% garment quantity of their POs (Purchasing order). If production factory works smart, they have the ability to over ship +2%. That will generate more profit and meantime cost of production will go down. As an example, if company has 3, 00,000 pcs with FOB value USD 8, and then they can over ship +2% or 6000 pcs which is worth to USD 48,000.

2. Fabric utilization with lowest marker efficiency

Fabric is the most import part in the garment manufacturing industry. 60% of the cost from FOB is for the fabric. Therefore, all cases agree that they should find ways to maximize the fabric utilization.

3. Time wasting for double work

In this industry, time has a huge value; usually value is between USD 0.08 – 0.10 per minute of machine operator. This value depends on the overhead cost of the respective factory. Therefore all the companies try to minimize the line idle situation by keeping fabric and trims at production plan with right quality, right quantity and right time.

4. Learning curves

Manufacturing plans like to produce long run styles as they do not have to change the styles frequently. That is advantageous to reach high efficiency levels. If there are many styles to change within a shorter period, then the length of the learning curve will be more. And it will cause to increase production cost.

5. Absenteeism of employers

Man power is one of the most import factors in garment manufacturing industry. Therefore absenteeism of employees distrub the production plan and schedules. Delays in the production will lead the organisation to use Air freight the shipments. Pre- planning and backup plans are very important to avoid unwanted destructions. Therefore human resource department must be fully activated in order for the success of this process.

6. Ineffective communication without transparency

Communication is the heart of this industry as every decision taken in the manufacturing process depends on effective communication. Uninterrupted internet connection is very important to have contineous and timely communication within the supply network.

7. Not managing overtime

Most of time, top management approve overtime in order to avoid the air freight situation. But its is observed that employee productivity is less during the overtime period. Therefore, work should be utilised within the usual working hours. This creates losses in time and money.

8. Poverty of negotiation

Before negotiation, person who is going to negotiate should have a good knowledge of market trend and market price. Also skills in managing customer relationship is a positive

factor in negotiations. Failed negotiations can create high production costs.

9. Misuse transportation ways

Due to unplanned and uncntrolled factors costly transportation modes are used. In such situations cost is considered as least important. Therefore, unnessary costs are incurred on transportation.

10. Improper purchasing

In the current purchasing mechanism, there are some non value adding activities which can be eliminated from the process. Not only that these activities add unnecessary costs to the process. Sometimes several merchandisers raise POs to same supplier and get the orders shipped as separate consignments which create extra banking charges, transportation costs and waste the effort and the time.

11. Plan unachievable production target

It was found that the planning departments draw unachievable plans with unrealistic targets with tight SMVs. This has created a bad image as some orders have not met the planned output. Further, it disturbs the master plan and the schedules of all the departments.

12. Insufficient employee training

Employees should be trained to carry out their task with minimum supervision. There is evidence that lack of training has created lot of issues as low quality production, inefficiency and waste.

13. Lack of innovations

Innovations bring new concepts which help to improve the current process. Therefore it is very important for this company to have a department for innovations with interrelationship with work study department (Industrial Engineering department).

14. Lack of resource

Since we are living in fast moving world, technology is changing day by day. As a result of that new machines and new technologies are introduced to this industry. This benefit should be taken in order to avoid high production cost.

15. Lack of team work

Team work is important as the organisation is working towards a common goal. Specifically as this industry depends on a supply chain network, team working mind set is important to achieve the business objectives.

TABLE I. THEAMES IDENTIFIED IN THE STUDY

Factor	Identified in Pre-Coding through Literature	Identified Section
Inability to maintain the 100% cut to ship ratio	Not mentioned	Production
Plan unachievable production target	Not mentioned	Production
Improper purchasing	Not mentioned	Logistics
Misuse transportation ways	Not mentioned	Logistics
Poverty of negotiation	Not mentioned	Logistics
Not managing overtime	Not mentioned	Production
Ineffective communication without transparency	Not mentioned	Production
Time wasting for double work	Not mentioned	Cutting, Packaging
Lack of resource	Found in Literature	Cutting, Production, Packaging, Logistics
Lack of Innovations	Found in Literature	Cutting, Production, Packaging
Lack of Team Work	Found in Literature	Cutting, Production, Packaging, Logistics
Insufficient Employee Training	Found in Literature	Production, Packaging
Absenteeism of employers	Found in Literature	Cutting, Production, Packaging, Logistics
Fabric utilization with lowest marker efficiency	Found in Literature	Cutting
Learning curves	Found in Literature	Production

V. CONCLUSION

This study examined the factor behind the high production cost of garment manufacturing industry through four case study companies in Sri Lanka. To achieve the purpose of the research qualitative case study approach was employed. A series of in-depth interviews with relevant personnel was conducted and documentary evidence also was collected.

Findings of this study add some new knowledge to the current knowledge repository of the garment industry. Going beyond the previous studies, cost centers of cutting, production, finishing and logistics departments were discussed across direct, indirect and micro level cost factors. Findings of this study can be used in improving the cost effectiveness of the garment manufacturing companies in Sri Lanka.

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A study on Business Failure Analysis using B-Sherrod's Failure Prediction Model

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Abstract— **Analysis of financial health is significant for a business firm. For measuring the financial health of a business firm, there are lots of techniques available. B-Sherrod's Failure Prediction Model is one of the reliable tools to predict business failures. This model predicts the possibilities of the bankruptcy of the business organization. The aim of the present study is analyzed the financial health of Auto Ancillary and Reality companies. For the purpose of this study, the required data collected from April 2014 to March 2018. The study found that most of the sample companies like Exide Industries, Amara Raja batteries, Sunteck, Phoenix Township, and Unitech company's financial health are difficult to predict. It's Z - Score range was 5-20. If these companies' failure to improve its working capital, solvency, proper utility of fixed assets and equity investments within 2 years they may go to bankrupt. The remaining sample company's financial position is very poor. So better they close down their business. The study recommended to the management must take necessary steps for improving their efficiency. And also it recommends to the policymakers to make the optimum capital structure like Debt and Equity mix and proper dividend policy for maintaining sufficient earnings for future potential investment**.

Keywords: *B-Sherrod's model, Business failures, Financial Health, Liquidity, Profitability and Solvency.*

I. INTRODUCTION

In the recent economic development, business failures are big problems of business enterprises. Analyzing business failures or financial distress is very much needed in the present scenario. Financial distress simply means the decline of a financial condition over several periods and this situation happens when a firm's cash flow conditions at some period do not match with the expected cash flows. Theoretically, business enterprises are assumed to operate eternally and their basic goal is to make a profit. While those business enterprises continue their successful operations, some of them cannot reach their goals and fall into financial failure mostly in the first two years of their existence. The strong and systematic management leads to longer survival of the entity. This long survival of the entity depends upon the year on year raising graph of the profitability and strong solvency position of the company. If the profitability position, solvency position and financial structure of the firm are not taken proper care, gradually the unit grows weak leading towards sickness and ends incorporate failure ultimately. So prediction financial health is great concern for a business firm. For measuring the financial health of a business firm, there are lots of techniques available. B-Sherrod's Failure Prediction Model is one of the reliable tools to predict business failures.

Financial distress

Financial distress/ failure's occur when an organization is unable to pay its creditors and lenders. This condition is more likely when a business is highly leveraged, its per-unit profit level is low, its breakeven point is high, or its sales are sensitive to economic declines. Financial distress refers to a condition in which a company cannot meet, or has difficulty paying off, its financial obligations to its creditors, typically due to high fixed costs, illiquid assets, or revenues sensitive to economic downturns. A company under financial distress can incur costs related to the situation, such as more expensive financing, opportunity costs of projects, and less productive employees. On account of these reasons, several business units lead to sickness from healthy stage, from sickness to incipient sickness, from incipient sickness to distress and from distress to ultimate closure of the business unit.

If high debt burden is the cause of financial distress, the company can undergo a debt restructuring. If operational issues are the reason for the distress, the company can negotiate a payment holiday with its creditors and improve operations to be able to service its debt.

Review of Literature

The following are some of the reviews related to the present study. They are as follows. **Shariq Mohammed (2017)** conducted to assess the financial health of a firm namely Raysut Cement Company SAOG and its subsidiaries in Oman. The study revealed that the Company Raysut Cement Company SAOG and its subsidiaries are financially sound as they have a higher Z score than the benchmark except in some years of study. It recommended that their findings may be useful for the managers to take a financial decision, the stockholders to choose investment options and others to look after their interest in the concerned cement manufacturers of the country. **Sanesh (2016)** analyzed the Altman Z-score of NIFTY 50 companies excluding banks and financial companies. The score tries to forecast the probability of non-payment by the companies due to the financial distress based on the current financial statistics of the company. This study analyzed the Z Score is not only

envisage when a firm will actually file for legal bankruptcy. And also measure how closely a firm like other firms that have filed for bankruptcy, i.e. it tries to assess the likelihood of economic bankruptcy. **Vikas Tyagi (2014)** in his paper investigated the financial health of logistics industry in India based on Z score analysis. It revealed that Indian logistic industry was a healthy industry. It is average Z score value increases from 2006 to 2010 (2.54 to 3.01) when the Indian economy was hit by global recession. This study found that the overall performance of the Indian logistics industry was good. **Mizan and Hossain's (2014)** Study has been conducted to assess the financial health of cement industry of Bangladesh. The study revealed that among the five sample firms, two firms are financially sound as they have a higher Z score than the benchmark. Another firm is financially sound, but the management requires special attention to improve the financial health of the organization. The other two firms are at serious risk of financial crisis. **Ramana Reddy and Hari Prasad Reddy (2013)**. This paper predicted the risk of financial distress of select sugar manufacturing units in Andhra Pradesh, India. The results clearly indicated that the liquidity, working capital turnover efficiency and solvency position of the companies is not good. The Z-Score analysis also showed the companies are suffering from the financial distress and tending towards bankruptcy of Chittoor co-operative sugars Ltd. Comparatively the financial performance of Sri Venkateswara Sugars Factory Ltd. was good. **Kumari's (2013)** paper tried to predict bankruptcy for MMTC based on Altman's model of the Z score. This study concluded that the overall financial health of MMTC is good, but its financing position of assets is reasonably poor. But, the Z score value indicated that it is in a strong position, and it has no chances of being bankrupt in the next two years. And it can be quoted as an investor friendly company. **Alkhatib and Al Bzour (2011)** conducted a study to report the effect of financial ratios in bankruptcy prediction in Jordanian listed companies through the use of Altman and Kida models. They suggested that the Jordanian listed companies should at least apply one of these models with high credibility for predicting corporate bankruptcy. Among others, corporate bankruptcy prediction model developed by Altman in 1968 is the most accepted and widely used tool (Mizan, Amin and Rahman 2011).The Altman Z score model is used in different countries for predicting bankruptcy. **Ramaratnam and Jayaraman (2010)** measured financial soundness of Indian steel industry by using Z score model. Their study revealed that all the selected companies are financially sound during the study period**. Gerantonis Vergos and Christopoulos (2009)** investigated whether Z-score models can predict bankruptcies for a period up to three years earlier. Results showed that the Altman model performed well in predicting failures. They concluded that the results can be used by company management for financing decisions, by regulatory authorities and by portfolio managers in stock selection. **Chowdhury and Barua (2009)** Applied Z score model to the Z category shares traded in DSE to judge financial distress risk of each share. They disagreed that the Altman's Z score model, though may not be fully applicable for companies in Bangladesh, yet proves its strong validity and correctness in predicting the distressful status of the Z category companies. **Al-Rawi, Kiani, and Vedd (2008)** used the Altman Z-score analysis to predict a firm's

insolvency. They observed that the firm has increased its debt and will be facing bankruptcy in the near future.

Objectives

➢ To analyze the Business failures of Auto –Ancillary units and Reality Co's in India
➢ To predict the financial distress using B-Sherrod's Failure Prediction Model.

Research Methodology

Need of the Study

The objective of the present study is to predict the financial health of Auto- Ancillary units and Reality companies. At present scenario the growth of the auto industry and reality business is slow down because of major global economic and other factors like crude oil price, exchange rate fluctuations, Petrol& Diesel price hikes etc. So its need of the hour for analyzing the financial health of the above two sector.

Sample and sources of data

The study is based on Secondary data collected from www.money control.com for the period of five years financial data from 2013 -14 to 2017-18. Totally ten companies five in each sector considered this research paper. They are Exide Industries, Amara Raja Battries, Amtek Auto, Omax Auto & PRICOL in Auto ancillary units and Brigade Enterprises, Phoenix Township, Unitech, Prestige Estate projects & Sunteck in reality business. The chosen sample is based on lowest turnover recorded in the month of September 2018.

Beaver B- Sherrod's model

The present study used B-Sherrod's Failure Prediction Model. This is one of the most modern models in predicting financial failure. It depends on the six independent financial indicators, in addition to the relative weights of the discrimination function coefficients given for these variables, following ratios of companies: – cash flow to total debt, – net income to total assets, – total debt to total assets, – Total assets to total liabilities – current ratio according to the following formula:

$$Z = 17X_1 + 9X_2 + 3.5X_3 + 20X_4 + 1.2X_5 + 0.1X_6$$

where: X_1 – Net Operation Capital /Total Assets,
X_2 – Current Liquid Assets/Total Assets,
X_3 – Total Equity/Total Assets,
X_4 – Net Income before Income Tax/Total Assets,
X_5 – Total Assets/Total Liabilities,
X_6 – Total Equity / Total Fixed Assets

Category	Risk degree	Z
I	Company is not possible to go the risk of bankruptcy	$Z > 25$
II	Little chance of exposure to the risk of bankruptcy	$25 \ge Z > 20$
III	Difficult to predict the risk Of bankruptcy	$20 \ge Z > 5$
IV	The Company is exposed to high risk of bankruptcy	$5 \ge Z > -5$
V	The Company is no more continued	$Z \le 5 -$

Limitations of the study

The study has the following limitations. They are

This study is based only on secondary data. So the limitations of the secondary data applicable to this study also.

And also the study considered only two sector each in 5 companies only.

The study period restricted to 5 years.

The study used only B-Sherrod's Failure prediction model. The limitations of the model applicable to this study also.

Results and Analysis of the study

The results of Exide industries financial ratios are presented in **Table 1**. It makes clear that X1, the working capital ratio gradually decreased from 2014 to 2018. X2, Liquid Assets in total assets were very low in the year 2017 and recovered in the succeeding year. X3, ratio total equity in total assets highest in the year 2014 and lowest in 2018. It indicated that the company gradually increased their borrowings than equity investment. X4, their earnings from total assets and also X5, ratio decreased from 2014 – 2018. The X6 ratio, total equity in total fixed assets highest in 2014 and gradually decreased to 2018. It shows that the company poorly manages their total assets and increasing their borrowings from outside. It recommended that the company may improve their working capital for smooth day to day business operation and proper usage of assets for increasing their earnings and reduce their debt.

Results of Amara Raja batteries are given in **Table 2**. X1 ratio, gradually improved from 2014 to 2018. But the liquid assets were decreased. Equity investment from total assets also declined. X4, X5 and X6. These ratios also shrink from 2014-2018.it indicated that the company's earnings capacity through total assets, total liabilities and equity investment from fixed assets were poorly managed. So it must improve the above things.

The results of Amtek clearly expressed that its working capital ratio was negative in all the years except in 2014. Liquidity earnings from total assets, assets management all are declined from 2014 to 2018. So the recommended to the company must improve the above. Otherwise it may go to bankrupts. It's Z - value negative from 2016-2018.

Results of Omax Auto make clear that the working capital is negative in some years and highest in the 2018. Their liquidity improved in 2018. Equity, earnings and total assets from total liabilities are shrink from 2014-2018. Equity through fixed assets is improved. Z Value range from 0.334 to 2.43 in 2018.

From Table-5 it understood that the working capital was negative in the year 2014 and declined from 2015-2018. Liquidity, equity investment from total assets and fixed assets are reduced from 2014-2018. Their earnings from total assets data are not available fully.

From the results of sunteck realty it's understood that the working capital is surge gradually and liquidity is decreased. X3, Equity investment from total assets highest value recorded in the year 2014 and lowest in 2017. Earnings from total assets are volatile every year. Through fixed assets the equity investment also declined. But the Z value improved in the year 2018.

Table 7 shows the results of Brigade enterprises. It point out that the working capital ratio was negative in most of the years and somewhat recovered in the year2018. Liquidity also low in all the years except in 2014. Equity and earnings from total assets also declined from 2015-2018. Equity from fixed assets is improved. But the Z value was very low and negative in the year 2015.

From the results of Phoenix township, it explained that the working capital ratio was positive in 2014-16 and negative in the year 2017 and 2018. Its liquidity conditions are lowest in the year 2017 & 2018. So it recommended that the company may take steps to improve the same. Equity investment also gradually declined. It indicated that the company increasing their borrowings from outsiders. Earnings declined from 2015-2018. In 2014 there is non-availability of data.

The Uniteck results make clear that the company's working capital, liquidity and equity investment very low and not much more variations during the study period. It's earnings was negative in 2016 and highest in the year 2018. The equity from fixed assets was highest in the year 2018 and lowest in 2017. So the company should take care about the same.

The results of Prestige estate projects presented in **Table 10**. It point out that the company's working capital ratio was negative in the year 2018, but liquidity was highest than the previous years. Their borrowings also increased from 2014-2018. Earnings from total assets are declined. The equity from fixed assets also declined in the year 2018. It's Z value was very low in the year 2018.

The summary of the above table was given in **Table 11.** It clearly explained the bankruptcy condition of sample companies. None of the sample companies ranked in I &II. It means not healthy and financially sound. Most of the companies like Exide, Amara Raja batteries, Sunteck, Phoenix Township and Unitech are ranked in III. It indicated that the above company's financial health is difficult to predict. It's Z -Score range was 5-20. If these companies's fail to improve its working capital, liquidity, proper utility of fixed assets and equity investments they may go to bankrupt and vice-versa. Those companies ranked in IV, are very poor in financial performance and high risk of bankruptcy. So better they close down their business.

Table 11: Result of B -Sherrod model Z-score

Co	2018		2017		2016		2015		2014	
C1	4.8	IV	5.2	III	5.2	III	5.0	III	5.5	III
C2	10.3	III	6.5	III	6.4	III	7.5	III	7.9	III
C3	11.3	III	8.8	III	4.5	IV	4.8	IV	7.2	III
C4	-9.8	V	-1.2	IV	-0.2	IV	0.7	IV	2.5	IV
C5	2.4	IV	1.7	IV	2.2	IV	1.3	IV	0.4	IV
C6	1.8	IV	13.7	III	2.9	IV	10.4	III	0.1	IV
C7	2.1	IV	0.9	IV	0.2	IV	-0.6	IV	3.0	IV
C8	7.6	III	7.5	III	10.	III	13.	III	4.	I

					0		2		7	V
C9	8.7	III	7.6	III	7.7	III	9.0	III	9.0	III
C10	0.6	IV	2.1	IV	2.8	IV	3.5	IV	2.6	IV

Source: Computed using above Tables.

Note : C1-Exide ; C2 -Amara raja; C3 – Sun tach;C4 –Amtak
C5-Omax;C6-PRICOL;C7- Brigade; C8- Phonix
C9-Unitech; C10- Prestige estate

Note: III (20 Z > 5):IV (5 Z > –5):V (Z 5 –)

Conclusion

The aim of the present study is analyzed the Business failure of Auto Ancillary and Reality companies. For the purpose of this present study, required data were collected from April 2014 to March 2018. The study found that most of the companies like Exide Industries, Amara Raja batteries, Sunteck, Phoenix Township and Unitech company's financial health is difficult to predict. It's Z -Score range was 5-20. If these companies' fail to improve its working capital, solvency, proper utility of fixed assets and equity investments within 2 years they may go to bankrupt. The remaining sample company's financial position is very poor. So better they close down their business.

The study recommended to the management must take necessary steps for improving their efficiency. And also it recommend to the policy makers to make optimum capital structure like Debt and Equity mix and proper dividend policy for maintaining sufficient earnings for future potential investment. It recommended to the government may arrange financial subsidies, tax reliefs for promoting their business activity.

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WEBSITES
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WWW.NSEINDIA.COM.

ANNEXURES

Table 1: Result of Exide Industries

Variable	2018	2017	2016	2015	2014
X1	0.1945	0.2276	0.2256	0.2107	0.2328
X2	0.0118	0.0029	0.012	0.0055	0.0242
X3	0.0115	0.0125	0.0138	0.0157	0.0171
X4	0.0019	0.0024	0.0018	0.003	0.0024
X5	1.0116	1.0127	1.014	1.016	1.0174
X6	0.0205	0.0234	0.0258	0.0276	0.0314
Z	4.707	5.2038	5.2483	4.9674	5.5069

Source: Computed using Ms-Excel
Table 2: Result of Amara Raja Batteries

Variable	2018	2017	2016	2015	2014
X1	0.5163	0.2787	0.2677	0.3109	0.3108
X2	0.0267	0.0477	0.0517	0.093	0.1377
X3	0.0041	0.0048	0.0059	0.0071	0.008
X4	0.0034	0.0047	0.0059	0.0078	0.005
X5	1.0041	1.0048	1.0059	1.0072	1.008
X6	0.0088	0.0099	0.0119	0.0166	0.0222
Z	10.3064	6.4839	6.3648	7.5162	7.8629

Source: Computed using Ms-Excel

Table 3: Result of Amtek

Variable	2018	2017	2016	2015	2014
X1	-0.6498	-0.145	-0.0856	-0.0377	0.0456
X2	0.0024	0.0041	0.0048	0.0161	0.0527
X3	0.0032	0.0028	0.0028	0.0032	0.0036
X4	0.0006	0.0018	0.0006	0.0006	0.0006
X5	1.0032	1.0028	1.0028	1.0006	1.0036
X6	0.005	0.0047	0.0046	0.0053	0.0061
Z	-9.7982	-1.177	-0.187	0.7295	2.4786

Source: Computed using Ms-Excel

Table 4: Result of Omax Auto

Variable	2018	2017	2016	2015	2014
X1	0.0129	-0.0212	0.0036	-0.0403	-0.0903
X2	0.0666	0.0484	0.0522	0.0479	0.0441

X3	0.0358	0.0361	0.0407	0.0399	0.0381
X4	0.0116	0.0116	0.0124	0.0059	0.0057
X5	1.0371	1.0374	1.0425	1.0416	1.0396
X6	0.0945	0.0886	0.0754	0.0727	0.0683
Z	2.4308	1.6894	2.1816	1.2634	0.3649

Source: Computed using Ms-Excel
Table 5: Result of PRICOL

Variable	2018	2017	2016	2015	2014
X1	0.0249	0.7256	0.0583	0.5046	-0.0923
X2	0.0062	0.0058	0.0153	0.0134	0.0019
X3	0.0068	0.0076	0.1198	0.0998	0.0933
X4	0.0042	0.0049	0	0	0
X5	1.0069	1.0077	1.1361	1.1108	1.1029
X6	0.0136	0.0135	0.199	0.1555	0.1425
Z	1.7964	13.7236	2.9318	10.3969	0.1122

Source: Computed using Ms-Excel

Table 6: Result of Sunteck Realty

Variable	2018	2017	2016	2015	2014
X1	0.5562	0.3806	0.1607	0.17793	0.2977
X2	0.0149	0.0264	0.0022	0.0022	0.0045
X3	0.0149	0.0112	0.0120	0.0160	0.0207
X4	0.0224	0.0396	0.0142	0.0141	0.0323
X5	1.0074	1.0113	1.0122	1.0162	1.0211
X6	0.464	0.3878	1.7013	1.5757	1.4538
Z	11.321	8.792	4.464	4.761	7.192

Source: Computed using Ms-Excel

Table 7: Result of Brigade Enterprises

Variable	2018	2017	2016	2015	2014
X1	0.0399	-0.0312	-0.0723	-0.1193	0.0857
X2	0.0077	0.009	0.0069	0.0063	0.0137
X3	0.0236	0.0241	0.0259	0.0316	0.038
X4	0.0017	0.0015	0.0013	0.0019	0.0016
X5	1.0242	1.0247	1.0266	1.0327	1.0395
X6	0.094	0.0928	0.0724	0.0770	0.0828
Z	2.1026	0.9056	0.1893	-0.575	2.985

Source: Computed using Ms-Excel
Table 8: Result of Phoenix Township

Variable	2018	2017	2016	2015	2014
X1	-0.0585	-0.0366	0.0976	0.0869	0.0631
X2	0.0075	0.0082	0.0188	0.0176	0.0103

X3	0.3508	0.3704	0.4099	0.4161	0.4102
X4	0.2683	0.2395	0.2316	0.3979	0
X5	1.5404	1.5884	1.6945	1.7125	1.6955
X6	0.5844	0.5583	0.555	0.5626	0.5472
Z	**7.5737**	**7.5014**	**9.9839**	**13.1613**	**4.691**

Source: Computed using Ms-Excel

Table 9: Result of Unitech

Variable	2018	2017	2016	2015	2014
X1	0.3691	0.347	0.3796	0.4019	0.4161
X2	0.0012	0.0013	0.0042	0.002	0.0047
X3	0.0272	0.0264	0.0255	0.0266	0.0275
X4	0.0059	0.0032	-0.0503	0.0011	0.0008
X5	1.0279	1.0271	1.0262	1.0273	1.0282
X6	9.8766	2.6617	8.8553	8.286	5.127
Z	**8.7199**	**7.5655**	**7.6927**	**9.0257**	**8.9746**

Source: Computed using Ms-Excel

Table 10: Result of Prestige Estate projects

Variable	2018	2017	2016	2015	2014
X1	-0.066	0.0271	0.065	0.0999	0.0451
X2	0.0399	0.0174	0.0251	0.0386	0.0325
X3	0.0271	0.0303	0.0375	0.0436	0.0516
X4	0.0019	0.0022	0.002	0.0017	0.0022
X5	1.0278	1.0312	1.0389	1.0456	1.0544
X6	0.2999	0.6127	0.3734	0.4628	0.5341
Z	**0.6349**	**2.0659**	**2.7853**	**3.5332**	**2.6004**

Source: Computed using Ms-Excel

AN EMPIRICAL STUDY ON IMPORTANCE AND SATISFACTION LEVEL OF FACTORS ATTRACTING ECOTOURIST TO AN ECOTOURISM DESTINATION

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ABSTRACT

The tourist product today is developed to meet the needs of the consumer and techniques like direct sales, publicity and advertising are employed to bring this product to the consumer. The tourist product is the basic raw material, be it the country's natural beauty, climate, history, culture and the people, or other facilities necessary for comfortable living such as water supply, electricity, roads, transport, communication and other essentials.

Service quality is a measure of how well the service level delivered matches customer expectations, while delivering quality service. This paper is aimed to study the importance and satisfaction level of factors attracting tourist to an ecotourism destination

Key words: Service quality, Customer satisfaction, factors affecting ecotourism

INTRODUCTION

The tourist product can be entirely a man-made one or nature's creation improved upon by man. A consumer can combine individual products in a large number of ways. There would be many possible destinations, each with a number of hotels, each to be reached by more than one airline. Thus, the potential choice facing the consumer is very large. The large number of tourist destinations has placed at the disposal of a tourist a very large variety of tourist products in abundant quantity from a large number of competing destinations. This eventually, has led to the adoption of the new concept i.e., the marketing concept in tourism by various countries promoting tourism.

Tourism, basically, is an infrastructure based service product. The nature of the service here is highly intangible and perishable offering a limited scope for creating and maintaining the distinctive competitive edge. The effective marketing of tourism needs constant gearing up of infrastructure to international standards and presupposes in its coordination with the tourism suppliers. In strategic terms, it calls for the action of an integrated approach to management and marketing. In operational terms, it means the implementation of a better defined, better targeted market-driven strategy for realizing the defined objectives.

The important point to note here is that marketing is applied to situations where the choice can be limited to a relatively small number of brands giving the consumer a reasonable choice. The process of selection thus becomes easier. In the field of tourism this process is taking place by the increased use of 'package tours'. A package tour is a travel plan which includes most elements of vacation, such as transportation, accommodation,

sight- seeing and entertainment. The tourist product is a composite product, whether it is sold as a package or assembled by the individual himself or his travel agent.

SERVICE QUALITY

Service quality has been increasingly identified as a key factor in differentiating service products and building a competitive advantage in tourism. The process by which customers evaluate a purchase, thereby determining satisfaction and likelihood of repurchase, is important to all marketers, but especially to services marketers because, unlike their manufacturing counterparts, they have fewer objective measures of quality by which to judge their production.

Many researchers believe that an outgrowth of service quality is customer satisfaction. Satisfying customers has always been a key component of the tourism industry, but never before has it been so critical. With increased competition, and with more discerning, experienced consumers, knowing how to win and keep customers is the single most important business skill that anyone can learn. Customer satisfaction and loyalty are the keys to long-term profitability, and keeping the customer happy is everybody's business. Becoming customer centered and exceeding customer expectations are requirements for business success.

Goods quality and service quality are unlike. When purchasing goods, the consumer employees many tangible cues to judge quality such as colour, label, package, and style whereas service quality is abstract and complicated construct that is difficult to for the consumer to evaluate compared to goods quality. The characteristics of services make measurement of quality a very complex issue. Most services are

intangible, that is, they are difficult to count, measure, inventory, test, and verify (Bateson, 1977). They have no physical manifestation. "Heterogeneity" (Booms and Bitner, 1981) is difficult to assure because what the firm intends to deliver may be entirely different from what the consumer receives. "Inseparability" (Carmen and Langeard, 1980) which is composed entirely of a delivery experience, cannot be produced at one time and place and then stored for later use at another place, and that quality occurs during service delivery. Because of service intangibility, a firm may find it more difficult to understand how consumers perceive service and service quality (Gronroos, 1982).

Previously, conceptualization and operationalization of service quality (SERVQUAL) was inadequate. In the marketing literature, Parasuraman, Zeithaml, and Berry (1985) conceived that "service quality is the difference between customers' expectation and their perceived performance of a service." Zeithaml (1988) defined service quality as "the customer's evaluation of a product's overall excellence or superiority". Gilbert and Joshi (1992) argued that service quality should be according to consumer expectations orientation, since "it acknowledges the importance of consumer behaviour in the evaluation of service". Delivery of high quality service has become an essential marketing requirement as a result of competitive pressure (Ostrowski, 1993).

Consequently, understanding and maintaining quality should be the main concerns of businesses today. Both manufacturing companies and service firms should be highly concerned with providing quality and delivery quality service (Akan, 1995). The delivery of high service quality to customers offers firms an opportunity to differentiate themselves in competitive markets, and results in greater customer satisfaction and

loyalty, greater willingness to recommend to someone, reduction in customer complaints, and improvement in customer retention rates (Magi and Julander, 1996).

Today, both practitioners and academics consider the evaluation of service quality a critical measure of organizational performance (Yavas and Yasin, 2001). The delivery of high service quality to customers offers firms an opportunity to differentiate themselves in competitive markets, and results in greater customer satisfaction and loyalty, greater willingness to recommend to someone, reduction in customer complaints, and improvement in customer retention rates (Magi and Julander, 1996).

FACTORS ATTRACTING ECOTOURIST

DESTINATION

The geographical location where the event takes place should be highly accessible. Some destinations are more accessible than others because a wide variety of airlines provide transportation services into the regional area (Yeoman, Robertson, Ali-Knight, Drummond, & McMahon-Beattie, 2004). It should be easy for the visitor to reach the destination, whether travelling by plane, train, bus or automobile and appropriate signage should be displayed at various transportation nodes to provide direction to points of interest.

HOTEL

The location of the hotel can be a tremendous source of satisfaction or dissatisfaction for the tourist. Proximity from the hotel to the sporting venue is an important factor for many travellers (Bernthal & Sawyer, 2004). Hotels that are not within walking distance of the sporting venue often provide public transportation shuttles.

When the hotel provides shuttle services it is important to have a sufficient amount of signage directing customers to the bus pick-up and drop-off locations. The guest may also evaluate the ease of access to their room, restaurants, parking, taxi-cabs and transportation stations such as bus stops, airports, train stations and so forth. Transportation should be readily available from the hotel to move spectators to the various attractions around the city.

ACCOMMODATION QUALITY

Within urban areas, accommodation usually refers to hotels, although it can refer to a wide variety of other accommodations such as motels, cabins, lodges, resorts and so forth (Murphy, 1997). Tourists may judge accommodation based upon several considerations, including the evaluation of interactions, hotel environment and the value associated with staying at the place of accommodation.

INTERACTIONS

One way to evaluate customer satisfaction concerning the accommodation is on the basis of interactions that take place during the stay. This concept is similar to Gronroos' (1984) reference to functional quality and Brady and Cronin's (2001) interaction quality. Interactions can take place in relation to the accommodation provider's personnel and/or other guests staying at the place of accommodation. Service personnel may include employees at the front desk, housekeeping, bell services, concierge services and restaurant employees. Hotel personnel can directly influence the quality of the visitor's experience. For example, a hotel bell captain may misplace a tourist's equipment vital to the contest or the reservation department may overbook the hotel and leave a visitor with nowhere to stay. In the same way, other guests can be a source of dissatisfaction when a

crying baby or a loud television from a neighbouring room prevents a guest from sleeping (David J. Shonk, M.S., 2006).

ENVIRONMENT

Environment of the hotel pertains to the services cape (Bitner, 1992) of the facility. The service quality literature suggests that physical evidence such as noise level, odours, temperature, colours, textures and comfort of furnishings may influence perceived performance in the service encounter. Such variations in physical environment can affect perceptions of an experience independently of the actual outcome (Bitner, 1990). Brady and Cronin (2001) suggest that ambient conditions, facility design and social conditions directly influence the physical environment (pp. 39-40). Cooper, Fletcher, Gilber and Wanhill (1993) claim that the accommodation market competes for customers based on physical facilities

CUSTOMER SATISFACTION

Customer satisfaction is viewed as an important research topic by both practitioners and academics. From a managerial point of view, customer satisfaction is the primary source of future revenue and is regarded as the key factor in winning market share. In the academic field, customer satisfaction has been a popular topic since the early 1960s, reflected by the constant growth of literature on customer satisfaction. Since satisfaction was introduced as a field of study, a considerable number of studies have focused on this concept. This is because it is conceived as the key to business success in today's competitive landscape.

(p. 172). Facilities may include such items as the room, lobby, hotel restaurant, pool, and fitness centre.

VALUE

Delivering high quality service within the hospitality industry positively influences a customer's perception of value. The process of the purchase judgment originates from the trade-off between benefits and sacrifices (Al-Sabbahy, Ekinci, & Riley, 2004). Guests judging the value of the accommodation to be worth the cost paid are more likely to stay past the end of the sporting event and will tend to be more satisfied with the event itself. In the case of many events, Silvers (2004) claims that specific hotels may be identified, rooms are blocked or reserved, and housing is assigned without much input from the attendees (p. 123).

Customer satisfaction is defined as "overall affective response to a perceived discrepancy between prior expectation and perceived performance after consumption" (Oliver, 1980), i.e. "primarily referred to as a function of pre-travel expectations and post travel experience" (Reisinger and Turner, 2003). Chen (2008) in defining customer satisfaction stated that it "pertains to a holistic evaluation after a service delivery experience, and acts as a consequence of satisfaction with individual attributes." Wang, Zhang, Gu, and Zhen (2009) defined tourist satisfaction as "a feeling generated both by cognitive and emotional aspects of tourism activities as well as an accumulated evaluation of various components and features of the destination".
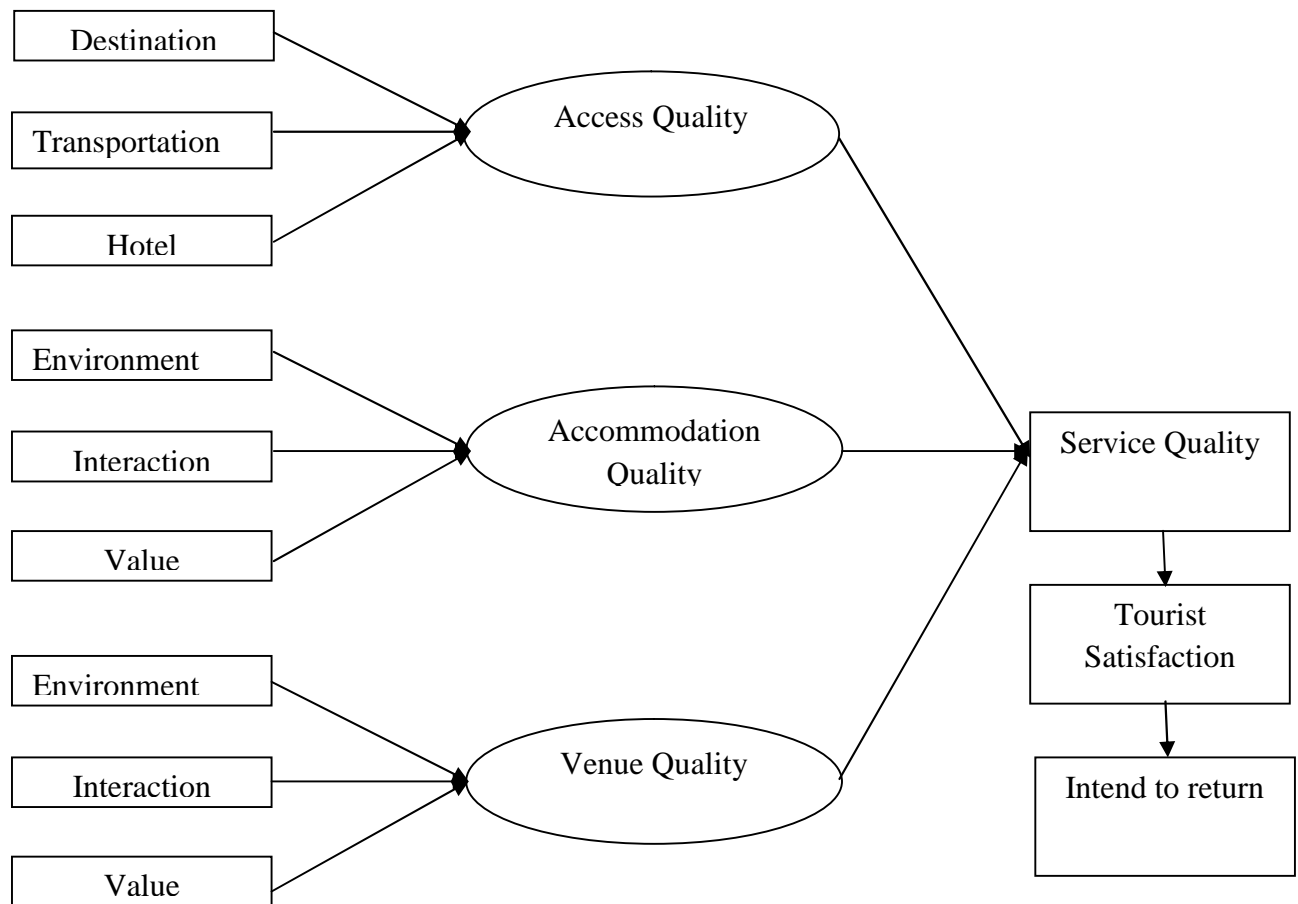
Fig No: 1 Factors affecting Service Quality in Tourism

EXPERIENCES

According to Pine and Gilmore, today's consumer desires what the industry is calling experiences, which occur when a company intentionally uses services as the stage, and goods as props, to engage individual customers in a way that creates a memorable event. More and more travel organizations are responding by explicitly designing and promoting such events.

As services, like goods before them, increasingly become commodified, experiences have emerged as the next step in the 'progression of economic value'. From now on, cutting-edge companies – whether they sell to consumers or businesses – will find that the next competitive battleground lies in staging experiences (Pine and Gilmore, 1998).

An experience is not an amorphous construct; it is as real an offering as any service, good, or commodity. In today's service economy, many companies simply wrap experiences around their traditional offerings to sell them better. To realize the full benefit of staging experiences, however, businesses must deliberately design engaging experiences that command a fee. Commodities are fungible, goods tangible, services intangible, and experiences memorable. Buyers of experiences value what the company reveals over a period of time. While traditional economic offerings – commodities, goods, and services – are external to the buyer, experiences are inherently personal, existing only in the mind of an individual who has been engaged on an emotional, physical, intellectual, or even spiritual level. Thus, no two people can have the same experience, because each

experience derives from the interaction between the staged event (like a theatrical play) and the individual's state of mind.

BACKGROUND OF THE STUDY

The study was undertaken to determine the factors attributed in attracting tourists/ visitors in the two Ecotourism Destinations in South Kerala. (1) Ecotourism Project of Pamba Biological Garden – Gavi (2) The best of Kerala's backwater (Vembanad Lake) and Bird Sanctuary – Kumarakom. The distributions of significant attracting factors are bases on the result of five Point Likert Scale are presented in Table.

Table No.:2 Table showing importance and satisfaction level of Pamba Biological Garden and Ecotourism Project, Gavi

Factors	Importance		Satisfaction	
	Mean	**Agree %**	**Mean**	**Agree %**
Location /proximity	6.57	92.19	6.23	89.13
Transport accessibility /good roads	6.08	87.32	5.74	84.26
Parking sites near the accommodation	6.17	88.24	5.83	85.17
Parking sites near the sites for visit	6.34	89.91	6.00	86.85
Tourist information /maps, guidebooks	6.56	92.10	6.38	90.64
Place for shopping	6.26	89.12	5.92	86.06
Cleanliness	6.87	95.19	5.87	85.55
Hospitality	6.44	90.92	6.10	87.86
Safety	6.15	88.02	5.81	84.95
Opportunities /facilities for adventure / sport	6.05	87.02	5.71	83.96
Organized cultural events	6.32	89.68	5.98	86.62
Prices corresponding to the services	6.19	88.42	5.85	85.35
Good equipped rooms	6.14	87.92	5.80	84.85
Good hygiene	6.67	93.20	6.33	90.14
Diverse food and drink	6.28	89.31	5.94	86.25
Prompt service	6.39	90.41	6.05	87.35
Well prepared food	6.67	93.20	5.98	86.65
Many nature landmarks	6.24	88.92	5.90	85.85
Favourable climate	6.48	91.32	6.14	88.26
Tourist paths	6.23	88.82	5.89	85.75
The tourist destination as a whole	**6.36**	**90.06**	**5.97**	**86.58**

*Agree % represents values of 4&5

Importance:

The factor considered most important is "Cleanliness" is placed first with mean 6.87 and agree % 95.19. "Good hygiene" is in second place with mean 6.67 and agree % 93.2. Hygiene refers to a set principles perceived by a community to be associated with the preservation of health and healthy living. While in medical sciences there is a set of standards of hygiene recommended for different situations, what is considered hygienic or not can vary between different cultures and gender.

The factor "Well prepared food" is in third place with mean and agree % 6.67 and 93.2. "Location /proximity" is in fourth place with mean 6.57 and agree % 92.19. Fifth place is for "Tourist information /maps, guidebooks" with mean 6.56 and agree% 92.1. "Favourable climate" is in sixth place with mean 6.48and agree

% 91.32. The factor "Hospitality" is placed seventh mean and agree % 6.44and 90.92. Hospitality is the relationship between guest and host, or the act or practice of being hospitable. Specifically, this includes the reception and entertainment of guests, visitors or strangers, resorts.

"Prompt service" is in eighth place with mean 6.39 and agree % 90.41. Prompt service is a function of how well an organization meets the needs of its customers constantly and consistently.

The factor "Parking sites near the sites for visit" is in ninth place with mean 6.34 and agree % 89.91. "Organized cultural events" is in tenth place with mean 6.32 and agree % 89.68. The factor "Diverse food and drink" is in eleventh place with mean 6.28 and agree % 89.31. "Place for shopping" is in twelfth place with mean 6.26and agree % 89.12. "Many nature landmarks" is in thirteenth place with mean 6.24 and agree % 88.92. The factor "Tourist paths" is placed fourteenth with mean and agree % 6.23 and 88.82. "Prices corresponding to the services" is in fifteenth place with mean and agree % 6.19 and 88.42. Price is one of important marketing tools to attract customers to purchase their products (Armstrong & Kotler, 2003). Marketers normally adopt different pricing strategies to achieve their desired sales objectives (Hsu & Powers, 2002). In the fierce competitive market, price reduction strategy is also commonly employed by marketers as a result of keen competition. However, Reid, Bojanic and David (2006) argued that reducing price strategy to attract customers may not be effective. On the other hand, hoteliers may need to focus on other areas they can improve in order to attract and retain their customers in the long run.

Sixteenth place is for the factor "Parking sites near the accommodation" with mean 6.17 and

agree % 88.24. "Safety" is placed seventeenth with mean 6.15 and agree % 88.02. Safety is the state of being "safe", the condition of being protected against physical, social, spiritual, financial, political, or other types or consequences of failure, damage or any other event which could be considered non – desirable. Safety can also be defined to be the control of recognized hazards to achieve an acceptable level of risk. The factor "Good equipped rooms" is in eighteenth place with mean 6.14 and agree % 87.92. Most hotels provide the standard set of facilities, which include bedrooms, restaurants, bars, function rooms, meeting rooms, as well as recreation facilities, such as swimming pool, sauna, golf fields or tennis courts (Medlik, 1994).

"Transport accessibility /good roads" is in nineteenth place with mean 6.08 and agree % 87.32. The twentieth place is for the factor "Opportunities /facilities for adventure / sport" with mean 6.05 and agree % 87.02.

Satisfaction:

The highly satisfied factor is "Tourist information /maps, guidebooks" is in first place with mean 6.38 and agree % 90.64. Second place is for "Good hygiene" with mean 6.33 and agree % 90.14. "Location /proximity" is in third place with mean and agree % 6.23 and 89.13. The factor "Favourable climate" is in fourth place with mean6.14 and agree % 88.26. "Hospitality" is in fifth place with mean and agree % 6.1 and 87.86. Sixth place is for "Prompt service" with mean 6.05 and agree % 87.35. The factor "Parking sites near the sites for visit" is in seventh place with mean 6.00 and agree % 86.85. "Organized cultural events" is in eighth place with mean and agree % 5.98 and 86.62. The factor "Well prepared food" is in ninth place with mean 5.98 and agree % 86.65. "Diverse food and drink" is in tenth place

with mean and agree % 5.94 and 86.25. The factor "Place for shopping" is in eleventh place with mean 5.92 and agree % 86.06. "Many nature landmarks" is placed twelfth with mean 5.9 and agree % 85.85. "Tourist paths" is in thirteenth place with mean 5.89 and agree % 85.75. "Cleanliness" is in fourteenth place with mean 5.87and agree % 85.55. The factor "Prices corresponding to the services" is in fifteenth place with mean5.85 and agree % 85.35. "Parking sites near the accommodation" is in sixteenth place with mean and agree % 5.83 and 85.17. The factor "Safety" is in seventh place with mean 5.81 and agree % 84.95."Good equipped rooms" is in eighteenth place with mean and agree % 5.8 and 84.85. The factor "Transport accessibility /good roads" is in nineteenth place with mean 5.74 and agree % 84.26. The twentieth factor is "Opportunities /facilities for adventure / sport" with mean 5.71 and agree % 83.96.

Table No: 3 Table showing importance and satisfaction level of Ecotourism Project, Kumarakom

Factors	Importance		Satisfaction	
	Mean	**Agree %**	**Mean**	**Agree %**
Location /proximity	6.08	88.75	5.85	84.30
Transport accessibility /good roads	6.03	88.25	5.80	83.81
Parking sites near the accommodation	6.32	91.16	6.09	86.71
Parking sites near the sites for visit	6.12	89.15	5.89	84.70
Tourist information /maps, guidebooks	5.87	86.65	5.64	82.21
Place for shopping	6.43	92.23	6.20	87.78
Cleanliness	6.07	88.65	5.84	84.20
Hospitality	6.66	94.51	6.43	90.05
Safety	6.01	88.04	5.78	83.60
Opportunities /facilities for adventure / sport	6.23	90.25	6.00	85.80
Organized cultural events	6.55	93.44	6.32	88.99
Prices corresponding to the services	6.12	89.15	5.89	84.70
Good equipped rooms	6.06	88.53	5.83	84.09
Good hygiene	6.50	92.95	6.27	88.49
Diverse food and drink	5.99	87.85	5.76	83.41
Prompt service	6.50	92.95	6.25	88.29
Well prepared food	6.67	94.65	6.44	90.19
Many nature landmarks	6.54	93.35	6.31	88.89
Favourable climate	6.48	92.76	6.25	88.31
Tourist paths	6.12	89.15	5.89	84.70
The tourist destination as a whole	**6.27**	**90.62**	**6.04**	**86.16**

*Agree % represents values of 4&5

Importance:

The factor "Well prepared food" is considered most important with mean 6.67 and agree % 94.65. "Hospitality" is in second place with mean 6.66 agree % 94.51. Hospitality is the relationship between guest and host, or the act or practice of being hospitable. Specifically, this includes the reception and entertainment of guests, visitors or strangers, resorts.

The factor "Organized cultural events" is in third place with mean 6.55 and agree % 93.44. "Many nature landmarks" is in fourth place with mean 6.54 and agree % 93.35. The factor "Good hygiene" is placed fifth with mean 6.5 and agree %

92.95. Hygiene refers to a set principles perceived by a community to be associated with the preservation of health and healthy living. While in medical sciences there is a set of standards of hygiene recommended for different situations, what is considered hygienic or not can vary between different cultures, gender etc.

"Prompt service" is in sixth place with mean 6.5 and agree % 92.95. Prompt service is a function of how well an organization meets the needs of its customers constantly and consistently.

"Favourable climate" is in seventh place with mean 6.48 and agree % 92.76. The factor "Place for shopping" is place eighth with mean and agree % 6.43 and 92.23. "Parking sites near the accommodation" is in ninth place with mean 6.32 and agree % 91.16. "Opportunities /facilities for adventure / sport" is in tenth place with mean 6.23 and agree % 90.25. The factor "Parking sites near the sites for visit" is in eleventh place with mean 6.12 and agree % 89.15. "Prices corresponding to the services" is in twelfth place with mean 6.12 and agree % 89.15. Price is one of important marketing tools to attract customers to purchase their products (Armstrong & Kotler, 2003). Marketers normally adopt different pricing strategies to achieve their desired sales objectives (Hsu & Powers, 2002). In the fierce competitive market, price reduction strategy is also commonly employed by marketers as a result of keen competition. However, Reid, Bojanic and David (2006) argued that reducing price strategy to attract customers may not be effective. On the other hand, hoteliers may need to focus on other areas they can improve in order to attract and retain their customers in the long run.

The factor "Tourist paths" is in thirteenth place with mean and agree %   6.12 and 89.15. "Location /proximity" is in fourteenth place with

6.08 and agree % 88.75.The factor "Cleanliness" is in fifteenth place with mean 6.07 and agree % 88.65. Cleanliness is both the abstract state of being clean and free from dirt, and the process of achieving and maintaining that state. Cleanliness may be endowed with a moral quality, as indicated by the aphorism "Cleanliness is next to godliness", may be regarded as contributing to other ideals such as health and beauty.

"Good equipped rooms" is in sixteenth place with mean and agree % 6.06 and 88.53. Most hotels provide the standard set of facilities, which include bedrooms, restaurants, bars, function rooms, meeting rooms, as well as recreation facilities, such as swimming pool, sauna, golf fields or tennis courts (Medlik, 1994).

"Transport accessibility /good roads" is in seventeenth place with mean and agree % 6.03 and 88.25. Accessibility is a general term used to describe the degree to which a service is available to as many people as possible. Accessibility can be viewed as the "ability to access" and benefit from some system / entity. The factor "Safety" is in placed eighteenth with mean 6.01 and agree % 88.04. Safety is the state of being "safe", the condition of being protected against physical, social, spiritual, financial, political, or other types or consequences of failure, damage or any other event which could be considered non – desirable. Safety can also be defined to be the control of recognized hazards to achieve an acceptable level of risk.

"Diverse food and drink" is in nineteenth place with mean 5.99 and agree % 87.85. The least important factor is "Tourist information /maps, guidebooks" is in twentieth place with mean 5.87 and agree % 86.65.

Satisfaction:

The factor "Well prepared food" is highly satisfied with mean 6.44 and agrees % 90.19 is placed first."Hospitality" is in second place with mean 6.43 and agree % 90.05. The factor "Organized cultural events" is in the third place with mean and agree % 6.32 and 88.99. "Many nature landmarks" is placed fourth with mean 6.31 and agree % 88.89. Fifth place is for the factor "Good hygiene" with mean 6.27 and agree % 88.49. The factor "Prompt service" is in sixth with mean 6.25 and agree % 88.29. "Favourable climate" is in the seventh place with mean 6.25 and agree % 88.31. "Place for shopping" is in eight place with 6.2and agree % 87.78. The factor "Parking sites near the accommodation" is in ninth place with mean and agree % 6.09 and 86.71. Tenth place is for "Opportunities /facilities for adventure / sport" with mean and agree % 6.00 and 85.8. The factor "Parking site near the site for visit" with

means 5.89 and agrees % 84.7 is in eleventh place. "Prices corresponding to the services" is in twelfth place with mean 5.89 and agree % 84.7. The factor "Tourist paths" is in thirteenth place with mean and agree % 5.89 and 84.7. "Location /proximity" is in fourteenth place with mean 5.85 and agree % 84.3. "Cleanliness" is placed fifteenth with mean 5.84 and agree % 84.2. The factor "Good equipped rooms" is in sixteenth place with mean and agree % 5.83 and 84.09. "Transport accessibility /good roads" is placed seventeenth with mean and agree % 5.8 and 83.81. The factor "Safety" is in eighteenth place with mean 5.78 and agree % 83.6. "Diverse food and drink" is in nineteenth place with mean 5.76 and agree % 83.41. The least important factor "Tourist information /maps, guidebooks" is in twentieth place with mean 5.64 and agree % 82.21.

CONCLUSION

Today's travelers are seeking experiences that provide them with greater insight, increased understanding, and a personal connection to the people and places they visit. Rather than choose their vacation by the destination, many are first determining the experiences they want, and then choosing the destination where these experiences are located.

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Employee Burnout: The New Conceptual Understanding

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Abstract

Burnout is a condition where the physical, mental and emotional exhaustion is an outcome from the amalgamation of very high expectations and tenacious situational stress. It describes a state of diminution of a person's resources, particularly energy due to extreme demands made on them, which results in impassive behavior of the individual towards their work and the other aspects of life as well. The basic thrust of this conceptual paper is to bring into lime light the theoretical postulates of burn out phenomenon and its reflections on the contemporary workforce in IT industry. Besides reviewing theoretical works on the burnout from a contemporary perspective this paper tries to capture the emotional strength and perceptual understanding of this phenomenon prevailing in IT workforce through a limited study. Thereby we tried to analyze the things and propound formulae for dealing with the menace. Above all, a unique attempt is made here to correlate the spirit of theoretical models with that of empirical findings by taking the help of 'Copenhagen's Burnout Inventory'. Leaving scope for a more elaborate study on a bigger sample size the conceptual understanding about the theme Burn Out is clearly spelt out in this paper much to the better understanding of laymen particularly the management clan. This finds more justification in the context of flexible knowledge workers and management of their work life which amply fits to the popular phrase called 'VUCA' (Volatile, Uncertain, Complex, and Ambiguous) business environment.

Key Words: burnout, stress, Indian, IT/ITES industry, fatigue, emotional, exhaustion

1. Introduction

The success of any organization is dependent on human resources – neither money, nor technology or infrastructure can deliver excellence without the requisite human resource bank. Nor money buy human resources – for this is one resource which develops and appreciates over time, while other resources depreciate. Thus, it is being realized globally that an organization can have competitive advantage by leveraging its human resources. Coordinating and managing human resources is very important for any organization to survive. Maintaining them effectively requires a lot of effort on the part of the organization. People in organizations cannot be regarded as human capital in reality until and unless their contribution to their organization can be measured with the same confidence as any other organizational asset. Job burnout emerged as an important concept in the 1970s, and it captured something very critical about people's experience with work especially in the knowledge based firms of contemporary times. The massive growth of IT and IT enabled services in third world countries has literally paved the way the new

phenomenon of engaging knowledge workers purely on skill set and knowledge coefficients rather than verifying the emotional strength of individuals. As such, it created lot of imbalances in the workplaces in the wake of increased levels of work stress which other way can be identified as the potential symptoms of burnout. Be it the quantum of work, employee relations, work place culture, job profile the modern day knowledge workers are succumbed to the vicious cycle of collapse of emotional and physical health in most of the countries. This is more so in countries like India where the advent of BPO sector with night shifts is another adding feature to the phenomenon. This view has inspired researchers to study it further and try to understand deeply its meaning and its causes. It has majorly inspired practitioners to find out means to deal with it, avert it, or contend with it. The purpose of this conceptual paper is to study the concept of Burnout amongst the people employed in IT sector, its reason and consequences and how it can be countered based on a survey of people working in select BPO companies.

2. Concept of Burnout

The symptoms are thought to be caused by work-related or other kinds of stress (PubMed Health, 2017). Burnout is a job related stress syndrome that has three components:

- Emotional exhaustion – lack of energy and the feeling that one's emotional resources have been used up at work. Commonly employees feel dread at having return to work with beginning of every working day
- Depersonalization – is characterized as viewing co – workers and clients as dehumanized objects
- Feelings of diminished personal accomplishment – evaluating work performance negatively and feel a decline in job competence and achievement.

Burnout is a result of exhaustion due to overwork. It generally affects professionals that have more responsibilities related to people and who pursue objectives, which are difficult to attain. The nature of Indian IT industry is prone to cause such exhaustion. Risky situations are those where there is a misfit between the tasks and the means allocated to accomplish them and if there is an ambiguity and / or role conflict.

Freudenberger (1974) defines burnout as "to fail, wear out, or become exhausted by making excessive demands on energy, strengths or resources"

Maslach and Leiter (1997) says "burnout represents an erosion in values, dignity, spirit and will – an erosion of the human soul. It is a malady that spreads gradually and continuously over time, putting people into a downward spiral from which it's hard to recover"

Burnout is categorized into two types:-

- Physical Burnout – is experienced with excessive physical exhaustion. It is most commonly reflected

by injury or fatigue and is normally seen among sports persons.

▪ Mental Burnout – is an accumulated state where the nature of work which used to be exciting earlier no longer excites the person.

Burnout is described as a state of depletion of a person's resources and energy resulting in apathetic and impassive behavior towards others, having dysfunctional repercussions on the individual and adverse effects on organization.
With technological advancements, workplaces have undergone drastic changes and many executives work in situations which require very little people contact, implying that the construct of executive burnout is qualitatively different and needs to be progressed for better comprehension of this fundamental problem.
The phenomenon of burnout, a debilitating stress syndrome, was observed and studied in US and European countries in the 1980s when these countries faced globalization.
Burnout is becoming a major threat to the executives throughout the world and more so in a country like India where they are under pressure to produce higher and higher outputs with minimum inputs.

3. Evolution of Burnout

Job burnout surfaced as a significant concept in the 1970s, and it captured something very crucial about people's experience with their work. It endures to do so even today after 35 years of its introduction to psychological literature and cultural discourse as well. Both then and now, burnout has been a concept that seems to ring true to a common experience among people (Wilmar B. Schaufeli, 2008). The burnout phenomenon was first described in the context of job related stress by Freudenberger (1974 –1975) closely followed by Maslach (1976) but early phenomenon of burnout was a "case study in the functioning of social systems at defense at anxiety" by Menzies. Freudenberger (1974) was first to characterize burnout stating it as feelings of failure and being worn out. He observed that volunteers entering into the social work experience as phase of more or less wear out and began to use the term burnout to connote with the popular meaning to refer to the effects of chronic psychoactive substance abuse. He presented direct accounts of the process when he and others experienced emotional depletion, loss of motivation, and commitment (Freudenberger, 1975). Applying qualitative methods of interviewing, Christina Maslach (1976) wanted to know how people in emotionally demanding jobs such as doctors, nurses and counselors cope in everyday work and found that coping strategies had important implications for people's professional identity and job behavior. Maslach reviewed the literature from 1975 - 2000 and described the history of research in 2 phases:-

Phase 1: Pioneering Phase

Several themes emerged from these early interviews in the human services, suggesting that burnout has some identifiable regularities:

▪ Occupation of service is demanding
▪ Element of depersonalization (cynicism) also emerged as people portrayed how they tried to deal with emotional stress. Regulating one's

compassion for clients by emotional distance from them (detached concern) was viewed as a way of shielding oneself from immense emotional stimulation that could distress their effective functioning on the job (Maslach et. al 2001:400).

Phase 2: Empirical Phase

In 1980's, the quantitative studies, dominant mode of investigating were on rage. Among this was Maslach's work to develop an inventory remains a pioneering one (Maslach and Jackson, 1991) which saw its 3rd edition within 15 years (Maslach, Jackson, Leiter, 1996) and is popularly known as Maslach Burnout Inventory (MBI)

Other scales have also been developed such as
▪ Burnout Measure (Pines, Aronson, Kafry, 1981)
▪ Oldenburg Burnout Inventory (OLBI) - provided a measure of burnout that can also be used to measure the opposite phenomenon (engagement and expanded the exhaustion component of burnout and its validity and reliability was tested in English (Halbesleben and Demerouti, 2005)
▪ Copenhagen burnout inventory (CBI) - was developed as a longitudinal study of burnout in human service workers in Denmark (Kristensen et.al 2005).

In 1990's, more quantitative studies came out with investigation beyond occupations in human services and education to clerical, computer technology and managerial work and MBI – GS (General Survey) was published (Gen, Surbey) in 1996 which allowed burnout to be studied independently from its specific job context. However, most of the burnout studies were cross sectional and therefore did not allow causal reference. Only recently, the methodological rigor of burnout studies has been conducted (Borritz, 2005). One of newer developments in burnout research is extension of burnout concept by positive antithesis job engagement so the full spectrum of workers well-being can be studied (Engelbrecht, et. al 2006; 27)

4. Models of Burnout

1. Veninga and Spradley's Stage Model

Veninga and Spradley (1981) believed that burnout occurred in the form of five distinct stages:

a) Honeymoon Stage:
   i. Stage characterized by feeling of excitement, enthusiasm, pride and challenge arising out of new job
   ii. Give rise to certain coping mechanisms and strategies which prove to be dysfunctional later
   iii. Flip Side – Marks the beginning of depletion of energy

b) Fuel Shortage Stage:
   i. General undefined feelings of fatigue, sleep disturbance, inefficiency and job dissatisfaction
   ii. Disturbances can result in concomitant behaviors of increased eating, drinking and smoking.

c) Chronic Symptom Stage:

   i. Psychological manifestation in previous stage becomes more pronounced
   ii. Can lead to occurrence of symptoms like physical illness, anger, irritation and depression.

d) Crisis Stage:
   i. Over a period of time, symptoms may develop into acute psychosomatic disorders like peptic ulcer, tension headache, chronic backache, high BP, sleep disturbance
   ii. Increased tendencies of self - doubt, pessimistic view of life and general feeling of oppression

e) Hitting the wall stage:
   i. Total maladaptation due to failure of the person's coping mechanism to deal with stress

2. Leiter – Maslach Process Model

On the basis of her studies, Maslach (1982) had developed a three –dimensional construct of burnout and had defined burnout as "a syndrome of emotional exhaustion, depersonalization and reduced accomplishment that can occur among individuals who do 'people work'. It is a response to the chronic emotional strain of dealing extensively with other human beings, particularly when they are troubled or are having problems."

Leiter and Maslach (1988) posited that there is a sequential development of different dimensions of burnout. It is the emotional exhaustion that first appears as a result of the excessive demands at work. In order to cope with the drainage of energy, the individual distances himself from his work and others as a defensive strategy, and this manifests as depersonalization or cynicism. Finally, as a sequel to this depersonalization, the ability of individual to work effectively decreases and when the realization that his present accomplishments do not match with his original expectations and ideals set in, it leads to a sense of reduced personal accomplishments or inefficacy. But this developmental sequence of exhaustion – depersonalization – reduced accomplishment has been modified in the light of later empirical findings. The revised model (Leiter,1993) proposes a mixed sequential and parallel development of the burnout dimensions. In the new model, burnout starts off with exhaustion and is sequentially followed by the development of depersonalization. There is a parallel development of the feeling of reduced personal accomplishment (renamed as ineffectiveness or reduced inefficacy) independent of other two dimensions, and this happens due to the work environment. Thus, while in the earlier model, burnout was entirely internal process in which exhaustion was triggered due to environmental stress, in the latter model; environmental stressors affected the entire process of burnout by influencing all the dimensions of burnout.

Building on Maslach's model, Leiter suggests a distinct relationship among the three dimensions of burnout (Dirk van Dierendonck, 2001). Firstly, emotional exhaustion is found to cause a decrease in personal accomplishment when depersonalization acts as the mediating variable between the two. Secondly, an inverse relation exists between job satisfaction and burnout dimensions. Thirdly,

the correlation between burnout and two types of social interpersonal relations indicates that if an employee has a large network of informal social contacts at the workplace, he is expected to have lower exhaustion and lower depersonalization along with higher personal accomplishment. Conversely, if an employee has a large network of work contacts, he will show higher levels of emotional exhaustion as well as personal accomplishment due to the existing positive relation between these variables. As per this framework, the person who experiences emotional exhaustion is likely to have many work contacts but relatively few informal contacts.

In his later model, developed in 1991 from a study of mental health workers, Leiter (2001) presents a framework of burnout exploiting the impact of both the work context factors as well as coping styles on burnout. The model was refined by Maslach, Schaufeli and Leiter (2001).

3. Cherniss' Transactional Process Model

Cherniss (1980) views burnout as a three stage process involving job stress, strain, and defensive coping. He considered burnout to be a transactional process, experienced in the form of self – perpetuating and self-reinforcing vicious cycle whereby one reaction feeds into another till this established pattern is difficult to break. There is an underlying assumption that stress might not be permanent or total in its impact; rather it is contingent on a number of factors which are all specific to each situation. However, it is generally felt that the higher the level of stress experienced and more overwhelming the situation, greater are the chances of occurrence of burnout and its severity.

Reviewing various definitions of burnout related to a change in attitudes and behavior caused due to the stress of excessive demands from the job, Cherniss (1980) came to view burnout as a state of withdrawal from work or a change in motivation due to excessive stress. Burnout is seen as a complex socio – psychological phenomenon, which is characterized by the reduction in motivation and enthusiasm. Deducing from his Transactional Model of Burnout, Cherniss posits, "Burnout can now be defined as a process in which a previously committed professional disengages from his/her work in response to stress and strain experienced in the job." The model is qualitative and descriptive in nature.

4. Pines and Aronson's Existential Model

Here, burnout is defined as "a state of physical, emotional and mental exhaustion caused by long – term involvement in situations that are emotionally demanding." Pines and Aronson (1988) see it as severe hampering of capability to cope, caused by the lingering presence of extremely high expectations and situational stress.

From their clinical and research experience, Pines and Aronson (1988) came to conceptualize burnout as an experience as physical, emotional and mental exhaustion characterized by the feeling of tiredness, low energy, a sense of helplessness, and hopelessness, disenchantment and disillusionment from work, formation of negative self – concept, and a negative and dehumanizing view of others in situations when excessive demands are made on the person and he gets caught between high expectations and chronic situational stress. They have developed a one dimension measure called BURNOUT MEASURE,

which unlike the MBI, yields a single burnout score. Shirom (2003), posits that in their development of this measure of burnout, Pines and Aronson (1988) have moved away from their operational definition of burnout.

5. Meier's Model of Burnout

Meier (1983) presents a framework patterned on the work of Bandura (1977), which views burnout from an interactionist perspective, suggesting that burnout is a result of not just the organizational factors; rather it develops from interplay between the environment and the individual factors. Burnout is defined as "a state in which individuals expect little reward and considerable punishment from work because of the lack of valued reinforcement, controllable outcomes, or personal competence" (Meier, 1983). The four elements are:-

a) Reinforcement expectations
b) Outcome expectations
c) Efficacy expectations
d) Contextual processing

To elaborate, burnout occurs when an individual, due to his repeated work experience, has low expectations or little hope of receiving positive rewards or reinforcements. Also, the person feels a lack of control over the existing reinforcers, being unable to exert control over the reinforcement along with a high expectation of punishment being present in the work environment (Sharma, 2007). The model has not received much support in later researches.

6. Smith's Cognitive – Affective Stress Model

A four stage model of burnout has been presented by Smith (1986) for athletes which looks at the physiological, and behavioral aspects of the process of stress and burnout and how these components are affected throughout by the individual's personality and his level of motivation. The four stages are:-

a) Situational Demands:-
   i. Person's resources fall short of demands made of him
   ii. Initially experience stress which overtime gradually turns into burnout.

b) Cognitive Appraisal:-
   i. He reaches his own assessment or valuation of the circumstances

c) Physiological Responses:-
   i. Individual's perception of a situation is threatening and potentially harmful
   ii. Serious incapacitating physiological effects like increased tension, anxiety, fatigue, anger, depression, sleep disturbance along with an increased susceptibility to illness

d) Behavioral Responses:-
   i. These physiological responses set in motion many coping and task behaviors, which are an attempt to deal with excessive stress

Since this model is based on a research on athletes, it may not be relevant for the executives.

7. Moore's Attributional Model of Work Exhaustion Consequences

In an attempt to bring together the concepts of work exhaustion (interchangeably used with job burnout) and causal attribution, Moore (2002) puts forth a model of work exhaustion which is largely based on Werner's 91974) attribution theory of motivation and emotion.

Moore posits that unlike earlier researches, the individual experiencing work exhaustion need not necessarily go through the plethora of attitudinal and behavioral reactions associated with the job. He is more likely to experience some subsets of these attitudinal and behavioral reactions which, in turn, are contingent and are influenced by individual's perception of the attributed cause of the exhaustion. Moore's model in elaboration:-

a) Antecedents in work exhaustion:-
   i. Situational factors like role overload, role ambiguity, role conflict and lack of rewards are more likely to be antecedents to work exhaustion rather than individual variables.

b) Causal search:-
   i. This process looks into 'why' or the causes of the occurrence of any unexpected, negative or important situation.
   ii. In context of work exhaustion, causal search can be understood as the individual's search for the causes of his work exhaustion

c) Causal attribution:-
   i. Outcome of causal search is perception and understanding of the cause of the exhaustion.

d) Attitudinal reaction:-
   i. Two kinds of reaction can be experienced by the individual -
      ▪ Direct Outcome → Attribution Independent attitudinal reaction
      ▪ Occurring as a result of causal attribution →Attribution Dependent attitudinal reaction
   ii. One reaction is independent of causal attribution (eg. Decreased job satisfaction), the other is totally contingent on the causal attribution (lower self – esteem at work)

e) Behavior and Action undertaken to alleviate work exhaustion:-
   i. A combo of factors attribution independent attitudinal reaction, attribution dependent attitudinal reaction, characteristics of causal attribution and various situational and individual difference factors are likely to determine behavior taken by individual in an attempt to alleviate his work exhaustion.
   ii. These are depersonalization, voluntary turnover, attempts to change the work situation and attempts to change one.

8. Golembiewsky's Phase Model of Burnout

This model is based on Maslach's (1982) model of depersonalization, personal accomplishment, and emotional exhaustion. On the basis of the responses on MMBI – modified version of original MBI- the individual obtains certain scores on all three dimensions, after which his score on each dimension is coded as high or low as

per the available norms from a large population across the eight phases of burnout.

Golembiewsky and Munzenriden (1988), in their proposed model, suggest that progression of burnout in the form of continuum of eight phases – the lower phases indicating lower levels of burnout and the level of severity of burnout correspondingly increasing as one progressed on the continuum, with the eighth phase being the most severe of them all.

Work autonomy and social support were found to be related to exhaustion through role stress (E, 1993). Unlike Maslach, this approach does not give equal importance to each of the three dimensions. Depersonalization is seen to be in 'initial burnout phase' and is considered a precursor to the reduction in personal accomplishment with both further generating the more advanced and the most severe conditions of emotional exhaustion. To elaborate, on the basis of the obtained MBI scores, the individual is placed on one of the eight phases. Individuals assigned to Phase I tend to value people, see themselves as doing well on jobs that are socially worthwhile, and cope with added stress factors. In contrast, individuals placed in Phase VIII keep themselves distant from people, lack of information and social support, believe their work is not rewarding psychologically, and we are unable to cope with new stress, (Golembiewsky et. al., 1998). In Leiter's view (1989), Golembiewsky's approach lacks sound empirical support; he questions Golembiewsky's dichotomization procedure of the phases and critiques the whole process of dichotomizing continuous scales'.

5. Stages of Burnout

Medical researchers have identified three stages of the burnout cycle:-

I. Stress Arousal

Stress Arousal includes physiological and psychological responses. Some of these includes persistent irritability, persistent anxiety, periods of high blood pressure, bruxism (grinding of teeth during sleep), insomnia and forgetfulness. Additionally, one may have heart palpitations, unusual heart arrhythmia, concentration problems, headaches / stomach problems, and acute gastrointestinal problems. Psychologists have come up with the finding that the presence of any two of these symptoms reveals that the person is suffering from burnout of first level.

II. Energy Conservation

Energy conservation attempts to compensate for stress. If those strategies fail, consequences might include excessive lateness, procrastination, excessive time – off, persistent tiredness, social withdrawal from family and friends, increased cynicism, resentment, increased substance use (nicotine, caffeine, alcohol, prescription drugs), and excessive apathy. Any of these two symptoms found suggests that the person is in the second stage of the burnout cycle.

III. Exhaustion

It is a stage where most people finally realize that something may be wrong. The symptoms to be found in this stage include chronic sadness or depression, chronic stomach or bowel problems, chronic mental fatigue, chronic physical fatigue, chronic headaches or migraines, the desire to drop – out of society, the desire to get away from family and friends and even recurrent suicidal thoughts. Any of the two symptoms found in a person indicates that the stress level has reached the final stage of burnout cycle.

The symptoms include: chronic sadness or depression, chronic stomach or bowel problems, chronic mental fatigue, chronic physical fatigue, chronic headaches or migraines, the desire to "drop out"of society, the desire to get away from family, friends, and even recurrent suicidal ideation (Girdin, 1996).

6. Reasons of Burnout

There are many causes of burnout. In many cases, burnout stems from the job. But burnout is not caused solely by stressful work or too many responsibilities. It is a common belief that there is just one dimension to job stress, work overload (Rampton, 2015). Other factors contribute to burnout, including your lifestyle and certain personality traits.

Work-related causes of Burnout

- Feeling like you have little or no control over your work.
- Lack of recognition or rewards for good work.
- Unclear or overly demanding job expectations.
- Doing work that's monotonous or unchallenging.
- Working in a chaotic or high-pressure environment

Lifestyle causes of Burnout

- Working too much, without enough time for relaxing and socializing
- Being expected to be too many things to too many people.
- Taking on too many responsibilities, without enough help from others
- Not getting enough sleep
- Lack of close, supportive relationships

Personality traits can contribute to Burnout

- Perfectionistic tendencies; nothing is constantly good enough
- Pessimistic view of oneself and the world
- The need to be in control; hesitancy to delegate to others
- High-achieving, Type A personality
  - Start the day with a relaxing ritual – Meditation, doing gentle exercises, reading something that inspires you, reading spiritual or religious text
  - Adopt healthy eating, exercising, and sleeping habits.
  - Set boundaries - Don't overextend yourself. Learn how to say "no" to requests on your time.
  - Take a daily break from technology - Set a time each day when you completely disconnect. Put away your laptop, turn off your phone, and stop checking email.
  - Nourish your creative side - Creativity is a powerful antidote to burnout. Try something new, start a fun project, or resume a favorite hobby. Choose activities that have nothing to do with work.
  - Learn how to manage stress - When you're on the road to burnout, you may feel helpless. But you have a lot more control over stress than you may think. Learning how to manage stress can help you regain your balance.

7. Symptoms of Burnout

Burnout is a gradual process that occurs over an extensive period of time. It doesn't happen overnight, but it can slither up if one does not pay attention to the warning signals (Gerry, 2013). The signs and symptoms of burnout are subtle at first, but they get worse with time.

Physical symptoms of Burnout
- Feeling tired and drained most of the time
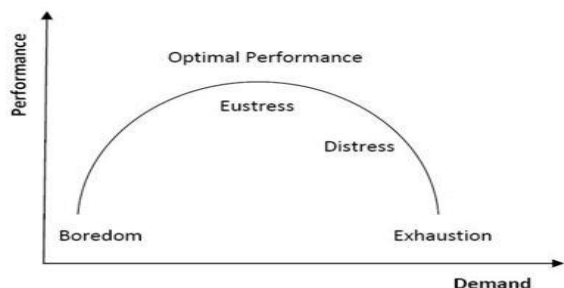
- Lowered immunity, feeling sick a lot
- Frequent headaches, back pain, muscle aches
- Change in appetite or sleep habits

STRESS	BURNOUT
Characterized by over – engagement	Characterized by dis – engagement
Emotions are over – reactive	Emotions are blunted
Produces urgency and hyper – activity	Produces helplessness and hopelessness
Loss of energy	Loss of motivation, ideals and hope
Leads to anxiety disorders	Leads to detachment and depression
Primary damage is physical	Primary damage is emotional
May kill you prematurely	May make life seem not worth living

Emotional symptoms of Burnout
- Sense of failure and self-doubt
- Loss of Motivation
- Detachment, feeling alone in the world
- Feeling helpless, trapped, and defeated
- Increasingly cynical and negative outlook
- Decreased satisfaction and sense of accomplishment

Behavioral symptoms of Burnout
- Withdrawing from responsibilities
- Using food, drugs, or alcohol to cope
- Taking out your frustrations on others
- Isolating yourself from others
- Procrastinating, taking longer to get things done
- Skipping work or coming in late and leaving early

8. Stress

Stress is defined as a response developed by the body to protect itself from overwork or extremely strained conditions. Stress is primarily a physical response (stress management society, n.d.). The stress response of our body is meant to protect and support us. The body tries to maintain its stability or homeostasis and in order to maintain this stability; it keeps on adjusting to the environmental changes. Whenever this equilibrium is threatened, the body reacts in a "fight or flight response". Stephen P Robbins defines stress as "a dynamic condition in which an individual is confronted with an opportunity, constraint, or demand related to what he or she desires and for which the outcome is perceived to be both uncertain and important."

There are mainly two kinds of stresses:
- Eustress – is a positive stress caused by desirable stimuli, which helps a person to remain motivated and perform at his / her peak. It is normally healthy and acceptable.
- Distress – is a negative stress which usually leads to underperformance, apathy towards life, and loss of control. This is usually brought about by intense physical and or emotional pressure and causes mental agitation.

9. Stress Vs. Burnout

Stress or burnout can befall in any aspect of life (TD, 2015). Stress is a customary part of our daily lives and each one of us respond to it in different ways. Stress yields physical, hormonal and chemical changes in the body to accelerate the performance of the heart, lungs and muscles. Stress involves pressures that demand too much of us physically and psychologically.

Burnout on the other hand, means feeling empty, devoid of motivation and beyond caring. People experiencing burnout often do not see any hope of positive change in their current situation. If extreme stress is like drowning in responsibilities, then burnout is like being all dried up. One other difference between stress and burnout is that one is usually aware of but he does not always notice burnout when it ensues.

Following table provides us with some of the points highlighting the differences between Stress vs. Burnout:

10. Preventing and Recovery from Burnout
I. Burnout Prevention Tips:

Stateme nt	Almo st Neve r (5)	Seldo m (4)	Sometim es (3)	Ofte n (2)	Alwa ys (1)
How often do you feel tired?	2	28	38	26	6
How often are you physically exhausted?	0	40	44	16	0
How often are you emotionall y exhausted?	0	10	32	54	4
How often do you think: "I can't take it anymore"?	0	40	34	24	2
How often do you feel worn out?	0	28	32	20	0
How often do you feel weak and susceptible to illness?	0	26	50	24	0

II. Burnout Recovery Strategies:

Burnout — the mental and physical exhaustion one experiences when the demands of the work consistently surpass the amount of energy one has (Knight, 2015). A few strategies for recovery from burnout are as follows:

Strategy # 1 – Slow Down

When one has reached the end stage of burnout, adjusting their attitude or looking after their health isn't going to solve the problem. One needs to force oneself to slow down or take a break. Cut back whatever commitments and activities you can. Give some time to rest, reflect, and heal.

Strategy # 2 – Get Support

The natural tendency is to protect what little energy you have left by isolating yourself, during burnout. Taking help of our loved ones for support would help heal faster. Simply sharing our feelings with other persons who care for us can relieve some of our burden.

Strategy # 3 – Re-evaluate your Goals and Priorities

Burnout is an unquestionable sign that something significant in one's life is not working. Taking time to think about one's goals, hopes and dreams would boost one's morale and give clarity of one's life. Burnout can give us an opportunity to rediscover what really makes us happy and to change accordingly along the lines.

11. Copenhagen Burnout Inventory (CBI) Research

Copenhagen Burnout Inventory was developed as a longitudinal study of burnout in human service workers in Denmark (Kristensen et.al 2005).

It comprises three components:-

Personal Burnout
- state of prolonged physical and psychological exhaustion
- This aspect is measured by 6 statements in the C.B.I

Work Burnout
- state of prolonged physical and psychological exhaustion, which is perceived as related to the person's work
- This aspect is measured by 7 statements in the C.B.I

Client Burnout
- state of prolonged physical and psychological exhaustion which is perceived as related to the person's work with clients
- This aspect is measured by 6 statements in the C.B.I

Copenhagen Burnout Inventory has been attached as an annexure in the report.

12. Research Methodology: The data was collected from 50 companies using the Copenhagen Burnout Inventory questionnaire. The data was analyzed using MS – Excel.

12.1 Data Analysis and Interpretations

12.1.1. Personal Burnout Component Analysis

Analysis:-
- Syntel shows the highest Personal and Work Burnout rate amongst all the 5 companies
- L&T Infotech indicates the highest Client Burnout amongst all the 5 companies

12.2.1.2. Specific Findings

12.2.2. Personal, Work and Client Burnout Gender wise

12.2.2.1. Generic Findings
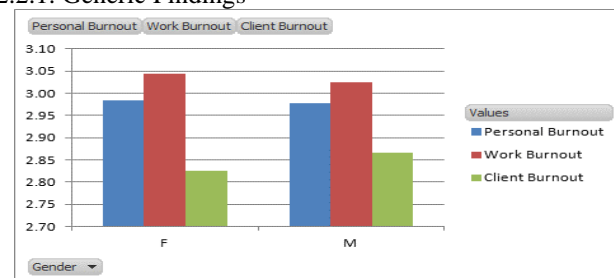
- Findings:-
- Females indicate more of a work burnout and are least effected by client burnout
- Males indicate more of work burnout than other two categories but in each category they are show less tendency of burnout as compared to their female colleagues

- 26% of the respondents say that they often feel tired which is marginally lower than the respondents who seldom feels tired
- 100% of the respondents are neither always physically exhausted nor almost never physically exhausted. 44% are sometimes physically exhausted
- 54% of the respondents are often emotionally exhausted which indicates that people in IT industry are tend to show more of emotional outbursts and jobs in this industry are more emotionally challenging and physical or mental challenging task
- 2% of the respondents say that they have often thought of almost giving up because they can't take in the job pressure and stress anymore
- 50% of the respondents say that they sometimes feel weak and susceptible to illness because of high emotional challenging tasks

12.1.2. Work Burnout Component Analysis
Analysis:-
- 28% of the respondents say that their work is emotionally exhausting and 4% says that they always feel their work as emotionally challenging and exhausting

- 100% of the respondents are neither always nor almost never felt burnout because of their work yet 44% felt burnout sometimes because of the work

- 44% of the respondents felt frustrated because of their work. This indicates that job of IT people involves monotonous as well as challenging tasks and calls for dynamic HR support functions.

- 50% of the respondents say that they sometimes and feel exhausted in the morning at the thought of another day at work which indicates the necessity of quality of work and environment of the organization

12.1.3. Client Burnout Component Analysis
Analysis:-
- 54% of the respondents say that they find hard to work with clients and 44% indicates that they sometimes get frustrated also which indicates the level of customization and understanding of customers requirement is very high in this industry
- 34% of the respondents are agreeing that they give more to the clients than the clients giving back to them. This calls for dynamic HR compensation and benefits policy to retain the talent in the organization
- 34% of the respondents felt that they are tired of working with clients. This indicates that monotony of the job and can be a main factor for high attrition level in Indian IT industry

Statement	Almost Never (5)	Seldom (4)	Sometimes (3)	Often (2)	Always (1)
Is your work emotionally exhausting?	0	10	58	28	4
Do you feel burnout because of your work?	0	24	44	32	0
Does your work frustrate you?	2	32	44	20	2
Do you feel worn-out at the end of your working day?	4	38	44	14	0
Are you exhausted in the morning at the thought of another day at work?	0	30	48	22	0
Do you feel that every working hour is tiring for you?	2	32	36	24	6
Do you have enough energy for family and friends during leisure time?	2	24	50	24	0

Statement	Almost Never (5)	Seldom (4)	Sometimes (3)	Often (2)	Always (1)
Do you find it hard to work with clients?	0	18	54	28	0
Do you find it frustrating to work with clients?	2	34	44	18	2
Does it drain your energy to work with clients?	2	26	38	30	4
Do you feel that you give more than you get back when you work with clients?	0	14	42	34	10
Are you tired of working with clients?	0	24	36	34	6
Do you sometimes wonder how long you will be able to continue working with clients?	0	18	48	24	10

12.2.2.2. Specific Findings

		Personal Burnout	Work Burnout	Client Burnout
Male	Highest	Syntel	Syntel	L&T Infotech - Mphasis
	Lowest	Mphasis	Patni	Syntel
Female	Highest	L&T Infotech	L&T Infotech	L&T Infotech
	Lowest	TCS	Patni - Syntel - TCS	Syntel

12.2.3. Personal, Work and Client Burnout Age wise
12.2.3.1. Generic Findings

	Personal Burnout	Work Burnout	Client Burnout
Highest	Syntel	Syntel	L&T Infotech
Lowest	Mphasis	Patni	Syntel
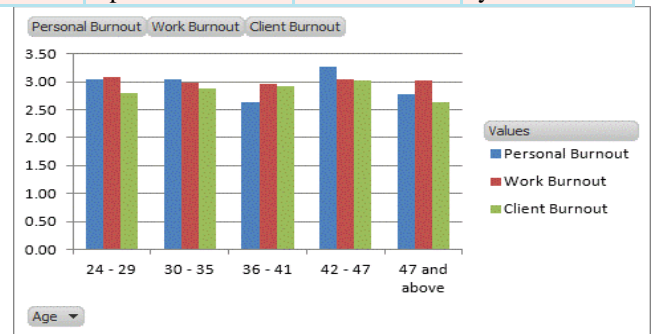
Findings:-
- Personal Burnout is highest amongst the age group of 42 – 47 because of their large involvement in more of analytical and conceptual part of doing the business

- Employees who belong to Eastern region of India tend to feel more of a Personal Burnout.
- Employees who belong to Northern region of India tend to feel more of a Work Burnout
- Employees who belong to Southern region of India tend to feel more of a Work Burnout but least of the personal burnout amongst employees from all the other three regions
- Employees who belong to Western region of India tend to feel more of a Work Burnout and Client Burnout than personal burnout.

12.2.5.2. Specific Findings
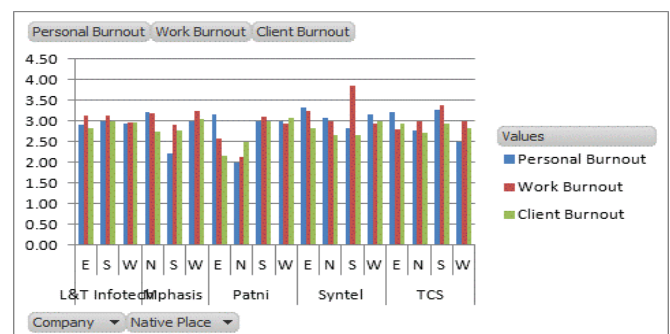
13. Conclusion and Recommendations
Conclusion:
The data collected from the primary survey conducted has been analyzed in both generic way and in specific to the companies. Following points indicate some of the major conclusions drawn from the survey:
- Client Burnout shows the highest impact amongst the employees of all the companies which indicates the level of customization to the customer needs.
- Since Syntel is not much into Client servicing, employees of that organization tends to feel burnout more by the Personal and Work factors.
- Employees of Patni seems to be comparatively less affected by Burnout because of their dynamic HR policies.
- Senior Management Team of L&T Infotech and TCS seems to be affected more by Client and Personal burnout because of their high orientation towards work and client.

- Work Burnout is highest amongst the age group of 24 – 29 because of high involvement in learning the job and satisfying the first three basic needs of Maslow's Need Theory

- Client Burnout is highest amongst the age group of 42 – 47 because employees in this group are on the verge of being promotedto the toplevel of management and since IT industry in India is customer driven, they involve themselves to a very high extent to show their talent.

12.2.3.2. Specific Findings
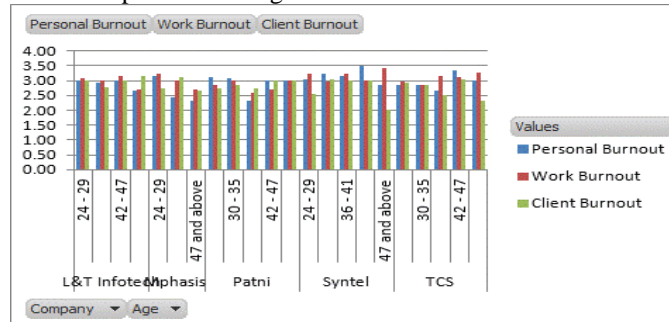
		Personal Burnout	Work Burnout	Client Burnout
24 - 29	Highest	Mphasis	Mphasis - Syntel	L&T Infotech
	Lowest	TCS	Patni	Syntel
30 - 35	Highest	Syntel	L&T Infotech - Mphasis	Syntel
	Lowest	Mphasis	TCS	L&T Infotech
36 - 41	Highest	Syntel	TCS	Mphasis
	Lowest	Patni	Patni	Patni
42 - 47	Highest	Syntel	L&T Infotech	TCS
	Lowest	Patni	Patni - Mphasis	L&T Infotech - Patni - Syntel
> 47	Highest	TCS	TCS	L&T Infotech
	Lowest	Mphasis	L&T Infotech	Syntel
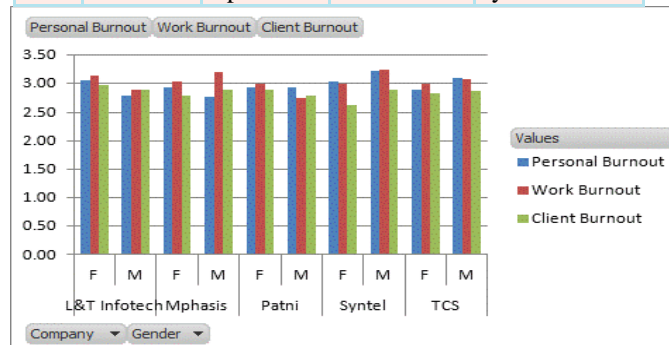
12.2.4. Personal, Work and Client Burnout Level of Mgt. wise

12.2.4.1. Generic Findings
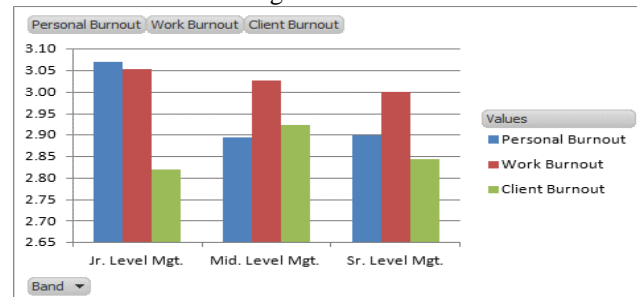
Findings:-

- Personal Burnout is highest amongst the Junior Level of Management employees because of their high involvement in the work assigned. They also indicate the highest level of work burnout

- Client Burnout is highest amongst the Middle Level of Management employees because they see their chance of promotion with the increase their customer's level of satisfaction.

12.2.4.2. Specific Findings
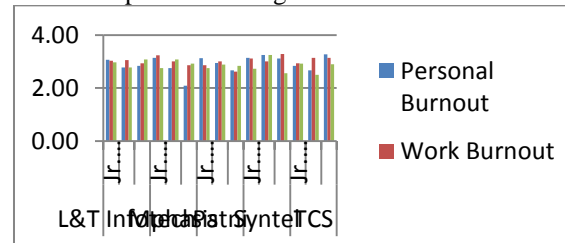
		Personal Burnout	Work Burnout	Client Burnout
Jr. Level Mgt	Highest	Mphasis	Mphasis	L&T Infotech
	Lowest	TCS	Patni	Syntel
Mid. Level Mgt	Highest	Syntel	TCS	TCS
	Lowest	TCS	Mphasis - Patni - Syntel	Syntel
Sr. Level Mgt	Highest	TCS	Syntel	L&T Infotech
	Lowest	Mphasis	Patni	Syntel

12.2.5. Personal, Work and Client Burnout Employees Native Region wise

12.2.5.1. Generic Findings
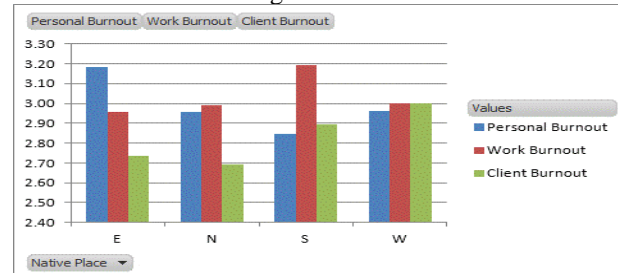
Findings:-

teamwork. Fun activities that help people see each other in a different light allow them to connect in a

Recommendations:
- Managing Diversity of Culture: Developing cultural competence results in an ability to understand, communicate with, and effectively interact with people across cultures, and work with varying cultural beliefs and schedules.
- Challenging yet Non – Stressful Environment: Managers often ask about motivating employees. Interesting and challenging work is a top motivator in the workplace. The work itself is a stronger motivator than the compensation for the work which destresses the employee.
- Equal Opportunity Employer: An employer which follows the principle of equal opportunity in regards to its hiring and promotion procedures. An equal opportunity employer is not allowed to discriminate based on items such as race or gender, and is required to give everyone an equal chance.

- Open Communication: Communication, the flow of information between people, is a very important part of the workplace. Managers must be able to communicate with employees and employees must be able to communicate with managers in order to have a profitable business.
- Trainings – Behavioral and Technical: Training is crucial for the organizational development and success. It is fruitful to both employers and employees of an organization. An employee will become more efficient and productive if he is trained well in his behavioral and technical aspects.
- Team Building Exercises: Team bonding brings people together by encouraging collaboration and

		Personal Burnout	Work Burnout	Client Burnout
East	Highest	Syntel	Syntel	TCS
	Lowest	L&T Infotech	Patni	Patni
West	Highest	Syntel	Mphasis	Mphasis
	Lowest	TCS	Patni	TCS
North	Highest	Mphasis	Mphasis	TCS
	Lowest	Patni	Patni	Patni
South	Highest	TCS	TCS	TCS
	Lowest	Mphasis	Mphasis	Mphasis

different setting are organized.

- De – Stressing Activities: Individuals who work in high stress or dangerous jobs as well as those who are employed at a place where there is high pressure environment are often prone experiencing stress. Understanding how to manage, minimize and deal with stress is essential which in turn, can help people feel more relaxed and react well when stressful situations actually arise. Hence, some de-stressing activities are very necessary, in order to make the employee feel like his stress issues are being taken into consideration by the organization.

14. Limitations of the Study

The sample size may not adequately represent the macro view as methodology followed is random sampling. Other variables like stress and coping mechanism can be included for better understanding of antecedents of Burnout

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16. Annexure 1: Copenhagen Burnout Inventory

The following questions refer to you and your current job. Please indicate your responses on a scale of 1 to 5.

1=Always or to a very high degree; 2= Often or to a high degree; 3=Sometimes or somewhat; 4= Seldom or to a lower degree; 5=Never/almost never or to a very low degree

S.No.	Item	1	2	3	4	5
1.	How often do you feel tired?					
2.	Do you feel worn out at the end of a day?					
3.	Do you find it hard to work with clients?					
4.	How often do you feel physically exhausted?					
5.	Are you exhausted in the morning at the thought of another day at work?					
6.	Does it drain your energy to work with clients?					
7.	How often do you feel emotionally exhausted?					
8.	Do you feel that working every hour is tiring for you?					
9.	Do you find it frustrating to work with clients?					
10.	How often do you think: "I can't take it anymore"?					
11.	Do you have enough energy for family and friends during leisure time?					

12.	Do you feel that you give more than you get back when you work with clients?					
13.	How often do you feel worn out?					
14.	Is your work emotionally exhausting?					
15.	Are you tired of working with clients?					
16.	How often do you feel weak and susceptible to illness?					
17.	Does your work frustrate you?					
18.	Do you sometimes wonder how long will you be able to continue working with clients?					
19.	Do you feel burnout because of your work?					

EMPLOYER BRANDING ON TALENT ACQUISITION IN IT/ITES SECTOR, MADURAI

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ABSTRACT

Now-a-days employees are undoubtedly attracted to the employer brand. It doesn't matter for them whether they are undergoing hardship in work or bullied; they cherish and encourage themselves because of their employer brand. Employer plays a major role among employees. Employees want to build their reputation among friends and relatives so they choose the best employer brand organisation. Important purpose of this study is to measure the impact of employer branding on talent acquisition. The descriptive study was adopted to study the impact of employer branding on talent acquisition. Structured questionnaire was used. Ninety one employees were selected from Madurai IT/ITES Sector through Convenience sampling. Chi-square test and Regression was used to find the association and impact of the variables. Through research, it was found that Employer brand strongly influences the employee to be a part of the organisation. Employer need to create an employer brand to acquire employees to their organisation. It was clearly found that employer branding plays a important role in Talent acquisition.

Key Words: Employer branding, Talent acquisition, IT/ITES, Madurai.

I.   INTRODUCTION

The trendy function of the corporate talent acquisition apparatus is a discipline known as employer branding.Now-a-days organisations are using branding as a strategy in business environment. Employer branding plays an influential role in acquiring employees with a talented. A talented employee feels to be recognized by the organisation. Talented employees strongly believe that working in a reputed organisation builds their image among Friends and Relatives. Just to build their reputation among friends and relatives, talented employees are ready to undergo any difficulties in their working place. Firms are applying brands and branding to acquire talented employees, even though brands and branding are not new idea(Wents & Suchard ,1993).It is very clear that employer branding has the budding to attract employee. Employer branding has the potential to attract the human capital that best fits and contributes to the strategic aims and bottom line of organisations.(Backhaus and Tikoo 2004; Martinet, 2011). Employer branding normally used to enhance the candidate experience from prehire to employment. The employer brand gives best shot on image promoting the organisation as a preferred employer to work for. Talented employees are more likely to identify with the employer brand about which they have gathered positive insights and thus, will choose to seek membership with the organisation.Organisation have found that effective employer branding lead to competitive advantage helps employees internalize company values and retain a talented employees(Dell & Ainspan, 2011). Now-a-days recruiting right talented employees is so difficult.Therfore, recruiting right type of talented employees became more critical, as does the employer brand image in the recruitment market(Ewing, 2002).Most of the organisation retain talent in the organisation using employer branding. Employer branding hitch employee loyalty through effective recruitment, engagement and retention practices.

II.   LITERATURE REVIEW

Literature search was conducted which focused on employer branding and acquiring talented employees.

Cleary (1981) found that the purpose of branding is essentially to build the product's image.

Armstrong (2006) found that employer branding aim is to become an employer of choice, a place where people prefer to work.

Berthon et.al. (2005) stated that employers who have high employer brand value are perceived by potential employees as more attractive than those with lower employer brand value.

Taylor (2010)acknowledged benefits to employer branding related to talent acquisition.

Aggerholm, Andersen and Thomsen (2011) found that employer branding as a successful talent acquisition strategy.

Backhaus and Tikoo (2004) stated that employer branding reach the qualified workforce outside of the organisation which the organisation wishes to attract.

Wilden, et al.(2010) found that brand signals convey the desired messages to the potential talent in the job market.

Oladapo (2014) found that one of the main concerns of many organisation today is talent acquisition. This author stated that employer branding is one of the best way to attract a talented employees.

III.   RESEARCH METHODOLOGY

91 employees working for various IT/ITES companies at Madurai, Tamil Nadu were chosen using Convenience Sampling to study the association between employer branding and talent acquisition and also the impact of employer branding on talent acquisition. The collected data were analysed using Chi-Square test and Multiple Regression Analysis.

IV. RESULTS AND FINDINGS

In order to study the association between employer branding and talent acquisition, chi-square test was used.

H_0:There is no significant association between employer branding and talent acquisition.

H_1:There is a significant association between employer branding and talent acquisition.

Table 1

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	133.544[a]	8	.000
Likelihood Ratio	98.707	8	.000
Linear-by-Linear Association	50.667	1	.000
N of Valid Cases	91		

a. 12 cells (80.0%) have expectedcount less than 5. The minimum expected count is .10.

From Table 1 it was understood that Pearson Chi-Square statistic, $\chi^2 = 133.544$, and p =0.001. The calculated value is lesser than the table value 26.296 at 5% level of significance. The null hypothesis is rejected. Since, p< 0.05.Accepting alternative hypothesis states that there is a significant association between employer branding and talent acquisition.From the above analysis, it's clear that employer branding influences talented employees to be a part of the organisation.

In order to measure the impact of employee branding on talent acquisition ,Regression analysis was used.

H_0:There is no impact of employer branding on talent acquisition.

H_1:There is a impact of employer branding on talent acquisition.

Table 2 : Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.868	.838	.866	1.34

From the above table 2, Model Summary can be a multiple correlation coefficient. *R* can be considered to be one measure of the quality of the prediction of the dependent variable(Talent Acquisition). A value of 0.868, indicates a good level of prediction. The "R Square" column represents the R^2 value, which is the proportion of variance in the dependent variable(Talent Acquisition) that can be explained by the independent variable (Employer Branding). R^2 value is 0.838 that our independent variables explain 83.8% of the variability of the dependent variable(Talent Acquisition).

Table 3 :Anova table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.303	1	13.303	39.094	.000(a)
	Residual	33.687	99	.340		
	Total	46.990	100			

a Predictors: (Constant), Employer Branding
b Dependent Variable: Talent Acquisition

The above table 3, shows that the independent variables statistically significantly predict the dependent variable, $F(1, 99) = 39.094$, $p < .0005$ (i.e., the regression model is a good fit of the data).

Table 4 : Coefficients

Model	Unstandardized Coefficients	
	B	Std. Error
(Constant)	.894	.183
Employer Branding	.764	.065

The above table 4, explains unstandardized coefficients indicate how much the dependent variable(Talent Acquisition) varies with an independent variable (Employer Branding)are held constant.

Regression equation is:

Talent Acquisition = 0.894+ (0.764 * Employer Branding)

Regression table represents relationship between employer branding and talent acquisition of the employees <0.000, which is less than 0.05, and indicates that, the regression model statistically significant predicts the outcome variable. There is an impact of employer branding on talent acquisition. From the above analysis, it's clear that employer branding helps to acquire a talented employees.

V. CONCLUSION

Organisation operate in a very competitive environment and they are in urge to hire talented employees to achieve their goal and prosper. By the analysis of this paper, it's found that branding has become a major tool for organisations to attract talented employees. Employees today are choosing to work for reputable organisations because they want to build their reputation among friends and relatives. Organisation should aim to attract talent employees through employer branding. As organisations are facing talent crux, it's mandatory to develop employer brand to acquire talented employees. As employer branding and image campaigns have become more sophisticates so have the tools companies use to measure their success. It's very clear that smaller organisation with equally good working environment disappear in the background with no potential talented candidate interested to join them. With branding, any smaller organisation can now compete fair and square in talent acquisition.

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A Study of Performance Appraisal Practices and its effect on Employees' Motivation

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Abstract:*Human Resource Management (HRM) is concerned with the people and management. Since every organization comprises people, acquiring their services, developing their skills, motivating them to higher levels of performance and ensuring that they continue at the same level of commitment to the organization are essential to achieving organizational goal. Organizations realize their motto through effective and efficient utilization and management of employees. If PA is conducted appropriately and its result is communicated to the employees it will improve the overall performance of the organization. This study was designed to assess the performance appraisal practice and its impact on employee's motivation. Moreover, PA was not strictly meeting its intended purposes, due to this employee become de-motivated and working with low morale. In addition to this, there is high rate of employee turnover and weak human power, poor customer service delivery was revealed on the findings.*

Keywords: Performance Appraisal, Performance Appraisal System, Motivation.

Introduction

Human Resource Management (HRM) is concerned with the people dimension of management, since every organization comprises of people, acquiring their services, developing their skills, motivating them to higher levels of performance and ensuring that they continue at the same level of commitment to the organization and are essential to achieving organizational goalsaccording to Decenzo and Robbins (1989), This is true, regardless the type of organization: viz. government, business, education, health, recreation, or social action. Human resource management is one of an evolving science concerned with the management of people and people constitute the principal asset of any organization.

Different organizationswill have different goals and objectives to be achieved. Some of the major goals or objectives are to produce quality product or rendering quality service, which enables them to satisfy their customers need. As a result, they can achieve their organizational goals too. Organizations realize their motto through effective and efficient utilization and management of employees. Employees are said to be the lifeblood of organizations, because, through people that organizations can achieve their missions and visions.

Therefore, its employees determine the destiny of a given organization and it can be agreed, an organization is as good as its people.

As human resource (HR) is one of the most important resources in the organization, so it should be managed well. One way of managing the HR is conducting performance measure and analyzing the role of performance measure upon services to the employees. If Performance Appraisal (PA) is conducted appropriately and its result is communicated to the employees it will improve the overall performance of the organization. The skill to conduct performance appraisal relies on the ability to assess an employee's performance in a fair and accurate manner. To do so, organizations must design a performance appraisal system (PAS) that can accurately measure the overall performance of the employees.

Performance Appraisal (PA) is the most important requirements for successful business and human resource policy. The ability to conduct PA relies on the ability to assess an employee's performance in a fair and accurate manner. To do so, an organization must design a Performance Appraisal System (PAS) that can accurately measure the performance of its employees. PAS provides valuable performance information to a number of critical human resource activities, such as allocation of rewards, e.g. merit pay, promotion, feedback on development and assessment of training needs, and others. [1]

Since performance appraisal is one of the most significant requirements for success of business and human resource, organizations must design proper PAS in order to achieve the goals and objectives of the organization. The key component of the Performance Appraisal Process (PAP) is the creation of specific performance criteria or competencies. These performance standards (PS) must developed, defined and communicated to the incumbent with performance monitored against those standards throughout the year. Without equitable and objective standards, questions will continue to arise about how

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[1]http://forebpx/vt/edu/usesrs/soc/ retrieved on 2nd October, 2017

performance is measured and how compensation decisions are made.

One of the most important concerns of a manager is to motivate employees to make their optimum contribution to the achievement of organizational goals. Therefore, it becomes important for him/her to understand what motivates employees to be had as they do. Since the needs of employees and the organization are not always the same, the managers can better integrate these two sets of needs by gaining an insight in to the needs of his employees and then persuade them in to the direction of organizational goals, because motivation is what drives a person into doing something.(Cole 1997).

For PA to meet its desired objective appropriate techniques must be in place. Hence, there is a need to match appraisal techniques to different PA situation in the organization.

The problem statement

The success of every institution depends on the quality and commitment of its human resources. In order to ensure continued efficiency and effectiveness of members of staff each organization has to carry out employee performance appraisal from time to time to keep them in check and replace, motivate, retrain or take any other appropriate action. Proper undertaking of PA will have positive impact for both the organization and its employees.[2]

Performance Measurement and Performance Management

Pradeep, (2005) explained significant ideas related to performance appraisal, as a tool for achieving desired organizational effectiveness. These are performance measurement and performance management.

Performance Measurement: It is based on the belief that performance can be measured by objective indices. Stress is not so much on behavior and activities as ends, of behavior and activities. Behavior or activities are seen rather as mean to the important results. Performance measurement is necessary to enforce accountability to results.

Performance Management: It is a result-oriented exercise. It brings into focus all organizational and sectional results, links them, into perspective, relates them in terms of the larger picture, measures them, set up monitoring and feedback mechanisms, and

finally, institutes development plans to improve upon results procured thus.

Process of Performance Appraisal

Performance appraisal comprises the following steps:

1. Select performance factors (based on job description) to be evaluated and set the standards to be achieved,
2. Set the performance review period,

3. Measure actual performance,

4. Compare performance with set standards and rate it with a suitable scale

5. Communicate the rating to the appraisee,

6. Use the performance appraisal for the desired purpose.(Pattanayak, 2009)

Benefits of Performance Appraisal

Appraisal is believed to enhance managerial and organizational performance as well as positively contributing to employee motivation Randell (as cited by Colling,2010). Conducted effectively, they credited with a number of positive benefits:

1. Performance planning and goal setting
2. Providing feedback and coaching

3. Employee development

4. Linking employee performance to compensation and promotion decision

In addition to these, Pattanayak, (2009), stated the benefits of PA. PA is a formal exercise carried out for all executives and workers with respect to their contributions made towards the growth of the organization. The aim is to measure the overall performance of an employee over a period, usually one year by his/her immediate supervisor to provide a feedback to the employees and aid the management. The benefits of successful appraisal system can be summed up as follows:

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[2]www.aibama.orgretrieved on 23rd Nov., 2017

For appraise

i. Better understanding of the role in organization what is expected and what needs to be done to meet those expectations

ii. Clear understanding of his/her strengths and weaknesses so as to develop himself/herself into a better performer in future

iii. Increased motivation, job satisfaction, and self esteem

iv. Opportunity to discuss aspirations and any guidance, support or training needs to fulfill these aspirations

v. Improved working relationships with the superiors

For the Management

i. Identification of performers and non-performers and their development towards better performance

ii. Opportunity to prepare employees for assuming higher responsibilities

iii. Opportunity to improve communication between the employees and the management

iv. Identification of training and development needs

v. Generation of ideas for improvements

vi. Better identification of potential and formulation of career plans

For the organization

i. Improved performance throughout the organization

ii. Creation of a culture of continuous improvement and success

iii. Conveyance of message that people are valued

The above benefits will be realized only if performance appraisal is considered as a process of management.

Relationship between Performance Appraisal and Motivation

In the growing age of business and markets, human resource is the big asset of the organization; if the organization is not keeping well with its labor work force then it might get into trouble. Employees are the main features of the progress of the organization. In order to have productivity, employee should be motivated and should be satisfied with their job and have loyalty with the organization. HR professionals are making it possible to motivate the employees with the performance appraisal systems by giving them fair appraisals, as per their performance over a period of time. It has been noticed that there is a strong relationship between performance appraisal and motivation, job satisfaction and loyalty. Keeping aside the main objectives of performance appraisal, it can be use as a mechanism to create a completion between employees to get the job done with all the linked targets and benchmarks (Robert, 1984).

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Methods of Performance appraisal

There are different systems and methods for measuring performance and appraising the employees. These methods and systems are categorized as the traditional methods and the modern methods.According to George (2004, pp.361-362), the choice of method should be based largely on the purpose of the appraisal.

Traditional Methods

Trait Method. It is inexpensive to develop and use. The disadvantage of this method is that it has high potential for rating error and it is not useful for employee counseling.

Behavioral Method. It uses specific performance, acceptable to employee and supervisor; useful for providing feedback; are fair for reward and promotion decision. The disadvantage is that it is time consuming and can be costly to develop.

Result Method. It has less subjectivity. It is acceptable to employees and supervisor; links individual performance to organizational performance, encourage mutual goal setting; are good for reward and promotion decisions. The disadvantage of this method is time consuming to develop or to use; may encourage short-term perspective; may use contaminated criteria; may use deficient criteria.

Forced distribution

One such change has been the use of systems of forced distribution. Forced distribution forces the appraiser to rate a certain proportion of employees in different categories.
Performance appraisal methods can be broadly classified as measuring trait, behaviors, or results. Trait approaches continue to be the more popular system despite their inherent subjectivity. Behavioral approaches provide more action oriented information to employee and therefore may be best for development. The results oriented approach is gaining popularity because if focuses on the measurable contributions that employees make to the organization.

The simplest and least expensive techniques often yield the least accurate information. However, research has not always supported a clear choice among appraisal method. While researchers and human resource managers generally believe that the more sophisticated and more time-consuming methods offer information that is more useful, this may not always be the case. Managers must make cost benefit decisions about which method to be use. (Ibid).

Modern Methods

There are different methods of performance measurement in the modern times, 360 Feedback System and Management By Objectives (MBO), Balanced Score Card (BSC).

Management by Objective (MBO)

This method is based on the principle of management by objective where the appraiser and the appraisee

lay down standards or target to be achieved. Appraises actual performance is measured against the standards or target set at the end of a specific period. This system serves as motivation to influence appraisee to achieve the target or standard set because it is noted to raise the morale of employees and for that matter the appraisee since he is involved in the whole processes of appraisal.(Ibid)

Balanced scorecard

The Balanced Scorecard is a strategic planning and management system used to align business activities to the organization's vision and strategy, improve internal and external communications, as well as monitor organizational performance against strategic goals.(Ibid)

360-degree feedback

A 360-degree feedback is credited with providing a more holistic and effective source of feedback on individual performance. Essentially, it involves getting feedback from multiple sources, including peers, supervisors, colleagues and so on.
The 360 Feedback systems can be an ongoing process throughout the year to keep an eye on the performance and other's perception about the employees and also it can be measured that how well employee is keeping with its required tasks and responsibilities. (Ibid)

There are four main parts of 360 feedback appraisal system:

    a. Self-appraisal
    b. Superior's appraisal
    c. Subordinate's appraisal
    d. Colleagues' appraisal

The success of organizations depends largely on the performance of its human resources. To determine the contributions of each individual, it is necessary to have a formal appraisal program with clearly stated objectives.

Carefully defined performance standards that are reliable, strategically relevant, and free from either criterion deficiency or contamination are essential foundations for evaluation. Appraisal system must also comply with the law. Appraisal should be

treated with the same concern for validity, as are selection tests.

International Perspective of Performance Appraisal

Research reports indicate that there is widespread use of performance appraisal in work organizations all over the world. This widespread use of performance appraisal system can be attributed to human resource specialists, academics and consultants who proclaim that performance appraisal is a critically needed tool for effective human resource management. Performance appraisal dates from the time of World War II. In a broader sense, however, it is one of the oldest professions with origins in Frederick Winslow Taylor's 1911 Time and Motion work, which used the scientific method to assess and improve worker productivity.[3]

Result Oriented Performance Management Change Initiative

Performance management is a systematic and strategic approach which works on continuous improvement of teams and individuals performance so as to achieve organizational goals (Armstrong and Angela, 1998).

How often should Appraisal be Done

Organizations use two basic timing periods for most employees. They are referred to as the anniversary date (the date the person entered the current job or a common review date). Under a common review date system, all employees are evaluated and compared so that such decisions as promotions, and merit pay increases have a common period being covered for all employees.

Researchers have found that feedback on performance should be given frequently and the closer the feedback to the action, the more effective it is. However, only few firms evaluate frequently. One way to reconcile the ideal with the reality in this respect is for the manager to give frequent feedback to employees informally and then formally summarize performance at evaluation time.
Another reason that some managers resist frequent subordinate evaluations is that they produce stress, especially if a rater has to use a system in which

he/she has little faith or confidence. There is also the stress associated with having to inform another person that he/she is not performing at acceptable levels (Srinivas & Motowidlo, 1987, as cited in Ivancevich & Glueck 1989, pp. 338-339). Researchers have found that raters under stress tend to notice and recall negative information about those being evaluated.

Based on the employees' nature of work the researcher used stratified sampling technique to choose respondents. Stratification factors such as position of respondents were used. It was categorized into two group Managerial and Non Managerial.

The total number of population of the Office are (278) permanent employees. Since the population was homogenous, the researcher specified the sample size to be 30% of the total population, which is 30% of 278 = 83 sample, was included.
Among 83 sample size 10.7 were managerial and 89.3 were none managerial employees. Due to their small size, the proportion of the Managerial respondents is less than that of the Non Managerial employees.

And the employees who were included in the data collection are determined by the formula: $278/83 = 3.34$ 3 therefore, by using the systematic random sampling methods, No. 2 is selected and every 3rd employee were selected from the list of total population up to the 83 sample size is satisfied.

Conceptual Framework

The employer chooses an appraisal approach or a mix of approaches to appraise the performance of employees. The employee is either motivated or de-motivated to perform depending on how the appraisal was administered. Whether employees are motivated or de-motivated, it affects their level of performance, which in turn affects output (productivity). The employer receives this output as feedback on the effectiveness or otherwise of the appraisal process.[4]

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[3] http://www.zenithresearch.org.in

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Figure 1: Conceptual Framework

Unsatisfactory Work Performance	**Strategic Intervention**

Performance Management Approaches

. Supervision, training, monitoring performance, and planning work and setting expectations

Hygienic Factors: Extrinsic Motivators

- Pay, Working conditions, Physical surroundings, Job

Intrinsic Motivators: Achievements, Recognition,

Good Work Performance: Satisfactory Work

Good Organization Performance
Analysis of Data
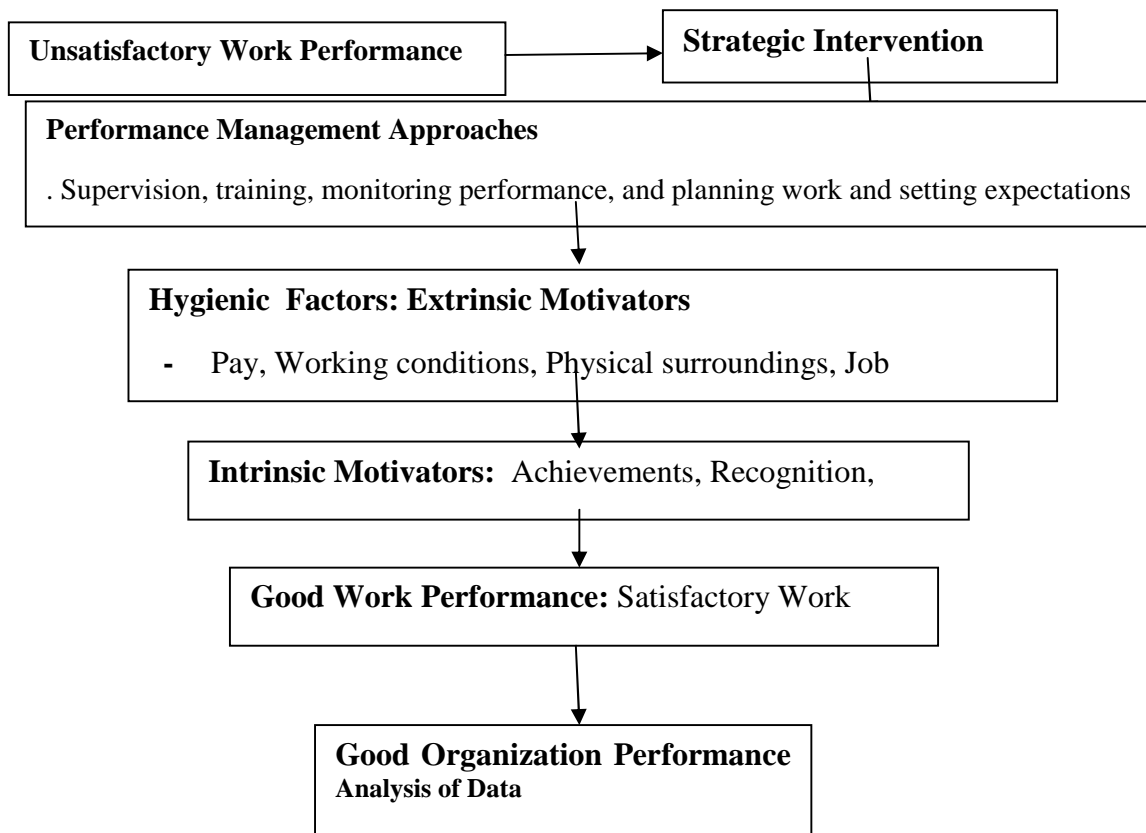
The data gathered through questionnaires were coded, entered into computer and analyzed and presented in the form of charts, diagrams, and tables using SPSS. For analysis purpose the responses under Likert scale were grouped in to three major categories: agree, neutral, and disagree.

Depending upon the nature of the basic questions and the data collected of this research, the researcher used simple statistical tolls like percentage, table, charts, and figure.

The results of the interview questions were integrated to the responses of employees through questionnaires and were analyzed accordingly.

As to the age composition of the respondents, the majority of the respondents 50.7% were between 25-34 years, 28% were between 35-44 years. About 12% of respondents were between age 45-54, 8% of respondents were below 25 years old and the rest 1% respondent were above 55 years old. Regarding the sex of respondents, the majority of the respondents 55% were males while 45% of them are females. The proportion of females is lesser in all age groups.

Regarding educational qualification Table 2 reveals the majority of the respondents 49% are first-degree holders and 23% of the respondents are diploma holder. Those who have masters' degree are 12% and 11% of the respondents are technical and vocational school graduates, the rest of the respondents 5% are completed 12th grade.

Regarding specialization area, majority of the respondents 31% specialized in the field of management, followed by 19% in the field of accounting and finance. From those who specialize in the field of management 19 % have BA, 7 % have college diploma, 5% have masters degree.

Regarding work experience, the above figure shows the largest groups of respondents 48% have a working experience of 5-15 years on the current job followed by 23% have a work experience below 25 years, 21% of respondents have a work experience in the range of 16-25 years, and 8% of the respondents have a work experience of 26-35 years.

Based on the responses gathered from the employees of the Mayor's Office, I have tried to discuss the employees' perception of the appraisal method, process, criteria and technique of the office of the Mayor's. These questionnaires were designed using multiple-choice questions and under Likert scale were grouped in to three major categories: agree, neutral, and disagree.

Performance Appraisal method

Which one of the following PA methods is currently applied in your organization?		Position of respondents		Total
		Managerial	Non Managerial	
BSC	Count	0	18	18
	(%)	(.0%)	(24.0%)	(24.0%)
Ranking	Count	0	1	1
	(%)	(.0%)	(1%)	(1%)
There is no clearly defined appraisal method	Count	5	48	53
	(%)	(11%)	(64%)	(75%)
Total	Count	8	67	75
	(%)	(11%)	(89%)	(100%)

Table 1 Response Regarding Performance Appraisal Method

As we can seen from Table 4, the largest no of the respondents 71% replied there is no clearly defined appraisal method. Among these respondents 64% were from none managerial position and 7% respondents were from managerial position.Those who answered BSC were 24%. Thus, it can be concluded that there is no clearly defined appraisal method in the Office. This may have negative impact on employees motivation.

Even though 24% answered BSC, the large number of respondents reveals that there is no clearly defined method of PA in the office. As the majority response, currently there is no a practice of measuring employees performance.

Interview was conducted with the Human Resource Department Head (HRDH), in order to gather additional information on: method used to measure performance of employee; contribution by HRMD to establish a system of appraisal; efforts made to improve practice of PA.

According to HRDH, there is no clearly defined method to conduct appraisal of employees in the office. For the last ten years CGAA is trying to implement the BSC strategies but, due to many reasons this strategies are not implemented, for this

reason appraising of employee performance is pending. As a matter of fact, HRMD is responsible for the start and achievement of such major personnel issues as human resources planning, recruitment and selection, placement, training & development, determination of employee compensation schemes, performance appraisal, promotion, demotion, transfer and layoff, of course with continuous assistance and feedback from top management wherever necessary. Therefore efforts have been to enhance the over all activities of HRM functions.

Performance Criterion and Process

The first step in the performance evaluation process is the specification of the standards against which the performance of employees will be judged. According to Mondy (1999), the criteria used for appraising employee performance must be job related. More specifically, job information should be determined through job analysis.

Table 2 Summary of Respondents Attitude towards the Criteria of PA

Which steps are included in the process of appraisal in your organization?		Position	
		Non Managerial	
Establishing Standards	Count	7	7
	%	10%	10%
Communicating standards with employees	Count	4	4
	%	6%	6%
Measuring actual performance and comparing it	Count	7	7
	%	11%	11%
Discussing appraisal with employees	Count	4	4
	%	6%	6%
Appraisal steps or process are not clearly stated	Count	45	45
	%	67%	67%
Total	Count	67	67
	%	100%	100.0%

As we have seen Table 5, this question was presented only for non-managerial employees to check whether there is appraisal criteria/process or not in their office. As indicated above the majority 67% respondents replied appraisal steps or process are not clearly stated. 11% respondents answered that their office established standards, and those who answered measuring actual performance and comparing it were 10%.

The rest of the respondents answered communicating standards with employees and discussing appraisal with employees are 6% respectively. Hence, on the basis of the response of majority respondents it is likely inferred there is no clearly defined criteria for appraisal.

In the absence of such clearly laid down goals, personal goals may control over organizational goals, in which case organizational productivity would be negatively affected.

Job Description

Job is a collection of task, duties, responsibilities, which as a whole from the establishment to an individual employee at a specific position. And job description is a formal, written explanation of a specific job, usually including the job title, task, relationship with other jobs, physical and mental skills required, duties responsibilities and working conditions; a part of the job evaluation process wherein a review of the nature of work occurs in relation to other jobs, working conditions, the degree of responsibility required. In addition, the appraisal should measure how well the various parts of the job are being performed. It should identify the employee's strengths, as well as the aspect of the job where improve, performance is needed. When this has been identified and agreed on between managers and employees, a performance improvement plan should be developed and implemented.

Table 3 Summary of Respondents about Job Description

Do you provide those employees working under your supervision with job description and clear performance expectations?		Managerial	Total
Yes	Count	2	2
	(%)	(25%)	(25%)
No	Count	6	6
	% of Total	75%	75%
Total	Count	8	8
	(%)	(100%)	(100%)

As we can see majority of the managerial employee 75% said no, the rest 25% employees said yes. As we can observe from the respondent.

**Table 4 Summary of Respondents Attitude
towards Job Description**

For Non Managerial		
Performance goals are clearly communicated to you by your supervisors via job descriptions or other statements of performance expectations	Frequency	Percent
Disagree	39	58%
Neutral	15	22%
Agree	13	11%
Total	67	100%

As we can see from Table 7, the majority of the employees 58% of the respondents disagreed and were not provided with job descriptions and hence were not well aware of the performance level that was expected of them. 22% of the respondents are neutral.

From both managerial and non managerial response it can be concluded that there is no the practice of providing job description to employees in the office.

In the absence of job descriptions, defining standards or criteria of performance appraisal would be difficult, employees may loose sight of the most important and challenging job activities while concentrating on the less important ones that contribute little to the effective performance of the individual or his/her work unit. However, well designed job descriptions, are the instruments that form the standards (criteria) against which employees' performance would be measured.

Working Environment

The working environment includes:work process management styles (the way managers act while they are leading others); teamwork (to generate positive synergy through coordinated effort);culture (that binds members of an organization together through shared values); affect the implementation of PA either positively or negatively depending on the prevailing conditions i.e., whether or not the work environment allows to implement the system without breakdowns in the process of undertaking objectives in the organizations.

**Table 5 Summary of Respondents Attitude
towards Working Environment**

For Non Managerial		
Are you are satisfied with working environment in your organization	Frequency	Percent
Disagree	57	(85%)
Neutral	4	(6%)
Agree	6	(9%)
Total	67	(100%)

As indicates on Table 8, majority respondents (85%)were not satisfied with the working environment. 9% were satisfied and 6% are neutral.

Thus, it can be concluded that, on the bases of the response of the majority of the respondents, the working environment in the Office of Mayor was not good for them.Their level of satisfaction will not lead them to work hard and put their full efforts at work. If the employees are not, satisfied with their working environment they become de-motivated and they have to force to looking for another job.In addition to this, some employees explained that their office does not consider administration work rather it focuses only on the political issue.

Employees Attitude towards Performance Appraisal

It has long been recognized that performance appraisal plays an important role in organizations. It serves a variety of purposes such as providing the basis for making selection decisions, determining salary increases, and provides a vehicle for feedback between the supervisor and employees and can be used as a powerful tool for managerial control.

**Table 6 Summary of Respondents attitude
towards the purpose of Performance Appraisal**

Degree of Agreement	My Office is open, transparent, and communicates well	I have got the opportunity to participate in the design of PA form

	Count	(%)	Count	%
Disagree	44	(66%)	49	(73%)
Neutral	5	(8%)	2	(3%)
Agree	18	(27%)	16	(24%)
Total	67	(100%)	67	(100%)

As Table 9 indicates 66% of respondents disagree with the statement my Office is open, transparent, and communicate well and 27% agreed with it. The rest 8% were neutral. Even if there is different perception among respondents in this regard, as the majority respondents response, can be conclude the level of openness and communication process was poor.

As cited by McCourt and Eldridge (2003) asserted that the success of PA depends on participation of employees. Nevertheless, transparency and continuous follow up is also weak. If employees are not allowed to participate and communicate openly with their appraiser, they do not have the chance to know about their strength and weaknesses.

From the above table, the majority (73%) of respondents did not get the opportunity to participate in the design of PA and 24% of respondents got the opportunity. The rest 3% were neutral. According to the finding of majority respondents have no access to participate in the preparation of PA. This implies that the design of the evaluation form and its content is left to the managers of the Office and it does not encourage participation of theemployees in the design of the form

As one major purpose of PA, is creating open relationship among evaluatees and evaluators to increase the motivation and commitment of employees and feel fairly treated, to develop their abilities of planning, and provide the opportunities for individuals to express their aspiration about their work should be highly encouraged.

Table 7 Summary of Respondents towards Feedback

Degree of Agreement	I am satisfied with the way my organization provides me with feedback.		The feedback I receive on how I perform my job is highly relevant.	
	Count	(%)	Count	(%)
Disagree	57	(85%)	41	(61%)
Neutral	3	(5%)	4	(6%)
Agree	7	(10%)	22	(33%)
Total	67	(100%)	67	(100%)

As indicated Table 9.1 the respondents were not satisfied with the way their organization provides them feedback, majority of the respondents 85% said disagree, followed by 10% respondents agreed with the way that their office provides feedback on performance. Those who said neutral were 5%.

As it is revealed, there is big differencebetween agreed and disagreed. Hence, from the bases of the response of majority respondent, it can be concluded that there is no feedback on the performance of employees since there is no properly established system of PA.

People want to know how they are doing on the job, and it is the responsibility of the managers to tell them. This requires the managers to evaluate their performance and communicate the appraisal to them. This process of appraisal and communication should be regular and on going.

As it is noticed in Table 7 the statement "The feedback I receive on how I do my job is highly relevant" was posed to the respondents so that they could forward their level of agreement. Thus, the majority 61% of the respondents disagreed, and 33% respondents agreed. The rest 6% respondents replied neutral. As we can observe from the attitude of the majority respondents indicate they are not happy with the feedback. So it can be concluded that there is no a practice of giving feedback in the office.

Table 8 Summary of Respondents Towards their attitude on purpose of PA

Do you think that the performance appraisal is meeting its intended purposes of determining employees' compensations, promotion, demotion, transfer and identification of employees' training needs?		Position			
		Managerial		Non Managerial	
			Total		Total
Yes	Count	2	2	52	52
	(%)	(25%)	(25%)	(22%)	(22%)

No	Count (%)	6 (75%)	6 (75%)	15 (78%)	15 (78.6%)
Total	Count	8	8	67	75
	(%)	(100%)	(100%)	(100%)	(100%)

From the above table we can observe the majority 75% of managerial and 78.6% of non-managerial respondent replied No, where as 25% of managerial and 22% of non-managerial respondents said Yes.

The respondents did not believe that the performance appraisal system of the Office is meeting its intended purposes. The performance appraisal has no significance in determining employees' future in the Office, the responses from the respondents indicated that one or a combination of the following might have accounted for their perception of the system:

> Lack of clearly defined criteria for conducting PA. For effective implementation of PA the first process is setting criteria of appraising the performance of employees.

> Lack of clear connection between performance and reward. So long as employees could not observe their efforts being accompanied by positive performance that eventually leads to rewards (which may be in the form of promotion, salary increase, or training & development) in a reasonably short period, they wouldn't be motivated and consequently their attitude towards the system's effectiveness would be distorted.

> Absence of clear and transparent communications between the Human Resources Department and the different work units on how employees' performance would be valued and what administrative decisions would be taken on that basis might have a negative implication on employees perception.

From this it can be conclude the PA did not achieve its intended purpose in order to determine employees' compensations, promotion, demotion, transfer and identification of employees; training nee. Therefore, it is highly advisable the office must revise its HRM manual.

Table 9 Summary of Respondents Attitude towards Training

In your office there is on job training program	Frequency	Percent
Disagree	52	(78.6%)
Neutral	1	(2%)
Agree	14	(21%)
Total	67	(100%)

The distribution of percent in Table 9.3 reveals the majority 78%, and 21% of employees were report that disagree and agree respectively. 2% employees were neutral. According to the majority response this distribution, there is no on job training program to enhance employees ability. Some respondents explained that training has given for some employees is unfair but that training was not job related and that does not build their capacity for a better product or better quality service.

Skill can be acquired through training and practice on an intervention. Its aim is to enable such employees to perform their current and future role effectively. No matter how well the person matches the job, some training is always necessary. Training includes the teaching of knowledge, skills, and attitudes.

Benefits of PA

Appraisal is believed to enhance managerial and organizational performance as well as positively contributing to employee motivation. Conducted effectively, they credited with a number of positive benefits: performance planning and goal setting; providing feedback and coaching; employee development; linking employee performance to compensation and promotion decision.

the majority of respondents 75% agreed and 25% respondents disagree with the statement performance appraisal is valuable to me as well as to my organization. From this we can infer that PA is very crucial for the employees.If the appraisal conducted in effective manner, it benefits the employee, the manager and the organization as a whole. Hence, on the bases of the response of the majority of the respondents it is highly advisable to the Office to conduct PA to get the benefit from this.Conducting performance evaluation helps organizations to reward and promote effective performers and identify ineffective performers to developmental programs or other personnel actions that are essential to the effectiveness of HRM.

indicates the majority of respondents 84% disagree and 17% respondents agree the statement, there is a strong link between performance and reward in your office.

Employees Attitude towards the Linkage between PA and Employee Motivation

Motivated employees are needed for an organization's survival in a highly competitive world. Motivated employees are more productive hence; managers need to understand what motivates employees. One of the managerial functions is employee motivation. However, this function is rather complex since what motivates an employee today may not necessarily motivate them tomorrow.

Therefore, well-motivated employees are those who work along clearly defined goals and who take action, which will result in these goals being met. Employees who manage to motivate themselves seek, find and carry out work that satisfies their needs. However, majority of employees need to be motivated by the management through pay, praise, promotion, transfer, training and development in order to improve their performance.
the majority of the respondents 65% disagreed, followed by 20.% were replied agree. 4% of the respondents were neutral. It could then be concluded that, the respondent disagree on the claim that performance appraisal does not determine pay and promotion decisions. A good promotion system is useful to employees individually as well as to the administration as a whole. From the majority respondents response the office must establish a system how motivate employees.

Impact of PA on Employee Motivation

For getting maximum effort and performance from employees is to reward for performance, not on the basis of years of services, favoritism, or any thing else. Reward can be monetary, such as wage incentives, merit salary increases, bonuses, profit sharing, and prizes. Alternatively, they can be non-monetary, such as praise, special job assignment, more responsibility delegated task, asking for ideas better working condition status symbol and authority.

The respondents were asked to respond whether it is essential to conduct performance appraisal in your Office?" The majority of the respondents about 95% from managerial and none managerial answered 'yes'. Findings of the responses showed that PA is conducted for a number reasons including:

➢ To measure the actual performance of employees' against tasks assigned to them;

➢ To enable employees to know their strengths and weaknesses with the view to motivate them to do better or warn them on the consequence of their weaknesses;

➢ To follow up the subordinates as well as to praise workers who works hard as long as it is conducted in a right judgment.

➢ To minimize employees' carelessness and negligence and to reward and punish them.

➢ To correct employee's behavior or to take corrective action whenever employees are in the wrong way or truck and if their performance is extremely below the expected performance standard.

➢ Performance appraisal is essential to the organization, as the employee performed well should be rewarded whereas the employee with poor performance should be known and to be informed to improve his/her performance.

➢ To identify training needs, staff development and to properly and fairly undertake staffpromotion.

Table 10 Summary of Respondents Perception about PA Problem

Which of the following problems apply to the appraisal system of your organization?		Manage rial	Non Manage rial	
A. Lack of rater ability (training) to evalua	Cou nt	1	1	2
	%	1%	1%	3%

te your perfor mance				
B. Absenc e of emplo yee partici pation in setting perfor mance evalua tion criteri a	Cou nt	2	15	17
	%	3%	20%	23%
C. There is no clear criteri a to measu re	Cou nt	3	27	30
	%	4%	40%	44%
D. No link betwe en some evalua tion criteri a and emplo yee job	Cou nt	2	1	3
	%	3%	1%	4%
E. B, C and D	Cou nt	0	23	23
	%	.0%	31%	31%
Total	Cou nt	8	67	75
	%	10.7%	89%	100.0 %

As indicated in the above table the majority 44% of the respondents from managerial and non-managerial replied that, there is no clear criteria to measure. 31% of respondents replied or chosen three of the above choices B.Absence of employee participation in setting performance evaluation criteria,C. There is no clear criteria to measureD. No link between some evaluation criteria and employee job and 23% of respondents from managerial and non-managerial said employees participation in setting performance evaluation criteria and 4%, 3% replied the link

between employee performance evaluation criteria and rater bias respectively.

Appraisal has to be against certain criteria. If a discrepancy between expected and actual performance is pointed out, the question is whether the expected was fully defined and communicated to the employee. In the absence of such an attempt, the appraisal reports can be questioned.

Table 11 Summary of Respondents Attitude towards Rater

In your opinion, who should evaluate an employee's performance? You may choose more than one.		Position of respondents		
		Manageri al	Non-manageri al	Total
Immediate supervisor	Count	0	33	33
	% of	.0%	44%	44%
Colleagues	Count	0	4	4
	%	.0%	5%	5%
Subordinates	Count	1	1	2
	%	1%	1%	3%
The employee himself/hers elf	Count	0	9	9
	%	.0%	12%	12%
Customer	Count	1	1	2
	%	1%	1%	3%
Customer and Immediate supervisor	Count	6	19	25
	%	8%	25%	33%
Total	Count	8	67	75
	%	11%	89%	100.0 %

The above question was raise to know their view on who should evaluate appraisal about appraiser, as revealed in the above table 44 % of respondents answered immediate supervisor followed by 33% respondents answered customer and immediate supervisor. Those who said employee him/herself are 12% and those who said colleagues are 5% and

3% respondents said subordinates and customers respectively.

When we see the managerial respondents' majority of them replied both customer and immediate supervisor, whereas the majority of non-managerial respondents replied immediate supervisor.

As the office is service render organization many customers have come to get services, therefore it is better that both customer and immediate supervisor to be rate appraisal of employees.

PA and Motivation

➢ Majority of respondents 65.4% indicated regarding promotion, as the finding revealed, there is no promotion as a result of good work. Promotion was not facilitated for those who perform well. Motivated employees are those who work along clearly defined goals. The reason for this might be failure in conducting PA. As the finding revealed there is no motivational factor that motivate employees. And there is no financial and non financial rewards based on job and there is a practice of recognition of good performer. As a result the initiation of employees for work is weak and has a negative implication.

➢ The result of the findings indicates, the office has made efforts to conduct PA in a best possible way. Majority respondents (94.7) indicated it.

➢ Regarding the problem, as indicated all problems are available except rater bias. In the finding the major problem of PA is criteria for effective appraisal was not established as 44.3% indicated, in addition to this 30%of respondents reported both absence of employees participation in the preparation of setting goals and objectives and criteria setting are another major problem.

➢ The finding revealed majority of the non-managerial respondents 44% favored that appraisal only by immediate supervisor whereas majority of managerial respondents 33.1% favored both immediate supervisor and customer.

Conclusion

As it was explained in the introduction part of this study, in today's era of competition, organizations should provide accessible and quality services, and meet customer needs in order to survive. To make certain the survival of the organization requires providing quality services for customers and satisfying their needs. The organizations must go through the process of change. In other words, the organizations should have committed, motivated, self-confident, and high performance leaders and employees. Having these types of personnel, the organizations amongst others, ought to have effective performance appraisal and motivational system. Based on the above major findings the researcher concluded the study in the following way:

➢ The presence of unclear appraisal system in the organization did create common performance appraisal problem.

➢ The appraisal standards lack relevance. There is no strong link between the standard and the individual job description. As a result employees become dissatisfied and de-motivated.

➢ The appraisal system failed to distinguish the outstanding, good and average performers.

➢ Employees were not consistently participating in the design of standard performance appraisal systems and motivational decision.

➢ This situation would result in employees de-motivation, dissatisfaction and lack of commitment. These drawback would result negative impacts on the productivity and service delivery of the employees.

Recommendation

➢ To establish performance appraisal system with clearly defined standards and criteria in relation to the objectives of the organization. However, research has not always supported a clear choice among appraisal method.

➢ To provide job description for all employees in order to identify what employees are expected to do on the job and indicate exactly what employees do, how they do it, and the conditions under which the duties are performed.

> To create conducive environment for work as it is one of the most essential tool which leads employees in the right direction. A positive working environment increase motivation of employees and is used in retaining experienced and talented employees for a longer period.

> A well-designed communication system can help achieve data that are potentially valuable for use in numerous human resource functional areas: human resource development, career planning and development, compensation program, internal employees' relations and assessment of employee's potential.

> To arrange substantial training and development programs for the employees and introducing best ways of performance appraisal methods along with designing employee motivational schemes.

> The organization should encourage the participation of its employees while setting goals, objectives, standards and process of designing the form and other materials required for Performance Appraisal Systems in order to make them more responsible and to create the spirit of ownership.

> To be successful one significant criterion that has to be fulfilled and promoted in the organization is the culture of openness and transparency. Continuous communication should take place in the organization in order to be aware what is being planned, what is expected to happen, what has happened, and what corrective actions are being taken. Therefore, the Office should establish open and transparent culture to influence behavior, attitude and beliefs of the staff.

> Motivated employees are needed for an organization's survival in a highly competitive world. Motivated employees are more productive hence; managers need to understand what motivates employees. Every employee within a company is different and, therefore, is motivated to perform well for different reasons. Due to the differences within an organization, it is important for a manager to get to know its employees and understand what motivates

their performance. If you are going to be successful in motivating people, you have to begin by accepting and trying to understand individual differences.

> HRM is the utilization of the firm's human resources to achieve organizational goals. It is widely acknowledged that employees are the most important and most valuable asset. Effective human resource management is about enabling each member a key contribution towards organization survival and growth in an increasingly competitive world. Therefore, it is highly recommended to the Office to revise its human resource manual and give due consideration human power.

> The human resource managers, officials, managers and the administrative body in the organization are not exerting their maximum effort to enhance the human capital management hence; care should be taken into consideration regarding this. Turnover, absenteeism, tardiness and poor customer service delivery would be the result of poor management of human power.

> To conclude, the organization should appreciate and value individual employees or team participation in its entire move to introduce a new performance appraisal system since the employees are the subjects of performance and any system cannot be expected to be effective without first involving all the parties that have a stake in it.

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Management Students' Competitiveness for Overall Employability Based on Fuzzy Approach using Triangular Fuzzy Numbers

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Abstract—**Accessing accurate competitiveness in any industry is a critical task. The research on competitiveness is a popular topic in many of the industries. In an Educational Industry, placements of the students after the completion of their studies had become most essential criteria. Placements have become the judging means for these institutions to attract more students in admission. In earlier days, the academic performance was the only criteria for evaluating the competitiveness of the student. At present, the trend has changed, due to globalization and liberalization, the work environment had become more dynamic duo, in which work force is selected using multiple selection criteria wherein the students are expected to be equipped with multi-skill parameters. In Literature, now educational data mining is used to extract the learning capability and the performance of students. However, no research work is carried out to reveal the competitiveness of the student based on employability. This gap insists to measure the competitiveness of the student's employability taking his/her skill parameters into account. This research work proposes a conceptual model for assessing Management Students' competitiveness for overall employability based on Fuzzy set Theory using the Triangular Fuzzy Numbers.**

Keywords— Assessing student's Competitiveness; Competitiveness for employability; Fuzzy-based approach; Triangular Fuzzy Numbers

I. INTRODUCTION

Accessing accurate competitiveness in any industry is a critical task. Many research works have been carried over in various industries about finding the competitiveness [13]. In an Educational Industry, placements of the students after the completion of their studies had become most important criteria. Placements have become the judging measures for these institutions to attract more students in admission. In olden days, the academic performance was the only criteria for evaluating the competitiveness of the student. At present, the trend has changed, due to globalization and liberalization, the work environment had become more dynamic duo, in which work force is selected using multiple selection criteria wherein the students are expected to be equipped with multi-skill parameters. In Literature, now educational data mining is used to extract the learning capability and the performance of students. But no research work is done to reveal the competitiveness of the student yet now based on employability. This gap forces to measure the competitiveness of the student's employability considering his/her other skill parameters into account. This research work proposes a conceptual model for assessing Management Students' competitiveness for overall employability based on Fuzzy set Theory using the Triangular Fuzzy Numbers..

II. LITERATURE REVIEW

Competitiveness studies are being conducted by many researchers during the past decades (e.g. [6]; [7]). Previous studies have presented several methods for assessing contractor competitiveness in prequalifying and short-listing tenders by using tender price [5]. In more recent studies, multiple parameters are used for competitiveness and in particular within markets. In line with the development of using multiple criteria in selecting contractors, several relevant studies have investigated solutions for helping contractors to formulate best bidding strategy when multiple selection criteria are adopted ([7]; [8]; [9]; [19]). After analyzing the construction business environment in China, in [10] introduced a multiple parameter model for assessing contractor competitiveness[14]. In [17], established a decision support system called Contractor's Competitiveness Assessment Scoring System (C-CASS) used for measuring contractors' total competitiveness value in the China's construction industry situation [18]&[22]. In further study, [17] identified a model adopted to award construction contracts on a multi-criteria basis in China by taking into account both the contractor's competitiveness and the defined project objectives. This model presents a widespread list of effectiveness parameters. In a latest study, [19] recognized a competitiveness indicator system and identified the key competitiveness indicators (KCIs) for measuring the contractor competitiveness in the context of the Hong Kong construction industry.

Competitiveness assessment is important in organizational strategic management to have an intelligent workforce. It can help students to find their positions in a specific market and to identify their strengths and weaknesses. In [17], developed a benchmark dictionary for helping assess competitiveness. However, the dictionary has to be updated with the changing competitive environment and the assessment process involves much fuzziness and uncertainty. The specification of decision attributes and decision makers' opinion involves fuzziness, and so it is intended to apply fuzzy theory to assist students in assessing their competitiveness or assist employers in selecting a

proper candidate. Consequently, based on the study by [19], a fuzzy competitiveness rating method for student competitiveness assessment is being introduced in this research work.

III. FUZZY SET THEORY DEFINITIONS

Fuzzy sets were introduced by Zadeh [21] as an extension of the classical notion of set. According to [21], if X is a group of objects denoted universally by x, then a fuzzy set Ã in X is a set of ordered pairs: Ã - {(x, μ (x)) | x X}, μ (x) is a value consigned to represent the membership of x in Ã. If the value of μ (x) is nearer to unity, the grade of membership of x in Ã will be higher. For example, if there are four fuzzy members in a fuzzy set Ã, namely, x1; x2; x3; x4, and their membership values are defined respectively as 0.4, 0.7, 0.5 and 0.9, then, we can write the fuzzy set as Ã = {(x1, 0:4),(x2, 0:7),(x3, 0:5) (x4,0:9)}, where x4 has the highest grade in fuzzy set Ã , as it assumes the value of 0.9 is closest to the maximum value 1. [15]

There are various established membership functions for describing fuzzy numbers, such as exponential, linear, and non-linear functions. Linear fuzzy membership function is deliberated effective and simple in its application [16]. As the simplest linear fuzzy membership function, triangular fuzzy membership function complies with relevant optimization criteria given some additional mild assumptions [12]. So, the triangular fuzzy membership function is used to describe the fuzzy parameters in this paper. The typical definitions of triangular fuzzy numbers are introduced as follows.

A. Definition 1

For a triangular fuzzy number with p, denoted by P(a,b,c), the membership function of the member p is defined as below(from [23])

$$\mu(P) - \left\{0, p < 0, \frac{(p-a)}{(b-a)}, a \le p \le b, \frac{(c-p)}{(c-b)}, b \le p \le c, 0, p > c\right\} \quad (1)$$

where a, b, c stand for the left boundary value, mean value, and right boundary value respectively in the distribution of a triangular fuzzy number, as shown in fig 1. If a=b=c, the fuzzy number P turns to a real number
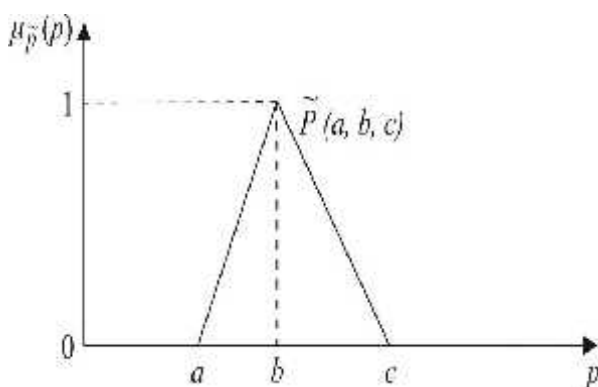

Fig. 1. Distribution of a triangular fuzzy number

B. Definition 2

(From ([3]) Let $V – [x_l, x_m, x_u]$ and $– [y_l, y_m, y_u]$ be two triangular fuzzy numbers, then operations of triangular fuzzy number can be expressed as:

(a) $\tilde{x} \oplus \tilde{y} = [x_l + y_l, x_m + y_m, x_u + y_u]$;

(b) $\tilde{x} * \tilde{y} = [x_l \ y_u, x_m \ y_m, x_u \ y_l]$;

(c) $\tilde{x} \otimes \tilde{y} = [x_l * y_l, x_m * y_m, x_u * y_u]$;

(d) $\tilde{x} \oslash \tilde{y} = [x_l / y_u, x_m / y_m, x_u / y_l]$; (2)

C. Definition 3

Let $V – [x_l, x_m, x_u]$ and $– [y_l, y_m, y_u]$ be two triangular fuzzy numbers, the distance between V and is defined as [5]

$$d(\tilde{x}, \tilde{y}) = \left\{ \left(\frac{1}{3}\right)\left(|x_l - y_l| + |x_m - y_m| + |x_u - y_u|\right)\right\}, 1 \le p < \infty \max(|x_l - y_l|, |x_m - y_m|, |x_u - y_u|), p \to \infty\} \quad (3)$$

formula (3) is based on the geometrical interpretation of the triangular fuzzy numbers when p=2, formula (3) is similar to the Euclidean distance measurement and it is most commonly used for distance measurement of triangular fuzzy numbers([2] and [3]). If V and are two real numbers [(x_l - x_m - x_u - x and y_l - y_m - y_u - y)], the distance measurement d(V,) is identical to the Euclidean distance and can be calculated as

$$d(\tilde{x}, \tilde{y}) = \sqrt{\left(\frac{1}{3}\right)(x_l - y_l)2 + (x_m - y_m)2 + (x_u - y_u)2}$$
$$= \sqrt{\left(\frac{1}{3}\right)(x-y)2(x-y)2(x-y)2} = \sqrt{(x-y)2} = |x-y|$$

D. Linguistic terms

Commonly, the decision-making problem such as student's compatibility for employment is made under uncertainty, fuzziness, vagueness, time pressure, risk, and some incomplete or missing information. For example, it is difficult for decision makers (institute) to give an exact value to express their opinion on a student's capability. As a substitute, they are able to define their feelings in the linguistic term of "poor", "fair", "good", "excellent", etc. For attribute weighting, decision makers can use linguistic term such as "very low", "low", "moderate", "important" or "very important" to express their opinion. Each linguistic term is allied with a fuzzy set defined by a membership function. The triangular fuzzy numbers are most recurrently.

In a fuzzy based decision-making problem, selecting apposite linguistic terms can help decision makers give accurate and precise judgment on assessments. The linguistic terms and corresponding membership functions can be stimulated from expert assessment and past data, and can be adjusted to incorporate individual conditions. A linguistic term set with seven linguistic terms is universally used for describing the ratings and weightings of decision attributes by researchers ([2]; [11]; [10]). Therefore, two linguistic terms sets with seven linguistic terms are used for expressing decision makers' judgment on ratings and weightings of competitiveness attributes, as shown in Table I and Figure 2. For example, if a decision maker considers an organization's

credibility is good, a corresponding fuzzy number (0.7, 0.9, 1) is used for representing his/her opinion.

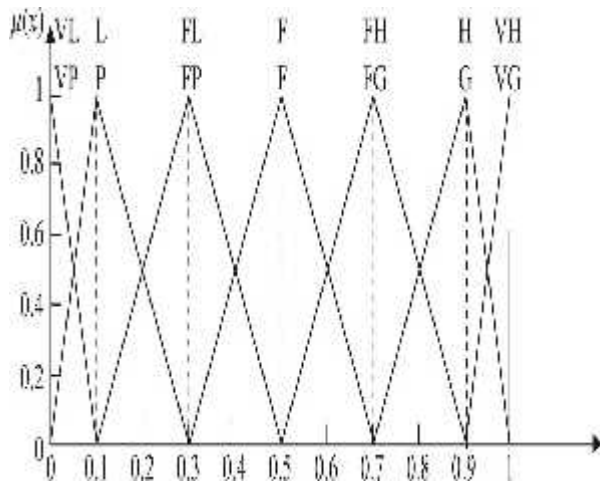| Linguistic Terms for attribute rating	Linguistic Terms for attribute weighting	Triangular Fuzzy Number
Very Poor (VP)	Very Low (VL)	(0, 0, 0.1)
Poor (P)	Low (L)	(0, 0.1, 0.3)
Fairly Poor (FP)	Fairly Low (FL)	(0.1, 0.3, 0.5)
Fair (F)	Fair (F)	(0.3, 0.5, 0.7)
Fairly Good (FG)	Fairly High (FH)	(0.5, 0.7, 0.9)
Good (G)	High (H)	(0.7, 0.9, 1.0)
Very Good (VG)	Very High (VH)	(0.9, 1.0, 1.0)

Fig. 2. Distribution of linguistic terms for ratings and weightings of attributes

IV. FUZZY COMPETITIVENESS RATING METHOD

Fuzzy theory has been widely used for assisting in decision making in industry where the fuzziness exists in defining variables ([16]; [10]). As the competitiveness assessment process involves the assessment of uncertainties, thus the assessment is associated with complexity and uncertainty. Hence, fuzzy multiple attribute decision analysis is considered suitable for assessing competitiveness. Competitiveness is usually assessed by a group of professional members based on their knowledge and experience. Assume that there are t assessment panel members, denoted as D = {d1; d2; dt}. The KCIs identified by [19] are selected as the competitiveness attributes for measuring student's competitiveness, including six main attributes and 36 sub-attributes. Assessment panel members will assess the

Competitiveness attributes' rating and weightings by selecting an appropriate linguistic term. Referring to Table I and Figure 2, the corresponding fuzzy ratings and fuzzy weightings of the competitiveness attributes are identified. In order to aggregate the assessment panel members' opinion, the average fuzzy ratings and average fuzzy weightings are used to pool their opinions. Referring to previous studies ([2]; [11]; [20]), the average fuzzy ratings and average fuzzy weightings can be obtained by following formula:

$$\tilde{\gamma}i = \frac{1}{t}[\tilde{\gamma}i^1 \oplus \tilde{\gamma}i^2 \oplus \ldots \oplus \tilde{\gamma}^1i], i = 1,2,\ldots n$$
$$\tilde{wi} = \frac{1}{t}[Wi^1 \oplus Wi^2 \oplus \ldots \oplus Wi^1], i = 1,2,\ldots n \quad (4)$$

Referring to existing literature ([2]; [10]), a Fuzzy Competitiveness Rating (FCR) method is used to measure competitiveness. This method consolidates the fuzzy ratings and fuzzy weightings of sub-attributes under each main attribute to represent the competitiveness of each main attribute; and six main attributes to represent the overall competitiveness. The higher a student's FCR, the stronger is the competitiveness of the student. Since each attribute has different weightings, the weighted attribute rating can be expressed as wi^ î. The fuzzy competitiveness rating can be obtained by aggregating the weighted attribute ratings:

$$FCR = \sum_{I=1}^{n} \tilde{wi} \otimes \tilde{\gamma}i \quad (5)$$

According to (5), the value of FCR is also a triangular fuzzy number, denoted as FCR = (al; am; au). In order to keep the value of FCR in the range of [0, 1], a normalization method is needed. According to existing studies ([2]; [11]), the common method is to use the maximum au, denoted as a* u, to divide FCR = (al; am; au). When there is only one student, a* u can be obtained by setting all attributes' fuzzy ratings as the maximum rating (0.9, 1, 1) and keeping the weightings unchanged. By using the formula (5), the FCR with the maximum au will be obtained as FCR* = (a* l; a* m; a* u), and the normalized fuzzy competitiveness rating (NFCR) can be calculated by following formula:⊗

$$NFCR = \frac{FCR}{\hat{a}u} = \left(\frac{al}{\hat{a}u}, \frac{am}{\hat{a}u}, \frac{au}{\hat{a}u}\right) \quad (6)$$

According to formulae (5) and (6), the normalized fuzzy competitiveness rating can be obtained. This rating can be further matched to an appropriate linguistic term, which can represent the same meaning of the NFCR, from a natural language expression set. The natural language expression set includes a set of linguistic terms for expressing decision makers' opinion on students' competitiveness levels. An effective natural language expression set has been introduced in previous studies ([11]; [10]), as shown in Table II, and this set is used in this research as well.

Natural Language Expression	Fuzzy Triangular Number
Extremely Low (EL)	(0, 0.1, 0.2)
Very Low (VL)	(0.1, 0.2, 0.3)
Low (L)	(0.2, 0.3, 0.4)
Fairly Low (FL)	(0.3, 0.4, 0.5)
Fair (F)	(0.4, 0.5, 0.6)
Fairly High (FH)	(0.5, 0.6, 0.7)
High (H)	(0.6, 0.7, 0.8)
Very High (VH)	(0.7, 0.8, 0.9)
Extremely High (EH)	(0.8, 0.9, 1.0)

There are several methods for matching a fuzzy competitiveness rating to a linguistic term for the natural language expression set [11]. The Euclidean distance in intuitive form incorporates the subjective perception of proximity ([1]; [4]). Therefore, the Euclidean distance is used in this study for matching the fuzzy competitiveness ratings to the natural language expression set. The distances

between NFCR and each member in the natural language expression set can be calculated by using formula (3). Then, students' competitiveness level can be identified by a linguistic term for the natural language expression set which has the minimum distance.

V. AN ACADEMIC EXAMPLE

Assume that a student, StudentA, is to undertake an internal competitive assessment by using the fuzzy competitiveness rating method. The competitiveness assessment process is as follows:

Step 1: Forming an assessment panel

All the instructors (teachers) who interact with the student on the regular basis during the lecture, the club moderator and their hostel supervisor will form the assessment panel.

Step 2: Briefing session

Before starting the assessment, a briefing session will be conducted to facilitate the panel members to acquire a holistic understanding of the situation. Relevant data and information will be familiarized to panel members for helping them to make a proper appraisal of their student's competing.

Step 3: Gauging the ratings and weightings

After the briefing session, the panel members are invited to measure the ratings and weightings of attributes based on their understanding of the student. The ratings and weightings of attributes can be communicated by using the linguistic terms proposed in Table I. For example, the rating of attribute "KCI-29 Effectiveness of getting done things" could be "very good" if he/she was able to achieve all managerial programs done in the past; the rating of attribute "KCI-16 Communication Skill" could be "very good" if the student is excellent in communication. With the provided data and information, the panel members can give their judgment on each attribute. The panel members' judgments on the weightings and ratings of the competitiveness attributes are shown in Table III.

Step 4: Combining panel members' opinion

According to Table I, the panel members' opinions in Table III can be transmuted into triangular fuzzy numbers and aggregated by using formula (4). The average fuzzy ratings and fuzzy weightings of the competitiveness attributes are obtained, as shown in Table IV.

TABLE III.   PANEL MEMBER'S OPINION ABOUT STUDENTA

Member1		Member2		Member3		Main and Sub attributes	(KCIs)
R	W	R	W	R	W		
	FH		H		FH	**Faculty Perception about Student**	**Sect.1**
G	FH	FG	H	FG	FH	Student's Sincerity	KCI1
G	FH	FG	FH	FG	FH	Student ranking within the Institute	KCI2
FG	F	FG	F	FG	F	Attendance and punctuality	KCI3
FG	FH	FG	H	FG	FH	Students representation within institution	KCI4
FG	FH	FG	FH	FG	F	Students participation in daily proceeding	KCI5
FG	FH	FG	F	FG	FH	Additional skill fine tuning (certification)	KCI6
	FH		H		FH	**Technology and innovation**	**Sect.2**
G	FH	FG	H	FG	FH	Capacity of student to keep in pace with new technology	KCI6
G	FH	FG	FH	VG	FH	Experiential intent to be innovative	KCI7
FG	F	FG	F	G	F	Practical application of technology	KCI8
FG	FH	FG	H	G	FH	Ease to quick adoption to existing technology	KCI9
FG	FH	FG	FH	G	F	Show casing the technical new ideas	KCI10
FG	FH	FG	F	G	FH	Presentation of New ideas	KCI11
G	VG	G	VG	G	VG	Enterprising capacity	KCI12
	FH		H		FH	**Soft skills capability**	**Sect. 3**
G	FH	FG	H	FG	FH	Presentation skill	KCI13
G	FH	FG	FH	FG	FH	Written skill	KCI14
FG	F	FG	F	FG	F	Put-up and show casing skill	KCI15
FG	FH	FG	H	FG	FH	Communication Skill	KCI16
FG	FH	FG	FH	FG	F	Respecting other skill capability	KCI17
FG	FH	FG	F	FG	FH	Diplomacy in dealing	KCI18
	FH		H		FH	**Sports capability**	**Sect.4**
G	FH	FG	H	FG	FH	Stamina	KCI19
G	FH	FG	FH	FG	FH	Speed	KCI20
FG	F	FG	F	FG	F	Vigorness	KCI21
FG	FH	FG	H	FG	FH	Physique	KCI22
FG	FH	FG	FH	FG	F	Representation in external competition	KCI23
FG	FH	FG	F	FG	FH	Representation in internal competition	KCI24
	FH		H		FH	**Initiative oriented management skills**	**Sect.5**
G	FH	FG	H	FG	FH	Me first intent	KCI25
G	FH	FG	FH	FG	FH	Listening intent	KCI26
FG	F	FG	F	FG	F	Effectiveness of coordination	KCI27
FG	FH	FG	H	FG	FH	Risk taking will and dealing	KCI28
FG	FH	FG	FH	FG	F	Effectiveness of getting done things	KCI29
FG	FH	FG	F	FG	FH	Scaling and measuring the effectiveness	KCI30
	FH		H		FH	**Group behaviour and collaboration**	**Sect.6**
G	FH	FG	H	FG	FH	Interact with senior group	KCI31
G	FH	FG	FH	FG	FH	Interact with junior group	KCI32

FG	F	FG	F	FG	F	Interact with colleagues group	KCI33
FG	FH	FG	H	FG	FH	Empathy to cultural importance	KCI34
FG	FH	FG	FH	FG	F	Scheduling and tracking	KCI35
FG	FH	FG	F	FG	FH	Fire to make collectively	KCI36

TABLE IV.   TABLE TYPE STYLES

Avg, Fuggy ratings	Avg. Fuzzy weights	Main and Sub attributes	(KCIs)
	(0.57, 0.77, 0.93)	**Faculty Perception About Student**	Sect. 1
(0.57, 0.77, 0.93)	(0.57, 0.77, 0.93)	Student's Sincerity	KCI1
(0.57, 0.77, 0.93)	(0.50, 0.70, 0.90)	Student ranking within the Institute	KCI2
(0.50, 0.70, 0.90)	(0.37, 0.57, 0.73)	Attendance and punctuality	KCI3
(0.37, 0.57, 0.73)	(0.43, 0.65, 0.71)	Students representation within institution	KCI4
(0.43, 0.65, 0.71)	(0.43, 0.63, 0.83)	Students participation in daily proceeding	KCI5
(0.43, 0.63, 0.83)	(0.50, 0.70, 0.90)	Additional skill fine tuning (certification)	KCI6
	(0.57, 0.77, 0.93)	**Technology and innovation**	Sect. 2
(0.57, 0.77, 0.93)	(0.27, 0.77, 1.00)	Capacity of student to keep in pace with new technology	KCI6
(0.27, 0.77, 1.00)	(0.57, 0.47, 0.00)	Experiential intent to be innovative	KCI7
(0.57, 0.47, 0.00)	(0.97, 0.57, 0.10)	Practical application of technology	KCI8
(0.97, 0.57, 0.10)	(0.72, 0.49, 0.58)	Ease to quick adoption to existing technology	KCI9
(0.72, 0.49, 0.58)	(0.17, 0.76, 0.40)	Show casing the technical ideas	KCI10
(0.17, 0.76, 0.40)	(0.57, 0.47, 0.00)	Presentation of New Ideas	KCI11
(0.57, 0.47, 0.00)	(0.64, 0.70, 0.56)	Enterprising capacity	KCI12
	(0.57, 0.77, 0.93)	**Soft skills capability**	Sect. 3
(0.57, 0.77, 0.93)	(0.97, 0.57, 0.10)	Presentation skill	KCI13
(0.97, 0.57, 0.10)	(0.57, 0.47, 0.00)	Written skill	KCI14
(0.57, 0.47, 0.00)	(0.43, 0.65, 0.71)	Put-up and show casing skill	KCI15
(0.43, 0.65, 0.71)	(0.57, 0.47, 0.00)	Dressing Code and sense	KCI16
(0.57, 0.47, 0.00)	(0.50, 0.70, 0.90)	Respecting other skill capability	KCI17
(0.50, 0.70, 0.90)	(0.22, 0.45, 0.91)	Diplomacy in dealing	KCI18
	(0.57, 0.77, 0.93)	**Sports capability**	Sect. 4
(0.57, 0.77, 0.93)	(0.50, 0.70, 0.90)	Stamina	KCI19
(0.50, 0.70, 0.90)	(0.43, 0.63, 0.83)	Speed	KCI20
(0.43, 0.63, 0.83)	(0.57, 0.47, 0.00)	Vigourness	KCI21
(0.57, 0.47, 0.00)	(0.97, 0.57, 0.10)	Physique	KCI22
(0.97, 0.57, 0.10)	(0.17, 0.76, 0.40)	Representation in external competition	KCI23
(0.17, 0.76, 0.40)	(0.64, 0.70, 0.56)	Representation in internal competition	KCI24
	(0.57, 0.77, 0.93)	**Initiative oriented management skills**	Sect. 5
(0.57, 0.77, 0.93)	(0.95, 0.87, 0.79)	Me first intent	KCI25
(0.95, 0.87, 0.79)	(0.64, 0.70, 0.56)	Listening intent	KCI26
(0.64, 0.70, 0.56)	(0.43, 0.63, 0.83)	Effectiveness of coordination	KCI27
(0.43, 0.63, 0.83)	(0.57, 0.47, 0.59)	Risk taking will and dealing	KCI28
(0.57, 0.47, 0.59)	(0.17, 0.76, 0.40)	Effectiveness of getting done	KCI29
(0.17, 0.76, 0.40)	(0.72, 0.49, 0.58)	Scaling and measuring the effectiveness	KCI30
	(0.57, 0.77, 0.93)	**Group behaviour and collaboration**	Sect. 6
(0.57, 0.77, 0.93)	(0.17, 0.76, 0.40)	Interact with senior group	KCI31
(0.17, 0.76, 0.40)	(0.56, 0.87, 0.73)	Interact with junior group	KCI32
(0.56, 0.87, 0.73)	(0.95, 0.87, 0.79)	Interact with colleagues group	KCI33
(0.95, 0.87, 0.79)	(0.64, 0.70, 0.56)	Empathy to cultural importance	KCI34
(0.64, 0.70, 0.56)	(0.43, 0.63, 0.83)	Scheduling and tracking	KCI35
(0.43, 0.63, 0.83)	(0.61, 0.48, 0.78)	Fire to make collectively	KCI36

Step 5: Calculating the FCR and NFCR

According to the formulas (5) and (6), the FCR and NFCR for each main attribute can be calculated.

For the main attribute "Faculty perspective image", the calculation process is revealed as follows:

$FCR_{(1)}$ = (0.50,0.70,0.90) ⊗ (0.57,0.77,0.93) ⊗ (0.30,0.50,0.70) ⊗ (0.50,0.70,0.90) ⊗ (0.57,0.77,0.93) ⊗ (0.50,0.70,0.90) ⊗ (0.30,0.50,0.70) ⊗ (0.50,0.70,0.90) ⊗ (0.43,0.63,0.83) ⊗ (0.50,0.70,0.90) ⊗ (0.50,0.70,0.90) ⊗ (0.43,0.63,0.83) = (1.30,2.66,4.44)

FCR* for Faculty perspective image: $FCR*_{(1)}$ = (0.50,0.70,0.90) ⊗ (0.90,1.00,1.00) ⊗ (0.30,0.50,0.70) ⊗(0.90,1.00,1.00) ⊗ (0.57,0.77,0.93) ⊗ (0.90,1.00,1.00) ⊗ (0.30,0.50,0.70) ⊗ (0.90,1.00,1.00) ⊗ (0.43,0.63,0.83) ⊗ (0.90,1.00,1.00) ⊗ (0.50,0.70,0.90) ⊗ (0.90,1.00,1.00) = (2.34,3.80,4.97)

$NFCR_{(1)}$ = $FCR_{(1)}$ / 4.97 = (1.30, 2.66, 4.44) / 4.97 = (0.26, 0.54, 0.89)

Similarly, the FCR and NFCR of the other five main attributes can be obtained as follows:

Technology and innovation: $FCR_{(2)}$ = (1.49,2.77,4.10), $NFCR_{(2)}$ = (0.35,0.64,0.95)

Soft skills capability: $FCR_{(3)}$ = (0.64,1.47,2.57), $NFCR_{(3)}$ = (0.17,0.40,0.70)

Sports capability: $FCR_{(4)}$ = (1.37,2.54,3.91), $NFCR_{(4)}$ = (0.31,0.57,0.88)

Initiative oriented management skills: $FCR_{(5)}$ = (2.41,4.68,7.47), $NFCR_{(5)}$ = ((0.28,0.54,0.86)

Group behaviour and collaboration: $FCR_{(6)}$ = (1.43,2.86,4.57), $NFCR_{(6)}$ = (0.25,0.51,0.81)

With the results of six main attributes, the FCR and NFCR of the students' competitiveness can be computed by the same method

FCR(O)=(1.04,2.68,4.94), NFCR=(0.18,0.46,0.85)

Step 6: Matching the NFCR to linguistic terms

With the results from the previous step, each NFCR can be matched to an appropriate linguistic term in the natural language expression set for representing the student's competitiveness level and distance between NFCR and natural language expression set can be calculated.

According to formula (3), the distance between NFCR(O) and each member in the language expression set (see Table 2) can be calculated as follows:

d(NFCR(O), EL) = {1/3[(0.18   0)^2+(0.46   0.1)^2 +(0.85   0.2)^2] }^(1/2)=0.44

Similarly, d(NFCR(O), VL) = 0.35, d(NFCR(O), L) = 0.28, d(NFCR(O), FL) = 0.22, d(NFCR(O), F) = 0.19, d(NFCR(O), FH) = 0.22, d(NFCR(O), H) = 0.28, d(NFCR(O), VH) = 0.36 and d(NFCR(O), EH) = 0.45 are calculated.

The competitiveness level of student, StudentA can be identified by the linguistic term, which has the minimum distance to the NFCR. In above calculation result, the minimum distance is (NFCR(O), F) = 0:19. Therefore, the total competitiveness level of StudentA can be expressed as "fair". StudentA's competitiveness level can also be illustrated in Figure 3.
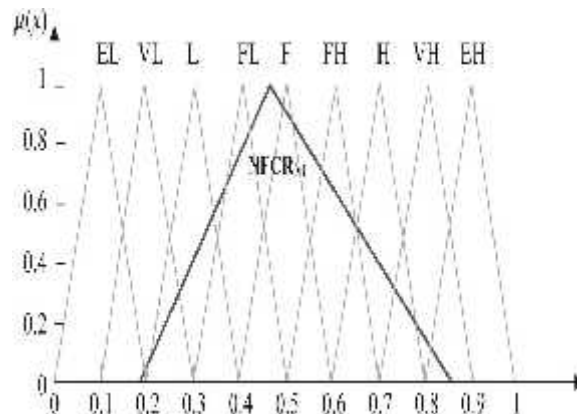

Fig. 3. Matching the NFCR to linguistic terms of Natural Language Set

By using the same method, the distances between main attributes' NFCR and the natural language expression set can be calculated and the results are shown in Table V. With the results in Table V, StudentA's competitiveness of six main attributes can be expressed as:

(1) Faculty Perception about Student is "fairly high";

(2) Technology and innovation is "fairly high";

(3) Soft skills capability is "fairly low";

(4) Sports capability is "fairly high";

(5) Initiative oriented management skills are "fairly high"; and

(6) Group behaviour and collaboration is "fair".

TABLE V. DISTANCE BETWEEN NFCR AND NATURAL LANGUAGE SET

Competitiveness Levels	$NFCR_{(0)}$	$NFCR_{(1)}$	$NFCR_{(2)}$	$NFCR_{(3)}$	$NFCR_{(4)}$	$NFCR_{(5)}$	$NFCR_{(6)}$
Extremely Low (EL)	0.44	0.50	0.57	0.35	0.51	0.49	0.45
Very Low (VL)	0.35	0.40	0.48	0.26	0.42	0.39	0.36
Low (L)	0.28	0.32	0.38	0.18	0.32	0.30	0.27
Fairly Low (FL)	0.22	0.24	0.30	0.14	0.24	0.22	0.19
Fair (F)	0.19	0.19	0.22	0.16	0.17	0.17	0.15
Fairly High (FH)	0.22	0.18	0.17	0.22	0.15	0.16	0.17
High (H)	0.28	0.22	0.17	0.31	0.19	0.21	0.23
Very High (VH)	0.36	0.30	0.22	0.40	0.26	0.29	0.31
Extremely High (EH)	0.45	0.38	0.30	0.50	0.35	0.37	0.40

Step 7: Strength and weakness analysis

The results can be promoted to accomplish a strength and weakness analysis. The competitiveness levels of six main attributes of StudentA can be exemplified in Figure 4. From Figure 4, we can see that the student's strength may come from Faculty perspective image, technology, Soft skills capability and Initiative oriented management skills, and its weakness from financing.

VI. CONCLUSION

Clearly understanding student's competitiveness will help the employer and institute formulate effective selection/counseling strategies and proposal planning for the employment. With the recognized KCIs in earlier literature, a fuzzy competitiveness rating method is proposed for helping students to conduct a competitiveness assessment in the context of management studies.

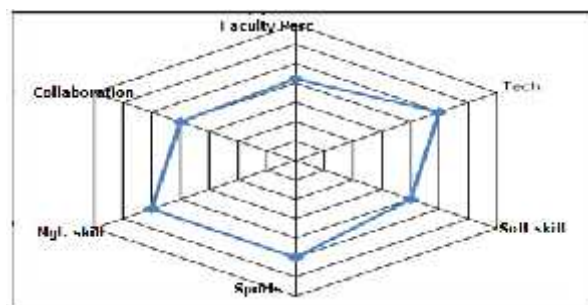Fig. 4. Competitiveness levels of six main attributes of StudentA

The results help students understanding their position in the market and their strengths and weaknesses. Excluding the internal competitiveness assessment, the fuzzy competitiveness rating method can also be used to grade students. On the other hand, the model employed in this study is not endorsed by real cases. In the future work, the

model will be further established by conducting actual case studies. Further, the linguistic terms and corresponding fuzzy numbers will be updated based on the collected data.

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The influence of Microfinance on Women Empowerment derived through Self Help Groups in Kanchipuram District, Tamil Nadu, India.

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Abstract

This study is carried out with the objectives of examining the Impact of Microfinance on Women Empowerment with variables of Social Empowerment, Economic Empowerment and Enhancement of their Skill through Self Help Group. The study is carried out based on Descriptive Research method. The population for the study is Self Help Group members residing at Kanchipuram district. One hundred respondents were chosen as sample by using Convenience Sampling. The study shows that the married women are empowered more than unmarried women. Also, it shows married women have attained Social Empowerment and enhancement on their skills compared with unmarried women and the SHG members Economic Empowerment is still not up to the mark.

Key Words: Microfinance, Self Help Group, Women Empowerment, Economic Empowerment, Social Empowerment, Enhancement of skill.

Introduction:

Microfinance means women who are unemployed joint together and from a small group mostly between fifteen to twenty members mobilize funds from the group members and this pooled funds are utilized for their small business. Apart from this for their further funds requirements they borrow loans from the commercial banks and private banks at a less interest rate than offered to commercial establishments. But most of the commercial banks and private banks are not willing to fund for these self-help groups, because of two reason, one is recovery of loans from this group is very difficult and the second one is they are not in a position to pay at a lower interest rate. So, National Bank for Agricultural and Rural development which is created to fund mainly for the

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agricultural sector is refinancing for these commercial and private banks who are willing to fund for these SHGs. By doing this NABARD is developing the agricultural sector which is a back bone of our country and also these funds are refinanced by commercial and certain private banks for the development of these SHGs. Self Help Group plays a vital role in empowering the women and Social, Economic and also helps to enhance their skills. Social empowerment means women gain confidence on themselves, their awareness about family planning, free interaction with outsiders, awareness about family health, nutritious diet, sanitation and children education. Economics empowerment means their income level, assets building, credit or loan availing procedures and reduction in poverty. Skill enhancement means participating skills with the self-help group and others, marketing skills to manufactured products of their own, customer relationship management skills, communication skills and technical skills.

Microfinance is growing rapidly all over the world for the past two decades. Indian microfinance industry is not exempted from this trend. The non-banking finance companies providing credit to several hundred to develop the women self-help groups. Companies which are providing microfinance have operations in 29 states, 4 Union Territories and 563 districts of India. Loan outstanding for year 2017 grew by 26% compared to the previous year 2016. The total outstanding loan by these companies which are funding for SHGs is around Rs.47,000crores. On an averageeach borrower outstanding is Rs. 12,500. Women borrowers is totally 96%. The people who are employed in this sector is around 90,000. In this field staff alone 60% of the work force. The urban clients has shown a decreasing trend. The Scheduled Cast and Scheduled Tribes occupy 20% of borrowers followed by minorities of 10%. Day to day the SHG's women population increased. In the past year and the number of families linked to the SHG-BL program crossed 11 crore 20 lakhs. The loan outstanding bySHG's isRs.

61,500 Crore. The Non-Performing Assets of SHG's is 6.5%.

Bank and Self Help Group Linkage Program:
Model One: Self Help Groups promoted, guided and financed by banks.
Under this model the SHGs are promoted, guided and financed by banks. The Self Help Groups and banks have direct contact and in between there is no agency or agent. So, the banks will directly finance money to SHGs and they also monitor directly. They also recover the money directly from the SHGs. But commercial banks failed miserably in this task because of the pre-occupation it has in lending to commercial establishments and taking care of recovery from these establishments.

Model Two: Self Help Groups promoted by NGOs and financed by banks.
Model two is the most popular model under the SBLP programme. Cooperative banks, Commercial banks and the Regional Rural banks have been actively participating in the SBLP. Because of the high recovery rate.
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Model Three: Self Help Groups promoted by Non-Governmental Organizations and financed by banks using NGOs or formal agenciesas financial intermediaries.

In this model Non-Government Organizations act as agency between the bank and the Self Help Groups. The Bank will finance to NGOs and in turn NGOs will fund for Self Help Groups. The disadvantage of this model is NGO get money from the bank and they may divert these funds to SHGs, but they will not pay full loan sanctioned by the bank to the SHGs.
We have followed the second model which is promoted by NGOs / Government agencies and financed by banks.
The familiar model two is chosen for this study.
Objective of the Study
- ✓ To know the influence of microfinance on Social Empowerment of Self Help Group women.
- ✓ To study the influence of microfinance on Economic Empowerment of Self Help Group women.
- ✓ To identify the influence of microfinance on enhancing the Skills of SHG women.

Review of Literature:
(Ashild Kolas: 2015)[1]Women empowerment take place with the relevance to civil society, policymakers and practitioners. First view of empowerment is towards political empowerment. Secondly, social empowerment in governance and thirdly, women aspirations towards politics. They should consider the new opportunities for women. More over to end gender discrimination and women right. So, these measures will enable women to empower
Barinaga, E (2013)[2]This study explains the initiative taken in the first year by microfinancegroup to work with suffering groups in Sweden and to explainwhether microfinanceas a

tool to analyze social change needed in developed countries like Sweden. This study shows the mobilization of capital and the financial frame work process set by microfinance.
Duflo, E. et al. (2013)[3]This study is the first randomized evolution of introducing the standard microcredit. Thesegroup's product is looking for a new market. They found no stone had turned up form the outcomes. The perception about microfinance includes education, health and women empowerment has not taken place.
Kamath, R., Dattasharma, A and Raman than, S (2013)[4]This study shows how daily household funds flow get influenced with or without MFI borrowings by utilizing the financial diary methodology in Ramanagaram, Karnataka with the sample size of 90 house hold in India. The analysis shows that microfinance in India has to go a long way.

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Vadde, S. (2012)[5] This study scrutinize the operating system of Self Help Groups how they pool their savings and how they deliver the credit to needy, how they manage funds, how they recover loans, how they built leadership, how they establish linkage with banks and other financial institutions and finally how they derive social benefit or social empowerment for their members.
The analysis reveals that the SHGs bank linkage program developed in the past 18 years has become a known tool for bankers, corporate houses and development agencies.
Sarmah, G. N and Das, D. K. (2012)[6]this study analyze the role played by microfinance and SHGs for the social and economic development ofpeople who are living below poverty line inLakhimpur Dist. ofAssam. The primary data collected from 50 Self Help Group and five from each group were collected under random sampling method. This study reveals that after joining the Self Help Group rural poor people earning has improved and their living standard also improved. This gives economic empowerment to the self help group members.
Ranjani, K. S. (2012)[7]This study outlines the need for regulationof Micro Financial Institutions in India. The findings of this research proved that like every other financialagency of microfinance institutions will benefit the customer as well as the industry when they subject themselves with self and statuary regulations.
Vijender, A. et al. (2012)[8]This study stresses on developing farm level efficiency derived throughmicro financing in achieving their Social and economic objective, which at present found have limited result. The study shows micro finance institutions are growing in steady pace to bring down poverty and the state government role is crucial in accommodating farm micro financing, farm investment, micro insurance and facilitating private investment thus spreading to help the poor people in realizing swift growth of the India.
Mula, G. et al. (2012)[9]This analysis examine the growth of Self Help Groups and the role of financial institution in micro credit finance in Cooch Behar District, west Bengal. This study outcome shows that Cooch District took the 2nd position in creditlinkage in spite of sluggish physical growth

of Self Help Groups in thestate. The study also showed a skewed growth of Self Help Groups.

Arora, S. and Meenu (2012)[10] They studied the role played by micro financing intervention to analyse how it is successful in meeting the financial needs of poor people in terms of their preference for informal and formal sources of finance, their financial knowhow and the level of understanding with referenceto micro financing services. This study has been carried in the village of Punjab. This study shows that saving habits among the poor. The maximum of them save consistently in formal financial avenues, similar in case of credit utilisation, majority of the respondents were using commercial bank micro credit. The study also revealed that the formal financial sector achieved the expected growth.

Belgaroui, H. M. and Belgaroui, E. I. (2012)[11]An attempt has been made to study the performance of micro credit institutions in Tunisia and to evaluate the micro finance on different basis like gender basis, education of the promoters, jobs created, sector credit and jobs created. The analysis also shows that micro credits are generated to founders with academic level & even

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to illiterates. Founders having a secondary schooleducation are generally the apt beneficiaries and the research study reveals that TBS is efficient in resource utilisation through targeting multiple categories of helpless people of this country as well as maintaining a certain financial possibility through funding and self-refinancing.

Mahmud et al. (2012)[12]This study visvulaise the empowerment as a dynamic process that is strongly changed by resources and settings, which measured by the four determinants: house hold asset (Economic Status); age(demographic status); Women Education (Social Status) and exposure to media like TV or Radio. These results in four amplitude of women empowerment, control of resources, mobility, decision-making and self-esteem. The authors want to say that empowerment processes are not directly recognizable, but the indicators can be used which are more relevant to a particular context.

Moses, E. (2011)[13]The focus is on the origin and concept of micro credit, features and role of micro credit in India, evaluating the weakness and progress followed by presentation for making micro credit as an effective measure of poverty elevation, rural development and women empowerment in India. The study shows micro credit is one of the most powerful tool for uplifting the economic conditions of very poor through group approach which ensures active participation and entanglement of the benefits in effective implementation of poverty elevation.

Samuel, J. et al. (2011)[14]This study examined the influence of microfinance on the women. The study explains the majority of the SHG members were married, middle aged and belonging to nuclear families from backward community. The impact was 45.59 percentage, employment was 112.48 percentage, the asset position has raised after joining the SHG was 53.43 percentage and the consumption change in household was 25.8 percent. The regression

analysis shows that revenue of the members raised by 0.50 from 1 rupee investment, savings raised to Rs 4.92 and employment raised to the income by Rs 40.37. The study shows that the major problemsfaced by members were quarrel among group members, lack of training, skill up graduation as moderate issues.

Regi, E. M. (2011)[15] This study analyse the impact of microfinance on empowerment of neighborhood groups in Kerala .The finding shows that the access to micro credit increased income many fold and helped the members to get due respect from their community and family as well. Their recognition paved the way of confidence among SHG members, control over measures, high level role in household practical decision-making, control over resources, ability to interact freely with members of the group and also with outsiders and ability to deal with adversities and involvement in community activities.

Sathiabama, K., (2010)[16] This Research paper states that Empowerment of women has come up with an important issue in current times. The economic women empowerment is being regarded in these modern days is the sine for progress of our country; hence, the issue of empowerment of women economically is a most importance fact for political thinkers, reformers and social scientists. The SHGs have showed the path for economic independence for women in rural areas. The Self Help Group members are involved in Micro Entrepreneurships. Through ME they are

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economically independent and creating employment opportunities, developing their family and community. This statement is demonstrated by Micro Entrepreneurship in Tamil Nadu.

Research Methodology:

Research Design: Descriptive Research

Population: Women members of SHG at Kancheepuram Districts

Sample Design: Convenience Sampling.

Sample Size:100 women SHG members are considered as sample from Kancheepuram Dt.

Source of Data Collection: The primary data is collected through Questionnaire.

Pilot Study:A pilot study was made with 20 respondents to validate the face value of
 Questionnaire.

Statistical Tools used: Simple percentage, mean, standard deviation, T-Test, One way Anova,
 Post Hoc Test, N Par Test (Friedman test) and Correlation has been used
for scientific analysis.

Analysis of the data:

Table 1. Social Empowerment after actively participating in Self Help Group

Sl. No.	Social Empowerment	Mean	Standard Deviation
1	Self Confidence has improved	3.990	0.661
2	Family Planning	2.700	1.087

	awareness improved		
3	Interaction with outsiders improved	3.230	1.062
4	Awareness on family health improved	3.450	0.880

Table 2. Economic Empowerment after joining the Self Help Group

Sl.No.	Economic Empowerment	Mean	Standard Deviation
1	Individual Income	4.110	0.680
2	Asset Building	3.340	0.855
3	Credit / Loan availing	3.740	0.812
4	Reduction in Poverty	3.170	1.006

Table 3. Skill improved after joining the Self Help Group.

Sl.No.	Skill Enhancement	Mean	Standard Deviation
1	Participating skill	3.290	0.782
2	Marketing skill	3.240	0.900
3	Customer Relationship Mgmt.	3.270	1.081
4	Communication skill	4.130	0.677
5	Technical skill	3.150	1.132

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Table 4. Consolidated table of Social, Economic Empowerment, Skill Enhancement
AndWomen Empowerment.

Sl. No	Variables	Mean	Standard Deviation
1	Social Empowerment	23.94	2.34
2	Economic Empowerment	15.34	2.52
3	Skill Enhancement	14.96	5.17
4	Women Empowerment	45.83	8.44

Hypothesis One:

Null Hypothesis says: There is no important difference between Married and Unmarried with reference to elements of Women Empowerment of SHG.

Table 5. T test for important difference between married and unmarried with respect to
Elements of Women Empowerment of SHG.

Elements of Women Empowerment	Marital Status				t value	p value
	Married		Unmarried			
	Mean	SD	Mean	SD		
Social Empowerment	24.52	2.08	22.86	2.44	3.589	0.001**
Economic Empowerment	15.63	2.59	14.80	2.32	1.585	0.116
Skill Enhancement	15.85	4.70	13.31	5.65	2.392	0.019*
Women Empowerment	47.40	6.99	42.91	10.09	2.608	0.011*

Note : 1. One star (*) denotes significant at 5%   2. Two stars (**) denotes significant at 1% level

Therefore if P value is below 0.01, null hypothesis is abandoned at 1% level with regard to elements ofSocial Empowerment of women SHGs.So, there is an importantdifference between Married and Unmarried Self Help Group members. Based on mean score Married have greater than unmarried in accomplishing the Social Empowerment of women.

Since P value is below 0.05, the null hypothesis is abandoned at 5% level, with regard toSkill Enhancement and Women Empowerment of SHGs. Hence there is an important difference between Married and Unmarried with regard to Skill Enhancement and Women Empowerment of Self Help Group members.

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There is no important difference between Married and Unmarried Self Help Group members with regard to elements of Economic Empowerment, since P value is greater than 0.05. Hence the null hypothesis is approved at 5% level with regard to Economic Empowerment of Self Help Group members.

Hypothesis Two:

Null Hypothesis: There is no important difference among Age Group of members with respect

to elements of Social, Economic empowerment and Women Empowerment

Table 6. ANOVA for important difference among Age group with reference to elements of women Empowerment.

Variables	Age Group in years				F value	P value
	Below 30	31-40	41-50	Above 50		
Social Empowerment	22.47[a][b] (2.94)	23.43[a] (1.50)	24.39[bc] (1.75)	25.24[c] (3.07)	5.555	0.001 **
Economic Empowerment	14.18[a] (2.40)	14.43[a][b] (1.95)	15.71[b] (2.31)	17.18[c] (2.81)	6.702	0.001 **
Skill Enhancement	12.65[a] (6.37)	14.21[a][b] (4.87)	15.87[b] (4.20)	16.47[b] (5.72)	2.292	0.083
Women Empowerment	40.18[a] (10.83)	45.54[b] (8.61)	48.42[b] (5.18)	46.18[b] (9.28)	4.112	0.009 **

Since P Value is below 0.01, null hypothesis is abandoned at 1% level with regard to the Factors of Social, Economic empowerment and Women Empowerment. Hence there is a important difference among age group of Self Help Group members and their Socio economic factors and Women Empowerment. Based on the Duncan Multiple Rate Test Social empowerment, Economics Empowerment and Women Empowerment comes denotes significant at 1% level.

There is no significance difference among Age group of Self Help Group members with regard to elements of Skill enhancement. Since P value is greater than 0.05, Hence the null hypothesis is approved at 5% level with regard to factors of skill enhancement under the Duncan Multiple Rage Test.

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Hypothesis Three:

Null Hypothesis: There is no important difference between Occupation of Self Help Group members with respect to elements of Social, Economic Empowerment, Skill Enhancement and Women Empowerment.

Table – 7   ANOVA for important difference among Occupation of SHG members as
With respect to elements of Social, EconomicEmpowerment, Skill Enhancement and Women Empowerment.

Variables	Occupation			F Value	P Value
	Labourer	House maid	Business		
Social Empowerment	24.32[b] (1.68)	22.69[a] (2.36)	24.74[b] (2.47)	7.967	0.001 **
Economic Empowerment	15.74[b] (2.37)	14.38[a] (2.08)	15.85[b] (2.84)	3.657	0.029 *
Skill Enhancement	16.15[b] (4.38)	12.84[a] (5.47)	15.76[b] (5.14)	4.255	0.017 *
Women Empowerment	48.53[b] (6.23)	42.16[a] (9.92)	46.59[b] (7.83)	5.338	0.006 **

Note: 1. * stand for significant at 5% level
 2. ** stand for significant at 1% level
 3. The value within bracket refers to Standard Deviation
    4. Different alphabet among the Age Group stand for significant at 5% level using
              Duncan Multiple Rage Test.

Since P value is below 0.01, null hypothesis is abandoned at 1% level with regard to Occupation of SHG members and the elements of Social empowerment and Women Empowerment. Hence there is a important difference among the Occupation of Self Help Group members and their Social Empowerment and Women Empowerment. Since P value is less than 0.05, the null hypothesis is abandoned at 5% level, with regard to Occupation of SHG members and the elements of Economics Empowerment and Skill Enhancement under Duncan Multiple Rage Test.

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Correlation Analysis
Table – 8   Pearson Correlation Coefficient between factors of Social, Economic
 Empowerment, Skill Enhancement and Women Empowerment.

Variables	Social Empowerment	Economic Empowerment	Skill Enhancement	Women Empowerment
Social Empowerment	1.000	.790**	.844**	.754**
Economic Empowerment	-	1.000	.640**	.564**
Skill Enhancement	-	-	1.000	.833**
Women Empowerment	-	-	-	1.000

** Correlation is important at the 0.01 level (2-tailed)

The correlation coefficient between variables of Social Empowerment and Economic Empowerment is 0.790, which pinpoint 79 % positive relationship. And it is important at 1% level. The correlation coefficient between variable of Social Empowerment and Skill enhancement is 0.844, which pinpoint 84.4% positive relationship. And it is significant at 1% level. The correlation coefficient between Social Empowerment and Women Empowerment is 0.754. Which pinpoint 75.4 percentage positive relationship. And it is significant at 1% level. The correlation coefficient between Economic Empowerment and Skill enhancement is 0.640, which pinpoint 64 % positive relationship. And it is significant at 1% level. The correlation coefficient between Economic Empowerment and Women Empowerment is 0.564. Which pinpoint 56.4 % positive relationship. And it is significant at 1% level. The correlation coefficient between variables of Skill Enhancement and Women Empowerment is 0.833, which pinpoint 83.3 percentage positive relationship. And it is significant at 1% level.

Finding & Suggestion:

Findings:

Findings various indicators of women empowerment are analyzed using the primary date through questionnaire in Kancheepuram district in Tamil Nadu. The main emphasis is given to theSocial Empowerment, Economic empowerment, Skill enhancement and financial Women Empowerment.

After analyzing the data it is found that the marital status of women self-help group says that 65% of the married women participate actively in self-help group activities than the 35% of the unmarried women group. The t test for important

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difference between married and unmarried with respect to elements of social empowerment. The married have better than unmarried in achieving the

P value of below than 1% significant level. Since P value is below than 0.05, the null hypothesis is abandoned at 5% level with regard to skill enhancement and women empowerment and there is no important difference between married and unmarried self-help group members, since the P value is higher than 0.05. Hence the null hypothesis is approved at 5% level with regard to economic empowerment of self-help group members.

Since P Value is below than 0.01, null hypothesis is abandoned at 1% level with regard to the elements of Social, Economic empowerment and Women Empowerment. Hence there is a significant difference among age group of Self Help Group members. Since P value is higher than 0.05, Hence the null hypothesis is accepted at 5% level with regard to factors of skill enhancement under the Duncan Multiple Rage Test.

In ANOVA analysis, Since P value is below than 0.01, null hypothesis is rejected at 1% level with regard to Occupation of SHG members and the Factors of Social empowerment and Women Empowerment. Since P value is below than 0.05, the null hypothesis is abandoned at 5% level, with regard to Occupation of SHG members and the elements of Economics Empowerment and Skill Enhancement.

In the Correlation co-efficient between variable of Social Empowerment, Economics Empowerment, Skill Enhancement and Women Empowerment all has got positive relationship.

Suggestion:

The factors of marital status and economic empowerment is not reached up to the

Expected level. Similarly the skill enhancement after joining the self-help group has not

Improved significantly. So, in these areas Self Help Group members should concentrate.

Conclusion:

So, after carefully analyzing all the factors of Social, Economic Empowerment, Skill enhancement and Women empowerment. There is a significant development in the socio economic condition of women self-help group members,

which is represented by the correlation analysis. After participating in the microfinance program there is a significant development in developing their skills of women is a positive sign. But at the same time the self-help group women members are economically trialing behind. Similarly they should improve their skills to face the future challenges.

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A STUDY TO ASSESS THE RELATIONSHIP BETWEEN ORGANISATIONAL CITIZENSHIP BEHAVIOUR AND ORGANISATIONAL COMMITMENT

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Abstract

This study aims to explore the relationship between organizational citizenship behaviour and organizational commitment among teaching faculties of various colleges from viruthunagar district. The sample comprised 100 engineering college professors. In selected review of literature there is a positive connection among organizational commitment and an OCB. This study prominently analyse the link between organizational citizenship behaviour and various dimensions of organisational commitment(Affective commitment, continuance commitment, normative commitment) and how it contributes among the industry, thereafter education is becoming anmore important industry for the amelioration of future generations of our country.

Key words: Organisational commitment, (Affective commitment, Continuance commitment Normative commitment) organisational citizenship behaviour.

I - Introduction

Person's voluntary involvement or commitment towards the organization is called organisational citizenship behaviour an OCB. Organ(1988) defines an OCB is an individual behaviour that is discretionary, not point blank or clearly acknowledge by the fundamental reward system, and that in the aggregate promotes the effective functioning of the organization" . Through an OCB employees get high level of motivation and engagement, moreover there is a positive link among its components and employee performance.

Smith, Organ, and Near (1983) first expressed their opinion that an OCB is consist of two aspects namely altruism and general compliance. These two elements will improve organizational effectiveness in different ways. Altruism is consider as a helping behaviour. These behaviours can be directed at inside or outside of the organization. (Organet al., 2006) The idea is that over time, the compilation of employees helping behaviour will eventually be advantageous for the organization

Organ(1988) analyse the dimension of general compliance and reconstructed the elements of general compliance and added additional dimensions of an OCB. Following are the dimensions of organisational citizenship behaviour they are altruism, courtesy, conscientiousness, civic virtue, and sportsmanship. Altruism is a helping

behaviour in this the employees will help their colleague with an organizationally relevant task or problem. Conscientiousness another behaviour it consists certain behaviours in that the employees will go beyond their specified job requirements (Law, Wong, & Chen, 2005). These behaviours refer that employees accept and adapt to the rules, regulations, and procedures of the organization. Civic virtue is another behaviours that mention the employee's deep concerns and spirited interest in the life of the organization (Law et al., 2005). This dimension also surround positive involvement in the matters of the organization (Organ et al., 2006).

II - Organisational commitment

Meyer and Allen's (1991) generated the models of commitment it has three different components that correspond with different psychological states. They construct this model for two reasons: first "help in the explanation of existing research" and "to deliver framework for future research". Mercurio (2015) continued this model by analysing the empirical and theoretical studies on OC (Organisational commitment). He hypothesizes that emotional, or AC (Affective Commitment) is the important essence of organizational commitment.

2.1. Dimensions of organisational commitment

2.1.1. Affective commitment

The tendency of employees to sustain in an organisation based on their emotional attachment towards the organisation. So employee's emotional attachment towards the organisation is called affective commitment. An employee who is having strong commitment with the organisation he will identifies the goals of

the company and he will have desire to work and he will participate in the all activities of the organisation. Affective commitment is influenced by various demographic factors namely: age, sex, education but these influence neither strong nor consistent.

2.1.2. Continuance commitment

Continuance commitment means the employee degree to which believe that leaving the organisation would be very costly. If the employee does not see the positive costs to stay with the organisation or company they should see availability of alternatives it may be job opportunities in the another organisation, it may interrupt personal relationship, and other side best that would be incurred from leaving their organisation

2.1.3. Normative commitment

Normative commitment is kind of a commitment in which employee feels obligated to work for the organisation for all the matters which the organisation has done for him or her. normative commitment may varies from person to person with the degree of incentive the gets from the organisation. If normative commitment is higher in organisation, it systematically transmit the fact to employees regarding reward, incentives, and other strategies. In organisation normative commitment is high where the employees cansee visible examples of the employer being committed to employees well-being.

III - Significance of the study

The purpose of the present study is to evaluate the relationship between organizational citizenship behaviour and

professional commitments based on the opinions of professors working at various colleges. ANOCB and organisational commitment are different terms but these two terms are related with one another and each organisation can include these two terms for the success of their organisation. Employees are the most significant source of the organisation and also success of the organisation depends on the employees, if the organisation adopt organisational citizenship behaviour and organisational commitment in their work environment by this the employees will go beyond their described work requirements and give more commitment towards their job. Here the commitment of the professors is more important in terms of students development, so this study will help to evaluate the commitment of professors with the institution which they are working.

IV - Review of literature

Organ(1988) argued that an OCB is different form related construct (organisational commitment). (cohen &vigoda, 2000) ANOCB may be empirically related to organisational commitment. (Borman& Motowidlo, 1993). define Contextual performance is non-task related work behaviours and activities that contribute to the social and psychological aspects of the organization.

Bar and Pawar (1995) Explained the relationship between OCB and commitment of an employee towards the organisation and the willingness of employees to remain in anorganisation. This is animportant behaviour which is expected by every organisation from their employees. Thereafter it is proven to improve the success of the organisation.

Organand Ryan(1995) carried out research on job satisfaction and organisational citizenship behaviour, they arriving at a judgement that there is a

noteable relationship between job satisfaction and anOCB.

Nadim Jahangir, Mohamed muzahid Akbar,and Mahmudul Haq (2004) differentiated from various dimensions of anANOCB and has inspect the relationship between antecedents of an OCB are the factors that augment the level of employees performance in anorganisation.

Spector,P.E.(2006) inferred that an Organisational citizenship behaviours can be defined as a behaviour that goes beyond the formal requirement of the job and is favourable to the organisation.

According to Gaa (2010) identified an OCB is important to individuals to understand the consequence of shared vision.
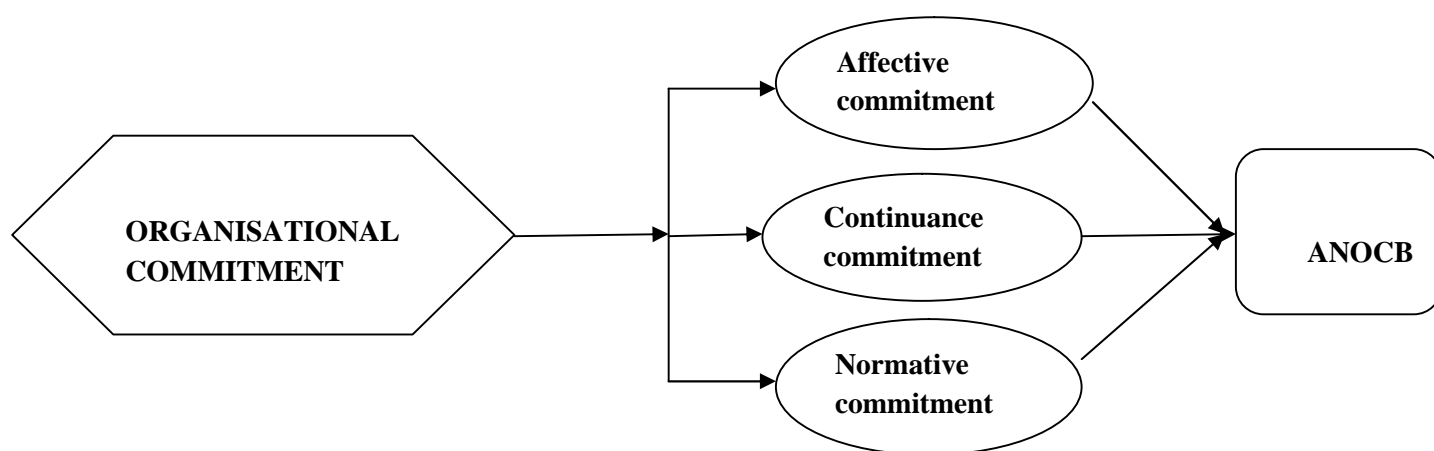
Kaveh Hasani, Saced Ssdaghi Boroujerdi,Samansheikhesmacili (2013) expressed "The effect of organisational citizenship behaviour on organisational commitment" the study explores the relationship between OCB and organisational commitment in physical education department in Iranorganisational commitment caused increase of an OCB and organisational commitment is significantly associated with some extent with the aspects of an OCB. Individuals commitment to organisation so more sacrifice prudence and loyalty. The study findings indicate that there is a prominent relationship between an OCB and organisational commitment.

Maylinn Bidne Kvitne (2017) revealed to check whether disparity in psychological contract fulfillment could forecast differences in the improvement in an OCB. This was examined through the use of longitudinal data and random coefficient modelling. The results support the supposition that individual an OCB

develops over time and that individual be at variance in this expansion.

Rabindra Kumar Pradhanand Hare Ram Tewari (2017) tinted the significance of an OCB in predicting work involvement through the mediating role of social capital. The OCB construct social capital by building multifaceted structures which leads to superior performance in workers. Thus, the study has both hypothetical and sensible insinuation for practitioners in encouraging an OCB and rewarding them so that it may lead to positive recital outcomes. Employee-friendly organization exercise should be adopted in organizations that facilitate the formation of network-building social capital which serves as an asset to organizations.

V - Objective of the study

To examine the link between the term an OCB and various dimensions of Organisational Commitment (Affective commitment, Continuance commitment, Normative commitment).

VI - Hypothesis

1. There is a positive association between affective commitment and an OCB.
2. There is a positive connection among continuance commitment and an OCB.
3. There is a positive annexe between normative commitment and an OCB.

VII - Proposed conceptual model

7.1. Proposed conceptual model

VIII - Research methodology

The descriptive research design and Pearson correlation method of analysis was utilised in the current study. The study was conducted among 100 teaching faculties of various colleges in viruthunagar district. And the sampling techniques used for this study is simple random sampling. The Pearson correlation coefficient, r, it considered a range of values from +1 to -1. A value of 0 indicates that there is no proper link or association between the two variables. If value is larger than 0 it represents a desirable association between the variables; that is, as the value of one

element increases, so does the value of the other element.

The Pearson correlation coefficient: Pearson R test indicate a statistical formula that measures the strength among variables and relationships.

8.1. Research variables

Organisational citizenship behaviour is independent variable and

organisational commitment elements are dependent variable namely Affective commitment, Continuance commitment, Normative commitment.

X - Result and discussion

This section presents the data analysis of the data collected from the respondents.

10.1. Descriptive analysis

Gender		Age		Educational Qualification	
Classification	Percentage	Classification	Percentage	Classification	Percentage
Male	**81%**	Under25 years	**14%**	U.G	**25%**
Female	**19%**	26 – 35	**35%**	P.G	**35%**
		36 – 45	**15%**	MPhil	**25%**
		Above 45	**36%**	PhD	**10%**
				Others	**5%**
Total	**100**		**100**		**100**

Table - 10.1

Interpretation

From the above table (10.1) 81% of respondents are male and 19 %of respondents are female. And 14% of respondents are come under the age of 25 years and 35 % of respondents are come under the age of 26 to 35 years and so on. In educational qualification 25% of the respondents are completed U.G, 35% of

them are completed P.G., 25% of them are having MPhil, 10% of them are completed PhD.

10.2. Below table depict the correlation between organizational citizenship behaviour and various dimensions of organizational commitment.

Independent variable		Dependent variable		
		Organisational citizenship behaviour		
Organisational commitment	level of Correlation	Level of consequence	Test Result	Hypothesis
Affective commitment	0.85	<0.001	Ho Rejected	Confirmed
Continuance commitment	0.80	<0.001	Ho Rejected	Confirmed
Normative commitment	0.79	<0.001	Ho Rejected	Confirmed

Table - 10.2

Based on the hypothesis of the research there is a positive link between employees ANOCB and organisational commitment. From the above table the obtained (Sig < 0.001) significant level is below (= 0.05). So the study is supported with hypothesis.

XI - Conclusion

This study conclude that there is a proper correlation among the variables of organisational citizenship behaviour and various dimensions of organisational commitment namely affective commitment, continuance commitment, normative commitment. Organizational commitment incite increase of an OCB. Organizational commitment is significantly connected with some aspects of an OCB. Individuals committed to organization exhibit more sacrifice, discretion, and loyalty. Findings of this study indicate that there is a notable link between an OCB and organizational commitment. Further researches could measure effect of leadership style, empowerment practices, and an OCB simultaneously.

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A Study on Consumer Satisfaction and Brand Loyalty towards Mobile Phone Services of BSNL in Tirunelveli District

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ABSTRACT

In the competitive business environment every organization is striving towards success and offering the best satisfactory services to their existing consumers and the new consumers. Satisfying the inner self of an individual is a challenging task and every organization is doing research on identifying the best strategies which induce the consumer to purchase their products and procure their services. Consumer is the king of today's market and Consumer satisfaction is an extent to which consumers are happy with the products or services provided by a business. Consumer satisfaction depends on the performance of the product and service after purchase. A Market starts with the consumer and ends with the consumer satisfaction and consumer delight. The satisfaction of the consumers becomes the most important goal of a business enterprise. The key to ensure consumer preference lies in understanding the consumer, their likes and dislikes, their expectation and motivations. Mobile phone services have become an essential and important role for communication in the modern days. Mobile phone communication is a part of telecommunication, which comes in the form of oral communication. Mobile phone service facilities are easy and faster means of communication and one can communicate with others and manage the business anywhere at any time at a reasonable cost of services. Telecom network in India is growing faster in the world because of its high population and development potential. India has many top network operators such as Aircel, Airtel, Idea Cellular, Reliance Communications, Reliance Jio and BSNL. BSNL a public sector telecom company in India ranks the 17th largest among the telecom companies in the world. If the service provider is unable to satisfy the consumers, they will switch over to another service provider. There are so many strategies to promote and develop the business but all are expensive ones. Offering quality service so as to promote the business is the best of strategies but at the same time it should be inexpensive. In addition to telephony, modern mobile phone services also support a wide variety of other services such as customer care services, MMS, email, Internet access, short range wireless communications (infrared, Bluetooth), business applications and others. Hence, the mobile phone service providers are to be very alert and highly sensitive to the needs of the consumers in order to retain them in their circle.

Key Words: Mobile Network Operators, Brand Loyalty, Telecommunication Industry, Consumer Satisfaction, Consumer Preference

SIGNIFICANCE OF THE STUDY

In spite of a well-established network and supporting infrastructure certain service providers weren't able to compete in the market due to lack of quality services and they are not able to satisfy their consumer expectation. Promotional initiatives and innovative strategies have not yielded fruitful results due to poor consumer satisfaction. There is a significant difference between the services offered by

different service providers; there is more chance for the subscriber to prefer the service provider, who satisfies him or her by service. So, it is highly essential for the service provider to know the influence of different demographic variables that increase the satisfaction level of the consumers to win their heart. The present study has some objectives to find out the innovative aspects introduced by BSNL towards the consumer satisfaction and the reputation from the consumer by measuring the brand loyalty of BSNL mobile phone services. The study concentrates on the various reasons for the satisfaction and dissatisfaction of the consumers and their brand loyalty towards the mobile phone services of BSNL in Tirunelveli District.

STATEMENT OF THE PROBLEM

In recent times, the country has undergone tremendous changes and has experienced higher rates of growth economically, industrially and technologically. Increasing infrastructure facilities for telecommunication industry have created more and more competition in the field of telecommunication industry. BSNL (Bharat Sanchar Nigam Limited) enjoys wide network and extensive coverage including in the remote areas. BSNL mobile phone service is very popular throughout the country because of their quality service both in rural and urban areas. In spite of many existing competitors in telecommunication field, BSNL is able to compete more effectively because of its valuable services such as mobile phone services, landline services and broad band services. Therefore, the present study has been undertaken to know about the services offered by BSNL mobile phone services and also the satisfaction of consumer and the brand loyalty of BSNL by using both primary data and secondary data.

OBJECTIVES OF THE STUDY

The objectives of the study are given below:

1. to analyze the profile of the respondents using BSNL in Tirunelveli District;
2. to identify the factors that influence the consumer towards preferring BSNL in Tirunelveli District;
3. to analyse the consumer satisfaction towards service quality of BSNL in Tirunelveli District;
4. to determine the relationship between consumer satisfaction and brand loyalty of BSNL in Tirunelveli District;
5. to measure the impact of advertisements on brand awareness of BSNL in Tirunelveli District;
6. to identify the significant association between perceived prices and competitive advantages of BSNL in Tirunelveli District;
7. to give valuable suggestions based on the research;

HYPOTHESES OF THE STUDY

The following hypotheses are framed based on the above objectives:

There is no significant relationship between the gender, age, education, occupation and income of the respondents and their level of satisfaction.

There is no significant relationship between brand loyalty of BSNL and the level of consumer satisfaction.

RESEARCH DESIGN

A research design can be defined as the blue print specifying every stage of action in the course of research. Such a design will indicate whether the course of action planned will minimize the use of resources and maximize the

outcome. Research design is the arrangement of conditions for collection and analysis of data in the manner that aims to combine relevance to the research purpose. In this study descriptive research was carried out by the researcher. This type of research describes what exists and may help to uncover new facts and meaning.

The purpose of descriptive research is to observe, describe and document the aspects of a situation as it naturally occurs. This involves the collection of data that will provide an account or description of individuals, groups or situations. Instruments we use to obtain data in descriptive studies include questionnaires, interviews and observations.

AREA OF THE STUDY

The area of study is Tirunelveli district which consists of three revenue districts (Tirunelveli, Charanmahadevi and Tenkasi),11taluks, (Tirunelveli, Palayamkottai, Sankarankovil, Ambasamudram, Radhapuram, Nanguneri, Tenkasi, Shenkottai, Sivagri, V.K. Pudur, Alangulam) 19 development Blocks and 7 municipalities ("Tirunelveli", 2012). The infrastructure of the district relating to 4G internet connection and other facilities are developing at a greater speed so as to provide technological facilities equivalent to that of the metropolitan cities. The people living in this area are conservative in nature, have more concern towards utility of the product and more price sensitive.

SAMPLING DESIGN

Proportionate Stratified Random Sampling method is adopted in the study. The population is divided into different strata (that is, segments). The items in each segment should be homogeneous. That is, each stratum contains a few elements, which are similar in every respect. Then in each stratum, a few elements

are selected to continue the sample. While making the selection from each stratum, same numbers of items are selected from each stratum, it is called proportionate stratified random sampling.

Primary Data

The researcher has used a self designed questionnaire for the purpose of collecting data regarding consumer satisfaction, influencing factors, brand awareness and loyalty of the consumers. These data are the first hand information generated to achieve the purpose of research. The sample population for this research is composed of consumer of BSNL mobile phone service who had located the study area of Tirunelveli District.

Secondary Data

Secondary data have been collected from various journals, research articles, seminar reports, newspaper, study reports of expert committees, departmental publications, published reports, books, websites and other literature.

RESULTS ANALYSIS AND DISCUSSIONS

It is the process of evaluating data using analytical techniques to examine each component of the data provided by the consumer. After the collection of data, the investigator tabulated all those data. The investigator analyzed the data with the help of a SPSS and Microsoft office package.

Data from various sources is gathered, reviewed, and then analyzed to arrive at a conclusion.

Table 1

Frequency Table for analyzing the profile of the respondents

VARIABLES	CATEGORIES	FREQUENCY	PERCENT
Gender	Male	284	55.9

	Female	224	44.1
Marital Status	**single**	277	54.5
	Married	231	45.5
Age (in Years)	**Below 20**	76	15.0
	21-30	188	37.0
	31-40	114	22.4
	41-50	64	12.6
	Above 50	66	13.0
Education	**School Level/ Diploma/ITI**	74	14.6
	Graduate	193	38.0
	Post-graduate	159	31.3
	Professional	82	16.1
Present Status	**Student**	74	14.6
	Self Employed	137	27.0
	Private Employee	157	30.9
	Govt Employee	80	15.7
	Pensioner/Retired	22	4.3
	House Wife	38	7.5
Monthly Income	**Up to 10000**	19	3.7
	10001 - 20000	127	25.0
	20001 - 30000	169	33.3
	30001 - 40000	52	10.2
	40001 - 50000	43	8.5
	No Income	98	19.3
Nature of Family	**Nuclear Family**	277	54.5
	Joint Family	231	45.5
Area of Living	**Rural**	269	53.0
	Urban	239	47.0

Source: Primary Data;

The above table implies the demographic profile of the respondents who had participated in this research.37% of the respondents are in the age group of 21-30,38% of the respondents are graduates, 30.9% of the respondents are private employees, 33.3% of the respondents had earning 20001 – 30000 and 53% of the respondents are living in urban area.

Table 2

Relationship between the overall service Quality and the Brand Loyalty of BSNL Consumer using Correlation in SPSS;

Variables		I am loyal to BSNL Brand	Overall service Quality

I am loyal to BSNL Brand	Pearson Correlation	1	.197
	Sig.(2-tailed)		.000
	N	508	508
Overall service Quality	Pearson Correlation	.197	1
	Sig.(2-tailed)	.000	
	N	508	508

Source: Primary Data;

From the table it is identified that the value of Pearson Correlation is .197 which lies in-between 0 to 1. So there is a positive correlation between the overall service quality and brand loyalty of BSNL.

Table 3

The impact of Advertisement on Brand Awareness using Regression in SPSS;

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.611ᵃ	.373	.372	.617

Dependent Variable: I am aware of the brand,

Independent Variable: Advertisements seen in Media

From the table it is inferred that R value is .611. Hence we identified that the advertisement seen in Media create a positive impact on the brand awareness of BSNL.

Table 4

Factor which influences the consumer to prefer BSNL

Consumer Preference	Frequency	Percentage
Network Quality	83	16.3
Reasonable Tariff Rates	173	34.1
Customer Service Quality	60	11.8
Data Service Quality	60	11.8
Variety of Value Added Services	44	8.7
Friends and Family are using BSNL	62	12.2
High Brand Loyalty	26	5.1
Total	508	100.0

Source: Primary Data;

From the table it is inferred that 34.1 percent of consumer prefer BSNL for the reasonable tariff rates, 16.3 percent of the consumer select BSNL for the network quality and 12.2 percent of the consumer prefer BSNL because of their friends and family.

SUGGESTIONS

Based on the finding of the study the following suggestions are made to improve the service quality of BSNL.To improve its business, BSNL has to reformulate new strategies to gain new consumers' base and to serve its consumer in a qualitative manner. In addition, the process involved in taking new connections should be simplified and made easy. By doing so, more people will be converted as consumers easily. Many respondents are getting communication through SMS, which are not understandable, as they are not sent in the mother

tongue of customers. As a result, there must be an option in the mobile phone for getting the message in mother tongue or to get the message converted into the language, which the customers know. Hence, mobile phone service providers have to focus on this area and send messages in understandable language or communicate with them in local language through customer care operators all around the country. Consumer is not satisfied with the network quality of BSNL. So the organization needs to cover the rural area by increasing the number of network towers. The value added services and the customer care services must get much attention to retain the loyal consumer of BSNL.

CONCLUSION

Consumer is the strong pillar supporting the service in any field and causing the success to it. Therefore, BSNL has to concentrate to widen its base of consumers, to strengthen its field and achieve success through them by true, sincere and excellent service. In order to have a large number of consumers, BSNL has to expand its services in village and towns. It has created an effective distribution channel to reach the end user. The first achievement of public service provider is to survive in the market among many powerful competitors and admits a big competition. The aim of the public service provider must be, along with its aim of making profit, to make the consumers get benefitted most by its service. Consumers' satisfaction must be the great care of the public service provider like BSNL.

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WORKING CAPITAL MANAGEMENT IN TATA STEEL LIMITED

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ABSTRACT: Working capital management statesthat the direction of all components of working capital-cash, marketable securities, debtors and stock and creditors. The words of H. G. Guthmann clearly clarify the importance of working capital. "Working Capital is vital and nerve centre of the business. The main aim of working capital management is to achieve the firm's current assets and current liabilities in such a way that a satisfactory level of working capital is preserved. In several units there is acceptable working capital but the mismanagement of working capital raises the costs and reduces the rate of return. The well-organized management of working capital minimizes the cost and can do more for the success of the business.

KEYWORDS: Working Capital Management, Current Assets, Current Liabilities, Current Ratio, Quick Ratio, Profitability, Steel Industry

INTRODUCTION

Steel is r the t important, multi-functional and highflexible[1] of materials. The development of manhood would have been difficult but for steel. The backbone of developed economies was laid on the strength and essential uses of steel. The Part of Iron and Steel Industry in India GDP is more significant for the development of the country. In India the visionary ShriJamshedji Tata started first Iron and Steel manufacturing unit called Tata Iron and Steel Company, at Jamshedpur in Jharkhand.

Iron and steel are amongst the maximum important mechanisms required for the infrastructure growth in the country. Tata steel Group established in 1907 as Asia's first integrated private sector steel company, Tata Steel Group is among the top-ten global steel firms with an annual crude steel capacity of over 29 million tones per annum. It is now the world's second-most geographically-diversified steel manufacturer, with actions in 26 countries and a commercial presence in over 50 countries.

The Tata Steel Group, with a revenue of Rs. 1, 48,614 crores in FY 14, has over 80,000 employees across five regions and is a Fortune 500 company. The Tata Steel Group's vision is to be the world's steel industry standard in "Value Creation" and "Corporate Citizenship" over the fineness of its people, its advanced approach[2] and general conduct. Supporting this vision is a performance culture dedicated to aspiration targets, safety and social accountability, continuous development, openness and transparency.

REVIEW OF THE LITERATURE`

Several researchers have studied working capital from different opinions and in different surroundings. The following study was more interesting and useful for our research:

Abdul Raheman* and Mohamed Nasr(2004) In this study made an effort to inspect the Working Capital Management And Profitability – Case Of 94 Pakistani Firms selected a sample of 94 Pakistani firms listed on Karachi Stock Exchange for a period of 6 years from 1999 – 2004, Initiate that there is a important negative relationship between liquidity and profitability. That there is aimportant positive association between size of the firm and its profitability. There is also a noteworthy negative relationship between debt used by the firm and its profitability.

K. Madhavideliberated "Working Capital Management and ratio analysis of Paper Mills" during the period from 2002-2003 to 2010-2011 with the help of accounting tools and statistical techniques. From this studyanalyse that, the management of Andhra Pradesh Paper Mills Ltd (APPML) necessitysecurityindispensible steps to use its idle cash and bank balances in good-looking investments or to pay back in short term liabilities.(current ratio).The low quick ratio may also have liquidity position, if it has fast moving inventories and is more acceptable in Seshasayee Paper Boards Ltd (SSPBL) with APPML. Cash ratio is not satisfactory in APPML as associated to SSPBL and it needs the responsiveness of the management to induce actual utilization of cash and bank balances.

B Bagchi and B Khamrui (2010) In this study, Designated a sample of 10 FMCG (Fast Moving Consumer Goods) firms in India from CMIE database cover a period of 10 years from 2000–01 to 2009–10. Profitability has been stately in terms of return on assets (ROA).Cash conversion cycle (CCC), interest coverage ratio, age of inventory, age of creditors, age of debtors and debt-equity ratio have been used as explanatory variables. Pearson's correlation and collective ordinary least squares regression analysis are used in the study. The study results authorize that there is a resilient negative relationship between variables of the working capital management and profitability of the firm. As the CCC increases, profitability of the firm decreases, and managers can make a positive value for the shareholders by dipping the CCC to a possible minimum level. There is also a stumpy negative relationship between debt used by the firm and its profitability.

Mr. N.SureshBabu and Prof. G.V.Chalam (2014) Suggest that the managers can make value for their shareholders by reducing the number of day's accounts receivable and cumulative the account payment period and inventories to a sensible maximum and also proposes that managers of these firms should spend more time to manage cash conversion cycle of their firms and make strategies of efficient management of working capital.

Daniel Mogaka Makori1and Ambrose Jagongo (2013) Concluded that the management of a firm can create value for their shareholders by reducing the number of day's accounts receivable. The management can also create value for their shareholders by increasing their inventories to a reasonable level[3]. Firms can also take long to pay their creditors in as far as they do not strain their relations with these creditors. Companies are accomplished of gaining maintainable competitive advantage by means of real and well-organized utilization of the resources of the organization through a careful reduction of the cash change cycle to its minimum. In so doing, the profitability of the companies is expected to increase.

OBJECTIVES OF THE STUDY

• To analyse the efficiency of the organization through ratios.

• To find the ways and means to improve present condition.

• To analyze overall performance of the company.

• To know the profitability, liquidity, solvency position of the organization.

METHODOLOGY

The methodology assumed for the present study concerning source of data, sample size, period of study, data analysis and research tools and techniques. Sources of the data is mainly founded on the secondary data. They were collected from company annual reports, journals, magazines and newspapers. Sample Size of this study data composed for five years of Tata steel industries. Research tools and techniques are used ratio analysis in the year period of the study 2010-2011to 2014-2015.

SCOPE OF THE STUDY

This is a micro level imperial analysis in the financial growth[4] and performance of Tata Steel Limited. The findings and proposals throw light on the guidelines for future policy formulation and implementation for the effective functioning of Steel industries in other districts of the state and the country also. Every work has been made to conclude relevantly and suggest for

the best performance in the most acceptable way, possession in view the market and construction levels.

LIMITATIONS OF THE STUDY

This study is constructed on only secondary data; the essential limitations of the secondary data would have affected the study. Ratios are calculated on the basis of financial statements of the Industry. Hence, future presentation of the industrial units not reflected. It will affect the results in the process of analysis. The complete figures may prove attractive as ratio analysis is primarily quantitative analysis and not qualitative analysis. Numerous people may understand the results in changed ways as ratio is not an end by itself.

Ratio Analysis

Ratio Analysis is a dominant tool of financial analysis. It is used as a device to analyze and interpret the financial well-being of a firm[5]. Analysis of financial statements with the help of ratios and helps the management in decision making and control. The use of ratio analysis is not confined to financial managers only.

Ratio analysis is used by creditors, banks, financial institutions investors and shareholders. It aids them in making decision s regarding the granting of credit and making investments in the firm. Thus, ratio analysis is of huge use and has large application.

Current Ratio

Current ratio may be the relationship between current assets and current liabilities[6]. This ratio also known as working capital ratio is a measurement of general liquidity and is most widely used to make the analysis of a short-term financial position or liquidity of a firm. It calculated by dividing the total of current assets by total of the current liabilities.

Current Ratio = Current Assets/Current Liabilities (or) Current Assets: Current Liabilities

The statistical data relating to calculation of current ratio was computed through the financial statements referred in their respective annual reports of Tata Steel Limited for the study period from 2010-11 to 2014-15 are depicted in the below table

Table 1: Components of Current Assets of Tata Steel Limited (Rs. In Crore)

YEARS	2014-15	2013-14	2012-13	2011-12	2010-11
Current Investments	1000.08	2343.24	434.00	1204.17	
Inventories	8042.00	6007.81	5257.94	4858.99	3237.58
Trade receivables	491.46	770.81	796.92	904.08	428.03
Cash and Bank balances	478.59	961.16	2218.11	3946.99	4141.54
Short term Loans and advances	1781.77	1299.20	2207.83	1828.09	15688.97
Other Current assets	55.27	182.38	615.80	122.18	716.18
Total	11849.17	11564.6	11530.60	12864.50	24212.30

* Source: Annual Reports

Table 2: Components of Current Liabilities of Tata Steel Limited (Rs. In Crore)

YEARS	2014-15	2013-14	2012-13	2011-12	2010-11
Short – term borrowings	34.88	43.69	70.94	65.62	
Trade payables	5801.98	8263.61	6369.91	5973.23	
Other current	9111.52	8671.67	8503.54	8798.55	7447.83

liabilities					
Short term provisions	1675.41	1902.81	1544.26	2066.24	3547
Total	16623.79	1888.78	16488.65	16903.64	10995.81

* Source: Annual Reports

Table 3: Current Assets and Current Liabilities of Tata Steel Limited (Rs. In Crore)

YEARS	Current Assets	Current Liability	Current Ratio
2014-15	11849.17	16623.79	0.71:1
2013-14	11564.6	18881.78	0.61:1
2012-13	11530.60	16488.65	0.70:1
2011-12	12864.50	16903.64	0.76:1
2010-11	24212.30	10995.81	2.20:1

*Source: Annual report

As a conservative rule, a current ratio of 2:1 is measured satisfactory. Higher current ratio may not be favorable because of slow affecting stocks, stocks may mound up due to poor sale, debt collection may not be satisfactory, cash and bank balances may be lying idle because of inadequate investment chances. This ratio is below the accepted standard norm in Tata Steel limited in the entire study period, excepting 2010-11. It clearly indicates, the usual general recognised solvency to encounter their current obligationsin time is not satisfactory during 2011-2014. Quick Ratio or Liquid Ratio

Quick ratio is also referred Acid-test ratio because it is the acid test of a concern`s financial soundness[7]. It is the relationship between quick assets and quick liabilities. Quick assets are those assets which are readily converted into cash. They include cash and bank balances, bills receivable, debtors, and short term investments. Quick liabilities include creditors, bills payable, outstanding expenses.

Quick ratio = Quick Assets/Quick Liabilities

Quick Assets = Current assets- (Stock +Prepaid expenses)

Quick Liabilities = Current Liabilities –Bank Overdraft.

A quick ratio of 1:1 is careful satisfactory. The quick ratio additions current ratio. Table 4: Quick Assets and Current Liabilities of Tata Steel Limited (Rs. In Crore)

Table 4: Quick Assets and Current Liabilities of Tata Steel Limited (Rs. In Crore)

YEARS	Quick Assets	Current Liability	Quick Ratio
2014-15	3807.17	16623.79	0.23
2013-14	5556.79	18881.78	0.29
2012-13	6272.66	16488.65	0.38
2011-12	8005.51	16903.64	0.47
2010-11	20974.72	10995.81	1.91

* Source: Annual Reports

A quick ratio of 1:1 is measured to represent aacceptable current financial condition. A quick ratio of 1:1 does not certainly mean suitable liquidity position, if all debtors cannot be understood and cash is needed directly to meet current obligations. A low quick ratio does not necessarily mean a bad liquidity position as inventories are not an absolutely non-liquid. It is experiential from the above data the quick ratio is less than the accepted norm from 2011-12 to 2014-15, whereas it is just above the standard in

2010-11.Quick ratio is very poor so it will increase their liquidity position, it will help to meet day to day expenses.

Cash Ratio (Absolute Liquid Ratio)

Cash is the best liquid asset. The relationship between cash including cash at bank and short term marketable securities with current liabilities is inspected to know the immediate solvency. Although

receivables, debtors and bills receivable are generally more liquid than inventories, yet there may be doubts concerning their realization into cash immediately or in given time. The formula to calculate the cash ratio is as under.

Cash Ratio = Cash* + Marketable Securities / Current Liabilities.

 * Cash means, cash in hand and cash at bank.

Table 5: Cash & Bank Balance and Current Liabilities of Tata Steel Limited (Rs. In Crore)

YEARS	Cash/Bank Balance	Current Liability	Cash Ratio

2014-15	478.59	16623.79	0.029
2013-14	961.16	18881.78	0.051
2012-13	2218.11	16488.65	0.135
2011-12	3946.99	16903.64	0.233
2010-11	4141.54	10995.81	0.377

* Source: Annual Reports

The ideal cash ratio is 1:2 or 0.5 or 50 percent. This ratio is less than the standard and not encouraging for the entire study period i.e. 2010-11 to 2014-15.

Working Capital Turnover Ratio

This ratio indicates whether or not working capital has been effectively utilized in making sales. It can be calculated by Net sales/Net Working capital

Table 6: Current Assets, Current Liabilities and Net working Capital of Tata Steel Limited

YEARS	Current Assets	Current Liability	Net Working Capital	Working Capital Turnover Ratio
2014-15	11849.17	16623.79	-4774.62	-8.87
2013-14	11564.6	18881.78	7317.18	--5.8
2012-13	11530.6	16488.65	-4958.05	-7.89
2011-12	12864.5	16903.64	-4039.14	-8.62
2010-11	24212.3	10995.81	13216.49	2.28

* Source: Annual Reports

Working Capital turnover ratio is not satisfactory. Additional funds raised are invested in fixed asset instead of provided that necessary working capital. The company may not be in a position to chance its obligations in time.

Fixed Asset Turnover Ratio

 This ratio indicates the level to which the investment in fixed assets contributed towards sales. These ratio calculated by Net sales/Net fixed Assets

Table 7: Net Sales and Net Fixed Assets of Tata Steel Limited

YEARS	Net sales	Net Fixed Assets	Fixed Assets Turnover Ratio
2014-15	42367.78	103827.95	0.408
2013-14	42498.67	99475.81	0.427
2012-13	39101.47	90372.08	0.432
2011-12	34819.19	83326.56	0.417
2010-11	30187.02	71438.7	0.422

* Source: Annual Reports

Fixed asset of a company are not held for sale but use in the business for a long duration of time. Therefore a lower fixed asset turnover ratio is improved. Tata Steel limited maintain lower ratio. Lower fixed assets ratio is satisfactory.

CONCLUSION

The Lower fixed assets ratio of Tata Steel Limited is satisfactory. But, Cash ratio is lower than the standard and not hopeful for the entire study period i.e. 2010-11 to 2014-15. Though the additional funds raised are invested in fixed assets instead of providing adequate working capital, the Working Capital turnover ratio is not satisfactory. Accordingly, the management may option to effective utilization of cash and bank balances in good-looking investments or to pay back in short term liabilities (current ratio).

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Impact of Social Media on College Students' Life Style

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Abstract: In today's world, social media plays a vital role in impacting our life style. It is a place where people exchange their ideas, views and opinions to strangers and at the same time they seek advice and also get some valuable information. Social Media as also act as a decentralised means of communication. The Impact of Social Media is undoubtedly overwhelming in our day to day life. In this study, the researcher aims to identify the impact of social media on college students' life style. The researcher used snow ball sampling method in order to find out samples among population. The sample size of present study is 140. The results revealed that the impact of social media refines the students' life style positively as well as negatively. Positive changes such as more interaction, increasing thinking power, better communication. Negative changes such as addiction; fall in love with strangers and unwanted contacts. The study suggested that students can use the social media more positively it will improve their life style.

Keywords: *Social Media, College students and Life style.*

Introduction

Social media sites are continuing to raise their attractiveness among college students. The main purpose of this study is to discover the impact of social media on College students' life style. Now-a-days the internet is more used about Twitter, Podcasts, Face book, Whatsapp, Viber, LinkedIn, Hike and many others. In these, some of the tools are associated with recent fact are called social media. Social media has become a part of the day to day life. In social media, people exchange their ideas, opinions, emotions, feelings, personal information, pictures and videos with true belief. Most of the time social media sites are used with people who are already known friends or relatives or people in connection with social media having

same mindsets, thoughts, views, discussion on topics, news, latest updates on television shows are the most frequent topics. It is not only a platform for chatting, sharing videos, media clips, voice messages, videos, pictures, emojies etc. but also it is useful for discussing hot current issues and updates. Formerly people used to keep their views, thoughts and information among themselves but in today's scenario, people shows their views, opinion and emotions in public and keep blogging and tweets on social medias. College students are usually keeping busy among themselves in viewing posts, update status, sharing news, posting pictures etc. So the life style of the college students has been totally changed.
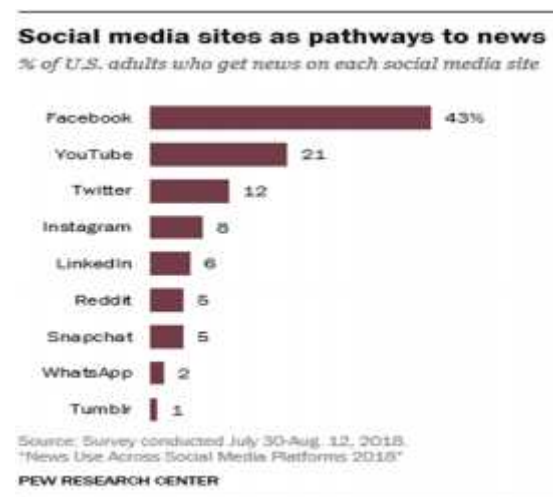
Figure 1: Social Media Sites

Figure 1 shows that the impact of social media on US adults.

Literature Review

Ortiz (2017) Most of the time students spend their money and time in games and virtual communities come into the picture when the user spends money to enhance the gaming experience (e.g. subscriptions, purchasing virtual items).

Virtual spaces are based on a real economic communications where users Real Trade money (RTM) in order to acquire, sell, and replace virtual items or virtual money. Jacobsen and Forste (2011) have studied about effects of social media among students. The study results showed that social media has negative effect on grades; about two-thirds of the students were used media while doing home work.

Kalpidou, Costin, and Morris, (2011) have investigated that relationship between social media and grades, Ohio State University. The results showed that their exits a negative relationship between students and their grades that those students had low grades who spent their time on social media. Brady, Holcomb, and Smith (2010) have stated that social media had provided better ways for improving education. The study results showed that students used social media for e-learning.

Lusk (2010) stated that, student used social media for academic purposes. The researcher also stated that students used social media for the purpose of learning and enhancing their communication skills. The results also shown that social media provided a web tool for learning.

Lee (2009) reports that those who had established strong social relationships at earlier ages were more likely to use online communication, which in turn predicted more cohesive friendships and better connectedness to school. Notley (2009) stresses that it is clear from the research that participants' online network use provided them with opportunities to participate in society in ways that were social, economic, cultural, civic, and educational. In this way online network use had supported all of the participants'social inclusion.

Livingstone (2008) Social networking sites enable communication among ever-widening circles of contacts, inviting convergence among the hitherto separate activities of email, messaging, website creation, diaries, photo albums and music or video uploading and downloading. From the user's viewpoint, more than ever before, using media means creating as well as receiving, with user control extending far beyond selecting ready-made, mass-produced content.

Elola and Oskoz (2008) have investigated the developing business relationships with other states using social media. The results showed that social media has shown significant positive relationship of business with other. Livingstone and Bober (2003), have identified that social media was the main reason for generation gap in numerous ways like lack of awareness, recognition of domestic rules, and not showing interest in their kids' activities. The results showed that people forgot their rituals, traditions and even family because of social media.

Wolak (2002) has identified about youth's anxiety with online relationships tend to be regarding to the contact and socialization with strangers and also with regard to the use of technological tools to harm or molest someone as well as to be bulled.

Turow (1999) has investigated about the prevalence of technology in the lives of adolescents. The results show that range from exuberant, discussing how socially-interactive technologies can save the young generation from social isolation and depression, to frightening, focusing on the use of these technologies promote anti-social behaviour

Objectives of the study

➢ To investigate how social media affects the daily life of college students

➢ To identify if the college student prefer social media as means of communication

➢ To examine the impacts social media on their behaviour changes

Hypothesis of the study

H_0: There is no significant difference between impact of social media and their behavioural changes.

Research Methodology
Data Collection and Sample

The study used both primary and secondary data. The primary data were collected from 1st year

college students in Chennai using structured questionnaire. The secondary data were collected through wide range of literature review. This study is based on empirical research. Snow ball sampling method was used to select the sample for the study. A total sample of 140 1st year students was selected from Colleges.

Research Instrument

The questionnaire was divided into 2 sections. The first section denotes demographical profile of the respondent which includes gender, age, family income and courses undertaken. The second section of the questionnaire covers impact of social media.

Data Analysis and Interpretation

The demographic profile was analyzed using frequency distribution. The Hypotheses for this study were tested with Pearson's correlation.

Table 1: Demographical Profile

Particulars		Frequency	Percentage
Gender	Male	60	43
	Female	80	57
	Total	140	100
Age	17 years	124	89
	18 years	16	11
	Total	140	100
Courses	Professional	70	50
	Arts and Humanities	70	50
	Total	140	100
Family Monthly Income	Less than Rs. 20,000	36	26
	Rs. 20,001 to Rs. 40,000	74	53
	Rs. 40,001 to Rs. 60,000	18	13
	Above 60,000	12	8
	Total	140	100
Using Social Media	Yes	140	100
	No	0	0
	Total	140	100

Source: Compiled from primary data

Table 1 shows the demographical profile of the respondents. Among the respondents 57% are fall under female category. 89% of the respondents are comes under 17 years of age. Among the respondents both Professional and Arts & Humanities courses are having equal percentage. 53% of the respondent's monthly income of the family falls between Rs 20,000 to 40,000. Among the respondents 100% of the college students are using social media.

Table 2: The respondent most common social media

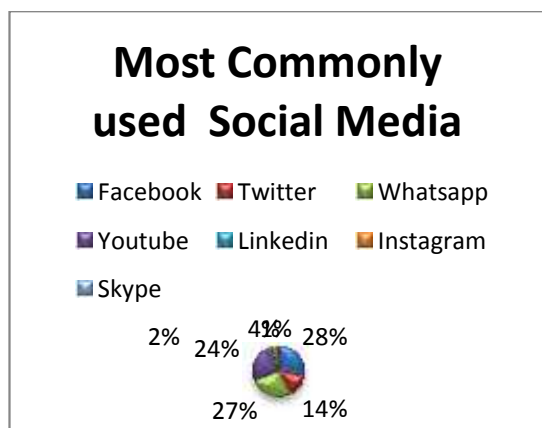| S.No	Social Media	Frequency	Percentage
1	Facebook	139	99
2	Twitter	70	50
3	Whatsapp	135	96
4	Youtube	120	86
5	Linkedin	12	8
6	Instagram	20	14
7	Skype	3	2

Source: Compiled from primary data

Figure 2: Most Common Social Media

Table 2 shows that the respondents were asked the most common social networking site they visited. Among the respondents 99%, 50%, 96%, 86%, 8%, 14%, 2% are commonly using Facebook. Twitter, Whatsapp,Youtube, LinkedIn, Instagram and Skype respectively.

H_0: There is no significant relationship between impact of social media and college students life style

Table 3: Correlation between Social Media and Students life style

		SM	LS
SM	Pearson Correlation	1	-.747[**]
	Sig. (2-tailed)		.000
	N	150	150
LS	Pearson Correlation	-.747[**]	1
	Sig. (2-tailed)	.000	
	N	140	140

[**]. Correlation is significant at the 0.01 level (2-tailed). Table 3 shows that there is a strong negative relationship exist between impact of social media and 1st year college students' life style. So the null hypothesis H_0 is accepted.

Conclusions

Based on the above analysis, clearly shows that social media played a major role on behaviour changes in the 1st college students' life style of the respondents. The 1st year college students mostly used social media for communicating between their friends and families. The impact of social media is negatively correlated with student life style. It affects the students' education and their career.

Negative changes such as addiction; fall in love with strangers and unwanted contacts. The study suggested that students can use the social media more positively it will improve their life style.

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An Analytical Review on the Challenges and Solutions of Women Entrepreneurs in Rural India.

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Abstract

Entrepreneurship is recognized as an important driver of economic growth, productivity, innovation and employment, and it is widely accepted as a key aspect of economic dynamism. Entrepreneur is the key factor of entrepreneurship and now women have been recognized as successful entrepreneurs as they have qualities desirable and relevant for entrepreneurship development. Entrepreneurship is a more suitable profession for women than regular employment in public and private sectors since they have to fulfill dual roles. Increasingly, female entrepreneurs are considered important for economic development. In this connection a review has been done about the challenges faced by women entrepreneurs and their solutions especially in rural India and an attempt is made to create an awareness regarding the schemes that are introduced by government for the help and motivation of women entrepreneurs.

Key words: Women entrepreneurs, Economic dynamism.

I. INTRODUCTION

In general, a **rural area** or **countryside** is a geographic area that is located outside towns and cities whatever is not urban is considered rural. Typical rural areas have a low population density and small settlements. Agricultural areas are commonly rural, as are other types of areas such as forest. Different countries have varying definitions of *rural* for statistical and administrative purposes.

Rural entrepreneurs: - One of the major objectives of developmental policies in India is to provide employment to millions of unemployed rural youth. The core of the problem in countries like India is surplus agricultural labour and closure of traditional village industries, resulting in increased unemployment in rural areas and migration of rural youth to urban areas in desperate search of jobs, in turn putting more pressure on the urban infrastructure and amenities. Rural industries generated employment for *47.97 lakhs* people in the year 1996-97, as against *37.21 lakhs* people in the year 1992-93. There are a large number of products and services available in rural areas, which can be leveraged by entrepreneurs to set-up new and small micro

enterprises. In fact, entrepreneurship can be pursued in virtually any economic field.

Role of rural entrepreneurs: -The fundamental role is to provide employment opportunities and consequently, applying a check on migration. Industries in rural areas are mostly micro or tiny in structure and quick yielding. In other words, their gestation period is much less as compared to large scale industries. Rural industries are also labour intensive and provide substantial employment opportunities to rural folks of all age groups. Few examples of such type of industries are Food Processing industry, Poultry industry, cottage and handicrafts industry, etc. This also helps in balanced regional growth and promotion of artistic activities.

Role of women: - Rural **women** are key agents for **development of rural entrepreneurship and so economy of India**. They play a catalytic **role** towards achievement of transformational economic, environmental and social changes required for sustainable development. Rather men women are facing limited access to financial support, health care, and education .not all but some of the challenges and their solution are discussed.

1. Cash flow management

The challenge: Cash flow is essential to small business survival, yet many entrepreneurs struggle to pay the bills (let alone themselves) while they're waiting for checks to arrive. Part of the problem stems from delayed invoicing, which is common in the entrepreneurial world. You perform a job, send an invoice, and then get paid (hopefully) 30 days later. In the meantime, you have to pay everything from your employees or contractors to your mortgage to your grocery bill. Waiting to get paid can make it difficult to get by – and when a customer doesn't pay, you can risk everything.

The solution: Proper budgeting and planning are critical to maintaining cash flow, but even these won't always save you from stressing over bills. One way to improve cash flow is to require a down payment for your products and services. Your down payment should cover all expenses associated with a given project or sale as well as some profit for you. By requiring a down payment, you can at least rest assured you won't be left paying others' bills; by padding the down payment with some profit, you can pay your own.

Another strategy for improving cash flow is to require faster invoice payments. Invoice clients within 15 days, which is half the typical invoice period. This means if a customer is late on payment you have two weeks to address it and get paid before the next month's bills are due. In addition, more and more companies are requiring immediate payment upon project completion – and in our digital age

when customers can pay invoices right from their mobile phones, it's not a stretch to request immediate payment.

You can also address cash flow management from the other side of the equation by asking your own vendors to invoice you at 45, 60, or even 90 days to allow ample time for your payments to arrive and checks to clear. If you can establish a good relationship with vendors and are a good customer, they'll be willing to work with you once you explain your strategy.

And if you're looking for an easier way to pay bills and save money, consider sending checks via email.

2. Hiring employees

The challenge: Do you know who dreads job interviews the most? It's not prospective candidates – it's entrepreneurs. The hiring process can take several days of your time: reviewing resumes, sitting through interviews, sifting through so many unqualified candidates to find the diamonds in the rough. Then, you only hope you can offer an attractive package to get the best people on board and retain them long-term.

The solution: Be exclusive. Far too many help wanted ads are incredibly vague in terms of what qualifications candidates must have, what the job duties are, what days and hours will be worked, and

what wages and benefits will be paid. You can save yourself a ton of time by pre-qualifying candidates through exclusive help wanted ads that are ultra-specific in what it takes to be hired at your firm, as well as what the day-to-day work entails. Approach your employee hunt the same way you would approach a customer-centric marketing campaign: through excellent targeting.

Once you have a pool of prospects, arrange for a "walking interview" in which you take candidates on a tour of their working environments. Ask questions relevant to the job and to candidates' experiences, expectations, dedication, and long-term goals. Don't act like an overlord determining which minion gets to live another day; rather, behave as though you're seeking a partner to help you operate and grow your business.

Take the time to seek real references: not the neighbor lady your candidates grew up with, but people who can honestly attest to their work ethic and potential. Once you've picked a candidate and before you've made a job offer, ask them specifically what it will take to keep them employed with you long-term. Tell them to be honest with their expectations. Provided they do a good job for you, you'll know what kind of rewards they're seeking and you can make adjustments accordingly: do they want more vacation? The opportunity for advancement? More

pay? Freedom from micromanagement? This isn't to say you have to bend backwards for your employees; however, it stands to reason that if you make expectations clear for both parties you can lay the foundation for a long-term, mutually-rewarding client-boss relationship.

3. Time management

The challenge: Time management might be the biggest problem faced by entrepreneurs, who wear many (and all) hats. If you only had more time, you could accomplish so much more!

The solution: Make time. Like money, it doesn't grow on trees, of course, so you have to be smart about how you're spending it. Here's how: Create goal lists: You should have a list of lifetime goals, broken down into annual goals, broken down into monthly goals, then broken down into weekly goals. Your weekly goals, then will be broken down into specific tasks by day. In this manner, what is on your task list in any given day is all you need to do to stay on track with your lifetime goals. If any tasks do not mesh with your goals, eliminate it or delegate them. If any tasks do not absolutely have to be completed by you, delegate them. Consistently ask yourself: "Is what I'm doing right now the absolute best use of my time?"

4. Delegating tasks

The challenge: You know you need to delegate or outsource tasks, but it seems every time you do something gets messed up and you have to redo it anyway.

The solution: Find good employees and good outsourced contract help, for starters. You might have to pay a little more for it, but the savings in time (and the resulting earning potential) more than make up for it. Next, be ultra-specific as to what you want done. It will take a little more time at first, but write down detailed steps listing exactly what you want your help to do. Don't make assumptions, and don't assume your help will be able to think for themselves (they can, but they will complete the job verbatim because that's what they're trained to do). So, don't say "list stats in a spreadsheet" when you can say "alphabetically list XYZ in the right spreadsheet column, then list statistic A in the next column." It might seem like overkill, but take the time to be specific once and your help will get it right every time thereafter.

5. Choosing what to sell

The challenge: You know you could make a mint if you just knew what products and services to sell. You're just unsure how to pick a niche.

The solution: Admit that you're weak in identifying prosperous niches, and delegate the task to someone

who is strong in this area. You don't have to hire a huge, expensive marketing firm; rather, recruit a freelance researcher who has experience in whatever type of field you're considering entering (retail ecommerce, service industry, publishing, etc.). Have them conduct market research and create a report with suggested niches, backed by potential profit margins and a complete SWOT analysis: Strengths, Weaknesses, Opportunities, and Threats. This isn't to say you should have someone else decide for you; however, if you're not good at identifying niches it's a good idea to have someone who is make suggestions. You can then analyze the suggestions for yourself to determine if you agree. Taking this step now can save you a lot of time, money, and hassles later – and it can save your entire business and livelihood.

6. Marketing strategy

The challenge: You don't know the best way to market your products and services: print, online, mobile, advertising, etc. You want to maximize your return on investment with efficient, targeted marketing that gets results.

The solution: Again, if you're not adept at creating marketing plans and placing ads, it's a good idea to outsource your marketing strategy to someone who is. At this point, all you need is a core marketing plan: what marketing activities will you undertake to

motivate purchases? Give your planner a budget and tell them to craft a plan that efficiently uses that budget to produce profits. This is not the time for experimentation. You can do that later, on your own or with the advice of your marketing strategist, after you've established a baseline that works.

7. Capital

The challenge: You want to start or grow your business, but you have little capital to do it with.

The solution: There are many ways to earn funding, from traditional bank loans to family and friends to Kick starter campaigns. You can choose these routes, certainly, but I prefer the self-fueled growth model in which you fund your own business endeavors. Instead of trying to launch a multi-million dollar corporation overnight, focus on your initial core customers. Continually work to find new customers, of course, but consistently strive to be remarkable to those customers you already serve. Word-of-mouth will spread, and more customers will come looking for you. As they do, develop systems and business processes that allow you to delegate tasks without sacrificing quality. Your business will grow slow and steady, and you'll be able to solve problems while they're small. Think about where you want to be five years from now. Can you get there without help, even if you have to delay growth a bit while you're doing it? This is the best strategy to adopt for small

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business entrepreneurs. If you do feel you need funding, however, be sure to consult an attorney to make sure you're not giving up too much of your business to get it.

8. Strapped budget

The challenge: Even though cash flow is fine, it seems you never have enough in your budget to market your company to its full potential.

The solution: Unless you're one of the *Fortune* 500 (and even if you are), every entrepreneur struggles with their budget. The key is to prioritize your marketing efforts with efficiency in mind – spend your money where it works – and reserve the rest for operating expenses and experimenting with other marketing methods. Keep a close eye on your money, too: chances are, there are areas you can skim to free up more funds. Unless an expense is absolutely critical to your business and/or represents an investment with an expected return, cut it. In fact, do this exercise: see how lean you can run your business. You don't have to actually do it, but cut everything you can and see if you still feel you can run your business (save for what you have to delegate and market with). Somewhere in between your leanest figure and your current budget is a sweet spot that will allow you to be just as effective and leave funds leftover to fuel growth.

9. Business growth

The challenge: We're assuming you are growing, not that you can't grow, and you've come to the point at which you can't take on any more work in your current structure.

The solution: Create new processes that focus on task delegation. Many entrepreneurs, used to wearing all the hats, find themselves in this position once they've achieved a modicum of success. Because you're doing everything, your growth halters to as top when it hits a self-imposed ceiling. The only way to break through is to delegate tasks to others and take yourself out of the production end and segue into management and, finally, pure ownership.

10. Self-doubt

The challenge: An entrepreneur's life is not enviable, at least in the beginning. It's extremely easy to get discouraged when something goes wrong or when you're not growing as fast as you'd like. Self-doubt creeps in, and you feel like giving up.

The solution: Being able to overcome self-doubt is a necessary trait for entrepreneurs. Having a good support system will help: family and friends who know your goals and support your plight, as well as an advisory board of other entrepreneurs who can objectively opine as to the direction of your business. One of the best ways to deal with self-doubt is to work your goals and tasks lists. When you're down and lack motivation, look at your lists and know that

the tasks you do today are contributing to your lifetime goals. By doing them, you're one step closer, and you can rest assured that you are, indeed, on the path to business success. Entrepreneurs face many challenges, and volumes have been written about how to overcome them. Perseverance and intelligence are your allies; use them to your advantage keep working toward your goals. Understand that you're not the first to struggle, and because of that there are many resources available to help you get through your darkest days as an entrepreneur so you can reap the immeasurable rewards that come with building your own successful business.

There are a few schemes which the government has implemented for the help and motivation of the women entrepreneurs in rural India:

1.Annapurna Scheme

This scheme is offered by the State Bank of Mysore for those women entrepreneurs who are setting up food catering industry in order to sell packed meals, snacks, etc. The amount granted as a loan under this scheme can be used to fulfill the working capital needs of the business like buying utensils and other kitchen tools and equipment.

Under this loan, a guarantor is required along with the assets of the business being pledged as collateral security. Further, the maximum amount of money that is granted is 50,000 which have to re-pay in

monthly installments for 36 months, however, after the loan is sanctioned, the lender doesn't have to pay the EMI for the first month. The interest rate is determined depending upon the market rate.

2. Stree Shakti Package For Women Entrepreneurs

This scheme is offered by most of the SBI branches to women who have 50% share in the ownership of a firm or business and have taken part in the state agencies run Entrepreneurship Development Programmers(EDP). The scheme also offers a discounted rate of interest by 0.50% in case the amount of loan is more than rupees 2 lakhs.

3. Bharatiya Mahila Bank Business Loan

This loan is a support system for budding women entrepreneurs looking to start new ventures in the fields of the retail sector, loan against property, MICRO loans, and SME loans.

The maximum loan amount under this loan goes up to rupees 20 crores in case of manufacturing industries and also a concession is available to the extent of 0.25% on the interest rate and interest rates usually range from 10.15% and higher. Additionally, under the Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE), there is no requirement of collateral security for a loan of up to

rupees 1 crores.

4. Dena Shakti Scheme

This scheme is provided by Dena bank to those women entrepreneurs in the fields of agriculture, manufacturing, micro-credit, retail stores, or small enterprises; who are in need of financial assistance. The interest rate is also decreased by 0.25% along with the maximum loan amount being rupees 20 lakhs for retail trade; education and housing whereas rupees 50,000 under the microcredit.

5. Udyogini Scheme

This scheme is offered by Punjab and Sind Bank so as to provide women entrepreneurs involved in Agriculture, retail and small business enterprises to get loans for business at flexible terms and concessional interest rates. The maximum amount of loan under this scheme for women between the age brackets of 18-45 years is rupees 1 lakhs but your family income is also taken into consideration and is set at rupees 45,000 per annum for SC/ST women.

6. Cent Kalyani Scheme

This scheme is offered by the Central Bank of India with the aim of supporting women in starting a new venture or expanding or modifying an existing enterprise. This loan can be availed by women who are involved in village and cottage industries, micro, small and medium enterprises, self-employed women, agriculture and allied activities, retail trade, and government-sponsored programs.This scheme requires no collateral security or guarantor and charges no processing fees. And the maximum amount that can be granted under the scheme is Rs. 100 lakhs.

7. Mahila Udyam Nidhi Scheme

This scheme is launched by Punjab National Bank and aims at supporting the women entrepreneurs involved in the small scale industries by granting them soft loans that can be repaid over a period of 10 years. Under this scheme there are different plans for beauty parlors, day care centers, purchase of auto rickshaws, two-wheelers, cars, etc. the maximum amount granted under this scheme is rupees 10 lakhs and the interest depends upon the market rates.

8. Mudra Yojana Scheme For Women

This scheme has been launched by the Govt. of India for individual women wanting to start small new enterprises and businesses like beauty parlors, tailoring units, tuition canters, etc. as well as a group of women wanting to start a venture together. The loan doesn't require any collateral security and can be availed as per 3 schemes –
i. Shishu – loan amount is limited to rupees 50,000 and can be availed by those businesses that are in their initial stages.
ii. Kishor – loan amount ranges between rupees

50,000 and rupees 5 lakhs and can be availed by those who have a well-established enterprise. iii. Tarun – loan amount is rupees 10 lakhs and can be availed by those businesses that are well established but require further funds for the purpose of expansion. If the loan is granted, a Mudra card will be given to you which functions the same way as a credit card however the funds available are limited to 10% of the loan amount granted to you.

9. Orient Mahila Vikas Yojana Scheme

This scheme is provided by Oriental Bank of Commerce to those women who hold a 51% share capital individually or jointly in a proprietary concern. No collateral security is required for loans of rupees 10 lakhs up to rupees 25 lakhs in case of small-scale industries and the period of repayment is 7 years. A concession on the interest rate of up to 2% is given.

II. CONCLUSION: - The results of the study show that women entrepreneurs faced a number of problems. The following suggestions are recommended to overcome the problems:

➤ Banks and financial institutions must come forward to support and motivate them to start the units.

➤ Financial help should be provided to women entrepreneurs by government as well as non-

government financial agencies as it removes their difficulty in procuring loans.

➤ Sources of power supply should be raised for women entrepreneurs. The power supply should be regular in general for the ventures being run by women entrepreneurs in particular. The government should provide power at low rate and other facilities related with electricity to those units, which are started and operated by women entrepreneurs.

➤ Women entrepreneurs should be provided with special training and development programs for developing their innovative instincts.

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5. International Journal of Science and Research (IJSR) www.ijsr.net licensed Under Creative Commons Attribution CC BY Rural Women Entrepreneurs: Concerns & Importance Garima Mishra1, Dr. U. V. Kiran

6. Research on women entrepreneurs: challenges to (and from) the broader entrepreneurship literature? Jennifer.E.Jennings & candida G.Brush

EFFECT OF TAMIL SOAP OPERA ON BEHAVIORAL CHANGE AND EMOTIONAL AROUSAL: A STUDY ON TAMILNADU HOUSEWIVES

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Abstract

This study aims to know different types of behavioural change and emotional arousal generated by the different genre of Tamil soaps. The data are collected from 430 housewives from Tamil Nadu. The questionnaire includes an opinion about different types of Tamil soap operas telecasted during prime time (19:00 to 23:00) from popular Tamil channels are respondents are asked to answer how often they were likely to watch a set of soaps as per the level of interest and opinion about emotional arousal generated because of scenes from Tamil soap operas. The researcher used both qualitative and quantitative methods. The research concludes that Tamil soap operas are significantly positively influencing viewers' emotions and Tamil Nadu soap opera scenes are arousing a high level of emotions of the viewer.

Keywords: Tamil soap operas, Behavioral Change, Emotional Arousal

Introduction

What are the majority of the Indian housewives doing in their free time? In the larger part of cases, they turn on the television and begin to watch programs, including soap operas. The vast majority of the Indian housewives spend a lot of hours before the television watching those projects that have unfavourable outcomes for their conduct. The soap opera is a television class made for stimulation, yet as a rule, it adversely affects society since individuals duplicate the practices that could be vicious. Numerous sorts of writing clarify that in the soap operas journalists create anecdotal characters that model effective or contrary practices, and through their stories and battles, groups of onlookers find out about issues going from local manhandle to individual liquidation. Effective soaps have a tendency to be keenly composed, hot and packed with plot curves and love triangles. In an ideal situation, the show ends up noticeably prominent, and watchers start to join a portion of the subjects into their lives. It would be more useful to communicate social substance and that way it could be a method for showing great things to the new eras. All the major TV programs in India deliver an assortment of dramatisation arrangement including family, comic drama, sentiment, history stories, loathsomeness, Devotional Stories and numerous others. They are typically indicated Day Time on Tamil television channels and begin at 11:00 to 15:30, Early Fringe begin at 18:00 to 19:30 and consistently at the primetime begin at 20:00 to 23:00. An arrangement will keep running for around three or four years. It might air five or six episodes every week, the example of a rule being Monday through Saturday. A Television channel will air five to sixteen soap operas all the while at any given time. Since they draw in the most watchers, each channel vies for

the most well-known stars. Consequently, it can be inferred that many Indian housewives are investing most extreme free energy before the television which will enormously affect their conduct. This study plans to uncover the behavioural effect of Tamil soap opera.

Problem statement

The presentation of television shows up, on the whole, to have effects affected Indian culture. This is especially the case for sexual orientation since this is a region where the lives of rustic watchers vary enormously from those delineated on most mainstream shows. By uprightness of the way that the most common Indian serials occur in urban settings, women delineated on these shows are ordinarily a great deal more liberated than rural women (Jensen and Oster, 2009). Further, as a rule, there is access to Western television, where these practices contrast significantly more extraordinarily from country India. In light of anthropological reports, this appears to have influenced demeanors inside India. Rao (2007) reports that few of his respondents thought television may lead women to scrutinise their social position and may help the reason for female headway. Another lady reports that, as a result of television, men and women can open up significantly more (Munshi, 2012). Many reviews cite many respondents depicting changes in sex parts subsequently of television (Jensen and Oster, 2009; Sankaran and Pillai, 2011). One man notes, Since TV has gone to our town, women are doing less work than some time recently. They just need to stare at the TV. So men need to accomplish more work. Commonly I enable my better half to clean the house.

A few reviews infer that the presentation of television and TV programs changed the system of social collaborations, expanded general world information and changed individuals' discernments about the status of their town in the wider world (Pace, 1993; McAnany and La Pastina, 1994). Presentation of television influences (in addition to other things) sees on sexual orientation, moving people in these ranges towards having more liberal perspectives on the part of women in both the work environment and seeing someone (Straubhaar, 2003; Kottak, 1990; Peterson, 2003). All things considered, the general impression given by the anthropology and sociology literature is that the presentation of television has affected society, and that sex and social issues are a specific point of convergence. Our information and setting give a chance to test this theory all the more thoroughly. There are no comparable reviews accessible in India to concentrate the effect of television soap operas effect on women practices specific in Tamilnadu.

Scope of the study

The principle topic of Tamil soaps is primetime serials radiate from a system comprising of various plot lines and a proceeding with a storyline that does not have confidence in the conclusion. The emphasis is primarily on the residential circle, despite the fact that it may include a more formal and corporate area with a view, maybe, to drawing in female crowds (Aggarwal& Gupta, 2001). Presently around 23 Tamil TV channels are noticeable all around, and the rundown is deficient. Sun TV, Vijay TV, Zee Tamizh and Polimar TV are the real Tamil channel wide costing more than 100 soaps each week. Presently some Tamil channels are discharging Hindi and Korean Serials in Tamil dialect. These television shows can be an association with media brutality to sound forceful conduct and viciousness. Look into has demonstrated that soap operas even can damage watchers or prompt bad dreams (Bar-On et al.,

2001).Housewives were particularly helpless against the messages passed on through soaps, which impact their recognitions and practices. Since there is abnormal state of plausibility in a behavioural change of ladies in Tamilnadu because of this sort of soap opera. Consistent introduction to soap operas like South Indian may bring about the only viewers seeing this present reality as being very like that exhibited by soap operas, bringing about a worldview inclined towards forecasts of impropriety and personal malice (Rubin and Perse, 1987; Carveth and Alexander, 1985). While endeavoring to evaluate the effect of these soaps on ladies groups of onlookers, it is critical for us at the end of the day to manage at the top of the priority list that, on account of the soap-opera design, with its mind-boggling and various storylines, convoluted plots and these self-disagreements, the way toward understanding gathering of people effect will be a perplexing one (Paik & Comstock, 1994; Ward & Friedman, 2006). This study will address the how soap operas are emotionally arousing the housewives.

Objectives of the study

1. To understand the soap opera viewing pattern of respondents from Tamilnadu.
2. To know the most preferred genre of soap opera as per the interest of the respondents from Tamilnadu.
3. To find the relationship between the genre of soap operas and emotional arousal of the respondents created by soaps.
4. To know more about the different behavioural changes because of Tamil soap operas.

Research methods

The present study used mixed method approach. The researcher used both qualitative and quantitative research methods. Totally 430 housewives from Tamilnadu was randomly selected for the research. The data was collected through well-structured questionnaire. The first part of the research instrument includes information like demographic details and television viewing pattern. The second part of the questionnaire includes an opinion about different types of Tamil soap operas telecasted during prime time (19:00 to 23:00) from popular Tamil channels are respondents are asked to answer how often they were likely to watch a set of soaps as per the level of interest in five-point scale range from always (5) to never (1) . Next part of instrument consists of different opinion about emotional arousal generated because of scenes from Tamil soap operas, and this part starts range from very high (5) to very low (1). Last part of the questionnaire includes information related to behavioural changes because of soap operas addressed by the housewives, and this part of questions are open-ended questions. The researcher used IBM SPSS 23 for quantitative analysis and NVIVO for qualitative analysis. This study is only limited to Tamilnadu. Only Tamil and Tamil dubbed soap opera are considered for the research, and the research participants are only housewives (working women are not included) ranges from 20 to 60. The researcher used Cronbach alpha reliability and convergent validity to assess the internal consistency of the research scales.

Results

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy is an index with values that fall in the

range 0-1. Brown(2014) suggests that values above 0.6 are appropriate. Current KMO value is 0.796.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.796
Bartlett's Test of Sphericity	Approx. Chi-Square	3980.194
	df	78
	Sig.	.000**

**p<0.01

Bartlett's Test of Sphericity is a statistical test for the presence of correlation among some of the variables and presents a statistical probability that the correlation matrix has significant correlations among at least some of the variables. With this data set, the KMO measure is greater than 0.6 and Bartlett's test of sphericity is significant; factor analysis is deemed suitable. The results are shown in Table 1.

Table 2: Rotation component matrix

Tamil Soaps	Components		
	Family dramas	Horror & Thriller dramas	Tamil dubbed Dramas
Deivamagal	.935		
Vani Rani	.844		
Saravanan Meenatchi	.819		
Vamsam	.811		
DeivamThandhaVeedu	.786		
Kula Deivam	.711		
Nandini		.938	
Ganga		.805	
Neeli		.758	
IniEllamVasanthamy			.811
InyaIruMalargal			.751
MoondruMudichu			.736
Karnan Surya Puthiran			.609
% of Variance	32.56	18.81	18.75
Cumulative %	32.56	51.37	70.12

The three component solution accounts for 70.12% of the overall variability in the original data. The first component accounts for 32.56%, the second component accounts for 18.81, and the last component explains 18.75% variance which was explained by rotation component matrix. Rotation component matrix helps to formulate an interpretation of the solution (Lawley& Maxwell, 1974). It can be concluded that the first component is clearly made up of family & romantic dramas. The second is mainly horror, and thriller dramas and the third mainly Tamil dubbed Hindi dramas.

Cluster Analysis looks at the profiles of each observed person and groups together simpler people. After saving the individual standardised score from exploratory factor analysis, that scores are further used for cluster analysis (Haiming&Wenlin, 2005). The Predictor Importance view shows the relative importance of each field in estimating the model (Figure 1). It can see that family & romantic dramas are the most important variable in determining cluster

membership (Mooi&Sarstedt, 2010). This view helps to better understand the factors that make up the clusters; it also enables to see differences between clusters not only as compared with the overall data but with each other (Figure 3) (Kaufman &Rousseeuw, 2009).

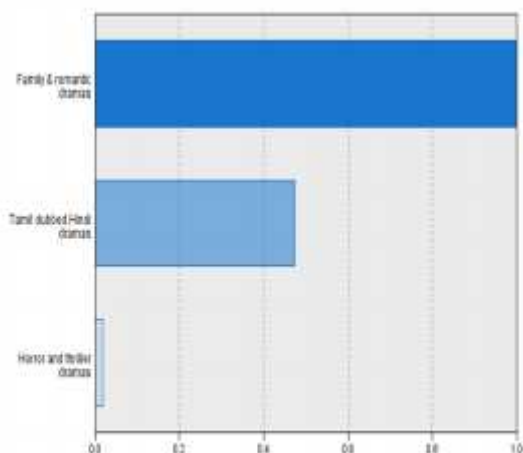**Figure 1: Predictor importance of clusters**

Table 3: Descriptive statistics and validity & reliability statistics for genre of soap operas

likelihood estimation (MLE), and the results are showed in Table 3. Hair et al., (2012) studies suggested the use of composite reliability (CR) as a replacement for Cronbach alpha reliability. As Table 3 shows, these values are larger than 0.7, indicating a high level of internal consistency reliability among all research variables. For convergent validity, each construct's average variance extracted (AVE) is assessed. Table 3 concludes that all of the average variance extracted (AVE) values are greater than the faircut-off point 0.5, confirming convergent validity (Fornel&Larcker, 1981). Discriminant validity is inferred when measures of each construct converge on their respective true scores, which are unique from the scores of other constructs (Churchill, 1979). Discriminant validity is demonstrated if both variance extracted estimates are greater than this squared correlation. The results of the variance extracted tests of viewing pattern of soap operas construct are shown in Table 3. Again, discriminant validity is supported by each squared correlation is less than both applicable variances extracted estimates.

| Genre	Mean	SD	CR	AVE	MSV	MaxR(H)	1	2	3
Horror and thriller dramas	2.74	0.87	0.92	0.668	0.19	0.985	.817	.438**	.140**
Tamil dubbed Hindi dramas	2.25	0.91	0.81	0.514					
Family & romantic dramas	1.92	1.04	0.91	0.785					

** p< 0.01

The above table concludes that many housewives are watching horror and thriller related soap operas compared with Tamil dubbed and family & romantic drama series. According to Arbuckle (2010) study, we measured the reliability and validity of the multiple-item research scales by analysing the measurement model using confirmatory factor analysis (CFA) with maximum

Figure 2: Cluster membership
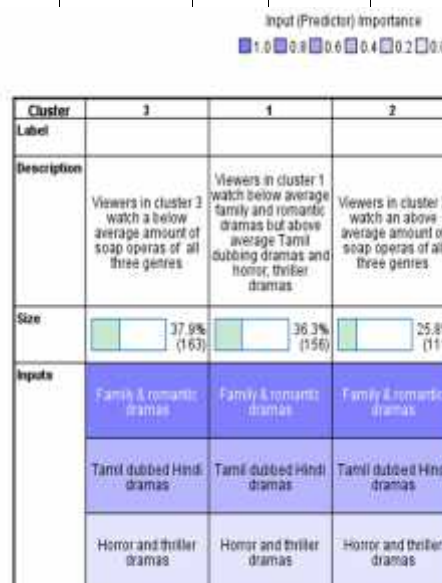
Table 4: Descriptive statistics for emotions aroused by soap opera scenes

Emotions	Mean	SD
Amusement	3.98	0.88
Surprise	3.78	1.02
Disgust	3.87	1.09
Fear	3.85	1.07
Anger	4.12	1.21
Sadness	4.16	1.22
Neutral	3.58	1.46

The above table shows that most of the emotions mean values are high, particularly sadness and anger emotions. It can be concluded that Tamilnadu soap opera scenes are arousing a high level of emotions of the viewer.

Figure 3: Effect of soap operas on housewives emotional arousal
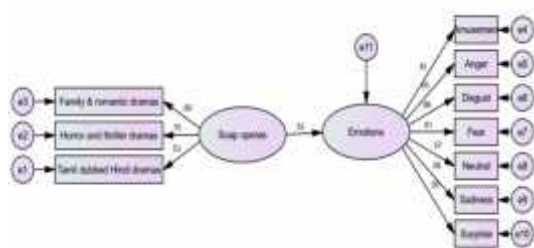
Themodelpossessedadequategoodnessoffitwithvalu esfor,GFI=.939,AGFI=.910,NFI= .941,CFI=.956,RMSEA=.079,andCMIN/df=4.37. Thesevaluessuggestanadequatefittothemodel.Given hesatisfactoryfitofthemodel,theestimatedpathcoeffic ientsofthestructuralmodelwerethenexaminedtoevalu atetherelationship.Fig.3 depictsthestandardisedpathc oefficients,t- values,andcoefficientsofdetermination(R²)ofthelate ntvariables.

The structural equation modeling was utilised to prove the relationship between the genre of soap operas and emotional arousal of the respondents created by soaps. Figure 3 concludes that Tamil soap operas are significantly influencing different emotional arousal of the TV viewers (beta=0.53, p<0.01). Horror and thriller dramas are the most significant soaps compared with Tamil dubbed dramas and family & romantic dramas. When it comes to different emotions, fear and disgust are the most significant predictors of emotions. Hence it can be concluded that Tamil soap operas are significantly positively influencing viewers' emotions.

Discussion and Conclusion

The psychological processes we have considered—discernment, perception, and translation—are the mental means by which seeing projects impact individuals' lives. More often than not watchers' shape about a soap opera will be so capable and pertinent that they will have an influence on others' lives. This study considers examining the behavioural and enthusiastic consequences for soaps which happen to a great extent outside of watcher's mindfulness. The subliminal impact is tactile boosts imperceptible to cognizant mindfulness which are by the by obediently handle by the cerebrum and hence influence behaviour. While the cases with respect to such jolts are emotional, social research has been unable affirm any critical effect on behaviour or however because of seeing or hearing the subliminal message in the pop culture. Most consequences for behaviour are outside our mindfulness. However, it is not that watchers are being influenced by things they can't see or listen. Rather, it is basically that they don't have the foggiest idea about that a certain something (a brutal scene) is causing something else (their own hostility). Whenever asked, the

most group of onlookers individuals will deny that media has anything to do with their behaviour, yet there is impressive confirmation that it does. And keeping in mind that impacts researchers never utilise the expression "subliminal," they expect that many impacts and the basic psychological processes are in fact "no cognizant." Since most human behaviour can be caught by soap opera, it is hypothetically conceivable that soap opera can influence any given human behaviour (Anderson & Bushman, 2002). While business showy films are resolved to offering themselves, they have obviously affected shopper behaviour now and again. Regardless of all the conceivable behaviours that a researcher may study, a disparity ate measure of consideration has been given to three areas—brutality, sex, and substance utilise. Every space is a range of social concern identified with imperative open issues—wrongdoing, war, family arranging, moral esteems, medical issues, unemployment, et cetera. The social mirror theory proposes that soap opera just reflect social behaviours. However, there is impressive proof to recommend that soap opera can influence behaviours (Young, 2012).

Based on the qualitative research, there are some behavioural changes are addressed in the present study. The copycat phenomenon, sometimes it is clear that a TV program has an impact on behaviour based on parallels between soaps and real life so precise they could not be mere coincidence. Aggressive behaviour is another behavioural change due to soaps. Finding shows as evidence that viewer behaviour on what they see around them, especially when such behaviours are not punished. This effect occurs at the level of direct imitation and more general instigations of aggression (Perse&Lambe, 2016; Anderson & Bushman, 2002). There appears to be nothing magical about soap's influence on the viewers.

Consistent with social learning theory, this study claims that soaps are one of many forms of observational learning that could influence the aggressive behaviour.

Concentrating on outward behaviours like hitting an inflatable sex toy or carrying out a wrongdoing is enticing since these behaviours are so striking. In any case, psychological brain research is similarly as intrigued by the reasoning and feeling that underlie behaviours (Bryant and Oliver, 2009). Throughout the years impacts research has moved toward examining the effect that soap operas have on the ways watchers consider themselves and their general surroundings. Soap operas frequently incite capable, passionate responses, yet sometimes individuals will react to a soap opera so unequivocally that they create manifestations of injury, wretchedness, or psychosis.

Fear and anxiety are regular feelings when seeing soap operas, and they are vital to the pleasure with sickening apprehension and thriller soap operas. In any case, infrequently fear is a delayed consequence that lives on when the soaps are over (Perse and Lambe, 2016). The psychiatric unsettling influences as of now talked about are extraordinary, yet in a milder shape, this phenomenon is normal.

Publicity is intended to make extensive quantities of individuals think especially. There have been many covers amongst publicity and account film history. Since promulgation is proposed to have a diffuse effect, its belongings are difficult to quantify (Bryant and Oliver, 2009). These films are generally made under desperate conditions, in which the accentuation is on activity, not investigation. The supposition behind such apprehensions is that the media influence our musings and behaviours as well as a whole method

for understanding the world. Types of media whereupon a culture depends are more critical than its substance (Anderson and Bushman, 2002; Young, 2012). Our reasoning changes with new types of innovation as they are presented. When we watch soaps, we are more influenced by the way that it is soap than by its kind or its general quality. The more soaps we see, the more we start to see the world like soap. Alongside the benefit of taking a gander at the brain science of soap operas from various points of view, my other bring home message is that soap operas are capable. They ought to be dealt with deliberately, yet their positive potential ought to be grasped. The researcher needs to make an edge as a psychological way to deal with film that helps perusers comprehend films as well as grasp them. We have seen that scholastic brain research has regularly centered around how to react to the perils of visual media. Empowering media proficiency is a standout amongst the most widely recognised responses to these threats, and it is a convincing thought. In any case, here and there it is utilised as a part of a way that accepts soap operas are characteristically lethal and that the main motivation to appropriately read a film is to weaken its negative strength. At different circumstances, the inspiration for media proficiency goes past moderating negative impacts. The contention for composed proficiency concentrates on the benefits to nationals of popularity based society. A similar contention is connected to visual media that mix words, sounds, and pictures. Media education advocates trust that a medium like soaps is an instrument that current society uses to convey and arrange itself, and that to work efficiently and beneficially, individuals should know how to precisely translate televisions.

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A STUDY ON SERVICE QUALITY AMONG THE PRIMARY HEALTHCARE CENTRES IN MADURAI DISTRICT

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INTRODUCTION

India has been witnessing an increasing concern regarding the quality health care services especially after globalisation and liberalization policies. With the increase in urbanization and standard of living of the people, the awareness on health care services also increases. The consumer's expectation on the quality in health care services is increasing at a faster rate. Service quality has been shown to be an important element in the consumer's choice of hospitals (Lynch and Schuler, 1990). Quality in health care is defined as the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs (Korwar, 1997). Health care service quality is giving patients what they want (patient quality) and what they need (professional quality), and doing so using fewest resources, without error, delays and waste, and within higher level regulations (management quality; Overtreit, 1992). The health care deals with different services such as hospital services, diagnosis services, physician consultancies and some other emerging fields. In the present study, the focusing services are all health care services together.

REVIEW OF LITERATURE

Shaikh et al. (2008)25 for a year between 2004 and 2005 March at a secondary level hospital in Karachi of Pakistan. For this, data was collected on a quarterly basis through SERVQUAL tool, with interviews and it was taken on 1533 patients and found 34.4% of patients were satisfied with the medical services offered by the secondary level hospitals. Apart from this they also conducted workshops towards the quality improvement based on the results of the four phases. This in turn within a year resulted in the improvement of patient's satisfaction level from 34.4% to 82.0 %(over a year).

The Egyptians hospitals service and its quality were tested by Mohamed **M. Mostafa (2005)35** through this paper. For this they considered both public and private hospitals.SERVQUAL model was adopted for the study. Across-sectional questionnaire survey carried out in 2005 took a random sample of 332 patients from 12 hospitals of Egypt was chosen. Factor analysis revealed three factor solutions and did not support the five factor model of SERVQUAL. The three factors were empathy, tangibles and reliabilityconfidence.In all the mentioned three factors the private hospitals have lesser gaps when compared with public hospitals. Patients may have a multifaceted set of significant viewpoint that cannot be confined in the opinion poll.

The Pain Treatment Satisfaction Scale (PTSS) was to assess patient satisfaction for those receiving treatment for either acute or chronic pain. The initial questionnaire of the study by **Evans C.** et al. **(2004)45** included a comprehensive literature review and interview swith patients, physicians and nurses in the United

States, Italy and France. After initial items were created, psychometric validation was performed on the participating patients.Analyses on this survey included principal components factor analysis tests of reliability, clinical validity, and confounding. All dimensions except medical care discriminated well according to pain severity. The PTSS survey has been proven a valid and comprehensive instrument to assess and evaluate satisfaction with treatment of painbased on independent modules that have demonstrated satisfactory psychometric performance.

STATEMENT OF THE PROBLEM

India is becoming one of the important countries which provide the quality medical services at cheaper rate. It attracts many foreign patients to India. Even, it is not at a reachable level to the people living in India especially people with lower middle income and poor people. Some hospitals are not following any ethical values in the medical profession. So these incidents namely reluctance of public hospitals influence the patients attitude towards the hospitals in a negative way. The service quality in public hospitals is declining whereas the service quality in private hospitals is increasing .but the problem is whether these are at the expected level of the patients or not. Hence, the present study focuses on this aspect

SCOPE OF THE STUDY

The medical profession has broadened its horizon globally and India is no exception. The emphasis is not only to provide specialized services more efficiently and effectively, but also to maintain the quality of overall services.In view of changing needs of customers, changing world, changing life style and technological innovations, the market has become customer service oriented. Therefore, in service delivery and services management the service quality has become an essential need in this competitive environment. As the physiological contentment of the people got satisfied; there is a demand for more satisfaction. Human's desire to live long has resulted in special healthcare services like health and fitness clubs, multispecialty hospitals, nursing homes etc.

NEED FOR THE STUDY

Health care service have a distinct position among other services due to the high risky nature of services and the general lacks of expertise possessed by consumers. A better understanding of how consumers evaluate the quality of healthcare will help administrators and service providers, in determining and improving the weaker aspects of their health care delivery system. With continuous monitoring of patient perceptions and improvements based on patient feedback. The quality of care and patient satisfaction will improve. The present study has made an attempt to evaluate the service quality in primary healthcare centres as per the view of the patients.

OBIECTIVE OF THE STUDY

1. To study the service quality of primary healthcare centre in Madurai district.
2. Tomeasure the level of patient satisfaction towards the primary healthcare centres in Madurai city.

RESEARCH METHODOLOGY

The validity of any research depends on the systematic method of collecting data and analyzing the same in a sequential order. In the study use of primary data . For collecting primary data, the field survey technique was consumers in the study area first-hand information pertaining prevailing practices for service quality in this area were collected from three hundred fifteen sample respondents who were chosen by convenience

sampling method. The tools used for analysis are percentage analysis,T-test,ANOVAand chi-square

ANALYSIS AND DISCUSSION

DEMOGRAPHIC PROFILE OF THE RESPONDENTS

The respondents of 44% of male respondent and 56% of female respondent while 24% 0f respondents age is below 25,25% of age is between 26 and 35, 24% of age is between 36 and 45,15% of age is between 46 and 55, & 12% of respondent age are above 55. further 26% of respondents educational qualification are PG, 21% are UG, 10% qualification are others, 23% are DIP/IT & 20% of respondents qualification is below +2. While 24% of respondents occupations are professionals, 24% are business man, 15% are home makers, 25% are from IT service and 12% of respondent's occupations are others.

HYPOTHESIS TESTING

T-TEST FOR GENDER AND LESSER WAITING TIME

Null hypothesis – Ho: There is no significant difference between male and female with regards to lesser waiting time.

Alternative Hypothesis –H1: There is significant difference between male and female with regards to lesser waiting time.

The p-value is 0.000 and it is less than 0.5(5% level of significance), so we accept the alternative hypothesis and reject the null hypothesis at 5% level of significance. It is conclude that there is no significant difference between male and female with regards to lesser waiting time.

ANOVA FOR AGE LEVEL AND GOING INDIVIDUAL ATTENTION

Null hypothesis – Ho: There is no significant difference between age level and going individual attention.

Alternative Hypothesis –H1: There is significant difference between age level and going individual attention.

The p- value is 0.000 and it is less than 0.05 (5% level of significance), so we reject the null hypothesis and accept the alternative hypothesis at 5% level of significance. It can be conclude that there is significant difference between age level and going individual attention.

CHI-SQUARE ANALYSIS FOR AGE AND CONSISTENCY OF SERVICE

Null hypothesis – Ho: There is no association between age and consistency of service

Alternative Hypothesis –H1: There is association between age and consistency of service

The 'p' value that is Pearson chi-square test reads a significant level of 0.000 at 5% level of significance. This value of 0.000 being less than the significance level of 0.05, the null hypothesis is rejected. Hence, there is association between age and consistency of service

SUGGESTIONS

1. The hospital management should establish a customer cell which has to reveal their customer expectation and perception on their service quality periodically.

2. They can update their facilities and infrastructure to meet the needs of their customer.

3. The hospitals are advised to focus not only on the service quality alone but also the level of education among the customers is growing at a faster rate. They are expecting the service quality at par with the international standard.

CONCLUSION

The study concludes that level of expectations by the patients are not yet fulfilled by the service provider. The perception on service quality in healthcare centre has a significant impact on the patient's satisfaction. Finally the study concluded that the primary healthcare centres should take serious steps to enrich their service quality according to the level of expectation of their customers .The healthcare centres should consider the problematic service quality to reduce the patients unrestness towards their service.

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Correlation Between Risk and Return of Stocks in Multisectors

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Abstract

Risk and return are both relevant to investment decisions. India has been an emerging nation and since liberalisation, there have been a number of reforms that have witnessed stock market reactions. This has caused both the risk and return of the different sectors of the Indian market to frequently change and become unpredictable. There is no clear answer to whether the risks and returns of these indices remain stable over a period of time. Stock market ensures liquidity of industrial securities; it also ensures the appreciation of funds invested in the securities with the improvement in the performance of companies and increase in the demand for their securities. Thus they motivate the public to invest their savings in the capital of companies. These savings are channelized in the productive activities of the companies resulting in the capital formation which is essential for the economic development of a nation.

Key words: Risk, Return, CAPM, Investment, Expected return, Beta.

I. Introduction

Stock exchanges play an important role in the economic development of a nation. Stock exchange keeps a record and makes a public declaration of prices at which securities are traded. On the basis of these prices for the securities quoted in the markets the investors and speculators can evaluate the values of securities held by them. Every individual always need high (or) maximum returns and wants to avoid the risk. They serve as an economic barometer of a country Stock exchange or stock market is a market where old securities that have been already issued by the companies and other organizations to the public are bought and sold through authorized agents according to certain rules and regulations. It is a mechanism though which the holder of securities may find a buyer for his holdings at a fair price. Similarly buyer of securities may find an immediate seller who is willing to sell his holdings at a fair price. The securities are bought and sold continuously among the investors in these stock exchanges without the involvement of companies. Stock exchanges facilitate the free trade of only the securities that are listed.

II. OBJECTIVES OF THE STUDY

- To study the Risk and Return relationship stocks on public sector banks
- To compare the performance of banks with their Yardstick index.

- To rank the companies on the basis of risk and return

III.   SCOPE OF THE STUDY

A Research entitled "An analysis of Risk and Return Relationships for selected stocks on NSE using Capital Asset Pricing Model with the special reference to Karvy Stock Broking Company, Sattur" attempts to analyze the investment decision on stocks based on risk and return. The aim of investors' is getting investment opportunities with minimum risk and maximum returns and therefore risk and returns are important variables that investors are looking for, at the time of investment decision making.   This study tries to establish the possible risk-return relation in capital market by analysing the influence of risk variables on stocks return for selected industries and the respective companies using Capital Asset Pricing Model.

IV.   NEED FOR THE STUDY

A research entitled "An analysis of Risk and Return Relationships for selected stocks on NSE using Capital Asset Pricing Model". This study is needed to know Investing money in the assets where the risk is less has always been difficult to decide, that means the investor would like to see risk and return before investing. When the expected return is high then the risk associated with such return is also high. So, one who intends to invest in such companies in particular sectors needs to be aware of return and risk involved in the investment. This analysis mainly studies the risk and return relationship of selected stocks from different sectors on NSE to make the investors get beneficial based on the risk and return analysis. This study is structured to analyse the performance of the selected stocks in

the selected industries to reveal the risk and return relationships in a particular period of time.

V.   REVIEW OF LITERATURE

Sunil Rashinkar et. al. **(2014)[i], entitled their research as "A Study on Market Risk Analyses of selected Banking Stocks (Nationalized Banks) in Indian Context".**
This paper studies the Market risk analysis of five Nationalized Banks in terms of Beta coefficient for the period from 1st July 2013 to 31st June 2014. On the other hand the betas of Punjab National Bank & Bank of Baroda were more than one. It indicates that these stocks were exposed to high market risk; i.e., any small changes in the market will directly impact on these stocks.

Shaini Naveen et. al. (2016), entitled their research as **"A Study on Comparative Analysis Of Risk and Return With Reference to Stocks of CNX Bank Nifty"**. This study deals with India is one of the emerging economies, which has witnessed significant developments in the stock markets during the liberalization policy initiated by the government. The study evaluates the performance of banking stocks mainly to identify the required rate of return and risk of a particular stock based upon different risk elements prevailing in the market and other economic factors.

Poornima et. al. (2017), entitled their research as **"A study on relationship between risk and return analysis of selected stocks on NSE using capital asset pricing model"**. This empirical paper has been done by analyzing in selected stocks from sectors such as automobile sector and IT sector. Five stocks in each sector have been taken for the sample. Automobile industry is considered to be one

of the fastest growing sectors in any developing and even in a developed country. A study revealed that automobile sector showing positive return and low risk and IT sector showing negative return and high risk during the study period.

Nirmala et. al. (2107), entitled their research as **"Risk And Return Analysis Of Equity Shares with Special Reference To Select Mutual Fund Companies (Using Capital Asset Pricing Model)".** This study aims to study the risk and return of select five mutual fund companies listed at NSE. The risk and return analysis done by using Capital Asset Pricing Model and Performance analysis done by using Jenson's Alpha. It can be concluded from the study that the investors can choose SBI and ICICI to invest their fund because their cost of capital and risk is less and they are performing too good. Long term investors were able to take advantage of the market as it less volatile. As there is less fluctuation in the shares when compared to market as well as its prices, the long term investors able to predict about when the share will raise.

Muthu Gopalakrishnan et. al. **(2017),** entitled their research as **"A Study on Risk Return Analysis of Pharmaceutical Industries in Indian Stock Market".** Every individual attempts to park his/her hard earned savings in various investment avenues depending upon his/her objectives. Among the various investment alternatives, stock market is considered to be one of the most rewarding avenue of investment. This study helps the potential investors to make informed and rational investment decision. The data have been collected and analysed using MS excel. The study concluded that from the selected pharmaceutical companies Sun Pharmaceutical

Industries Ltd provides high return but the market risk of the shares are much high.

Muthu Gopalakrishnan et. al (2017)[ii] **,** entitled their research as **"Equity Analysis of Automobile Industry in Indian Stock Market".** Every individual always wishes to get a decent return on his/her investments because investor makes the investment from the hard earned savings.. Since the risk is very high in equity investment, the investors need to make equity analysis that helps them to know about the risk-return characteristics of those equity shares and those industries in which he/she wishes to park the savings. In order to maintain the growing demand, many automakers have started to invest in this industry. It takes only 50% of the total companies forming NIFTY Auto index as on 21st April 2017. That is 8 companies. From the analysis, it is found that among all other companies Mahindra & Mahindra Ltd is the best company to invest because its beta value is less than one (0.9082) and it has a positive alpha value (0.0073).

Arti Sharma et. al. (2017)[iii] entitled their research as **"Return & Risk Analysis of Selected Sector Specific Mutual Funds in India"**. This Sector funds are industry specific funds which invest money in a particular sector of economy such as banking, healthcare, real estate, technology, transportation, etc. These funds provide diversification within a particular sector. But there return ability is more volatile than diversified equity mutual funds. The present study is based on analyzing the performance of some selected Indian sector fund schemes in terms of risk and return. In this paper Compound Annualized return, Standard

Deviation, Beta, Alpha and R-Squared are determined for last five year period.

VI. RESEARCH METHODOLOGY

Collection of Data

The present study based on secondary data collected from National Stock Exchange, journals, books, magazines, and Websites It is aimed at finding out the risk and return of selected five sectors.

Sample size

This paper studies the correlation between Risk and Return of 25 stocks selected from different five sectors on the basis of coefficient value of Beta/Volatile .The sample size for the study is taken on the basis of random sampling technique.

Automobile Sector

- Tata Motors Ltd.
- Bajaj Auto
- Eicher Motors Ltd.
- Hero Moto Corp Ltd.
- Maruti Suzuki India Ltd.

Banking Sector

- Axis Bank.
- ICICI Bank.
- State bank of India.
- HDFC Bank Ltd.
- Yes Bank

Information Technology Sector

- Tata Consultancy Service Ltd.
- Wipro Ltd.
- Infosys Ltd.
- Mahindra.

- HCL Technologies Ltd.

Pharmaceutical Sector

- Aurobindo Pharma
- Cipla Ltd.
- Dr. Reddy's Laboratories Ltd.
- Lupin Ltd.
- Sun Pharmaceutical Industries Ltd.

Fast Moving Consumer Goods Sector

- Britannia Industries Ltd.
- Dabur India Ltd.
- Nestle
- Godrej Consumer Products Ltd.
- ITC Ltd.

Tools Used for Data Analysis

The collected data has analysed with the help various statistical tools, The risk of an asset is measured quantitatively using statistics- the standard deviation and also beta is analyzed to measure the variability of returns. The most common indicator of risk is standard deviation, , which measures the dispersion around the expected value of returns.

Standard deviation $= \sqrt{\{\sum (k-\bar{k})^2 / n\}}$

Average Return

Formula for calculating the AR $=$ $\sum$ Return/N

Return = (Closing Price – Opening Price) / Opening Price *100

Variance $= \sum (x-X)^2/N$

Capital Asset Pricing Model

CAPM to find out Expected return
$Ri = Rf + \beta (Rm – Rf)$

Beta

$$\beta = \frac{COV \text{ (Market returns, sectoral index returns)}}{VAR \text{ (Market returns)}}$$

Where β is Beta, COV (Market returns, sectoral index returns) is the covariance between the market returns and sectoral index returns and VAR (Market) is the variance of the market returns. Calculations are done with the help of Excel.

VII.   DATA ANALYSIS

APPRAISAL FOR LONG TERM INVESTORS

Table 1 – Table showing the Escalation of Automobile Sector for Long term Investors

S.No	Name of the Automobile Companies	Average Return	Beta	CAPM	Standard Deviation	Ranking
1	Tata Motors	-0.11	0.91	0.61	1.94	4
2	Bajaj Auto	-0.05	0.68	2.45	1.51	3
3	Eicher Motors	0.02	0	7.77	0.02	1
4	Hero MotorCorp	-0.05	0.49	3.90	1.54	3
5	Maruti Suzuki	-0.01	0.58	3.20	1.59	2

Source: Secondary Data

Inference

The above table upshots that, all the companies has positive beta value, Risk averse investors can select Eicher securities has low beta value which is less risky. Return seeking investors can select Eicher securities whose average return is 0.02 and Risk Sensitive investors can select the securities of Eicher without much variation in return compared to expected return.

Table 2 - Table showing the Intensification of Banking Sector for Long term Investors

S.No	Name of the Bank	Average return	Beta	CAPM	Standard deviation	Ranking
1	Axis Bank	-0.10	0.92	0.56	1.90	3
2	HDFC Bank	0.01	0.33	5.20	1.24	1
3	ICICI Bank	-0.12	0.90	0.75	1.71	4
4	SBI	-0.20	0.93	0.51	1.94	5
5	YES Bank	-0.06	0.92	0.56	1.90	2

Source: Secondary Data

Inference

The above table upshots that, all the companies has positive beta value, Risk averse investors can select HDFC securities has low beta value which is less risky. Return seeking investors can select HDFC security

which has highest return of 0.01 and Risk Sensitive investors can select the securities of ICICI without much variation in return compared to expected return.

Table 3 – Table showing the Acceleration of FMCG Sector for Long term Investors

S.No	Name of the FMCG	Average return	Beta	CAPM	Standard Deviation	Ranking
1	Britania	-0.02	0.40	4.62	1.80	2
2	Dabur	-0.10	0.36	4.90	1.57	5
3	Godrej	-0.09	0.45	4.28	2.15	4
4	ITC	-0.01	0.92	0.56	1.90	1
5	Nestle	-0.08	0.22	6.04	1.48	3

Source: Secondary Data

Inference

The above table upshots that, all the companies has positive beta value, Risk sensitive investors can select Nestle securities has low beta value which is less risky. All the securities gives negative average return which is not feasible for the investors and Risk averse investors can select the securities of Godrej without much variation in return compared to expected return.

Table 4 – Table showing the Growth of Information Technology Sector for Long term Investors

S.No	Name of the IT Sector	Average Return	Beta	CAPM	Standard Deviations	Ranking
1	HCL	0.01	-0.01	7.85	1.63	1
2	Infosys	-0.04	0.92	0.26	1.90	2
3	TCS	0.01	0.92	0.26	1.90	1
4	Tech Mahindra	-0.07	0.64	2.81	1.93	3
5	Wipro	-0.07	0.56	3.42	1.38	3

Source: Secondary Data

Inference

The above table expound that some companies has positive beta value, Risk averse investors can select HCL securities has low beta value which is less risky. Return seeking investors can select HCL and TCS securities which has highest return of 0.01 and Risk Sensitive investors can select the securities of Wipro without much variation in return compared to expected return.

Table 5 – Table showing the Boom of Pharmaceutical Sector for Long term Investors

S.No	Name of the Pharmaceuticals	Average Return	Beta	CAPM	Standard Deviations	Ranking
1	Aurobindo	-0.21	1.05	-0.50	2.57	4
2	Cipla	0.05	0.73	2.01	1.55	1
3	Lupin	0.05	0.73	2.01	1.55	1
4	Dr.Reddy's Laboratory	-0.09	0.63	2.83	1.52	2
5	Sun Pharmaceuticals	-0.12	1.45	3.63	1.69	3

Source: Secondary Data

Inference

The above table upshots that, all the companies has positive beta value, Neutral risk takers can select those securities having beta value nearing to 1 such as Aurobindo and Sun Pharm whereas less risky investors can select Cipla and Lupin securities has low beta value which is less risky. Return seeking investors can select Cipla and Lupin securities which has highest return of 0.05 and Risk Sensitive investors can select the securities of Dr.Reddy's lab without much variation in return compared to expected return.

APPRAISAL FOR SHORT TERM INVESTORS

Table 1- Table showing the Escalation of Automobile Sector for Short term Investors

S.No	Name of the Automobile Companies	Average Return	Beta	CAPM	Standard Deviation	Ranking
1	Tata Motors	1.50	1.65	-2.47	11.52	3
2	Bajaj Auto	1.14	0.65	3.73	6.77	5
3	Eicher Motors	4.29	0.72	3.30	8.88	1
4	Hero MotorCorp	1.16	0.69	3.52	7.42	4
5	Maruti Suzuki	2.99	1.24	0.12	9.53	2

Source: Secondary Data

Inference

The above table upshot that, all the companies has positive beta value, Neutral risk takers can select those securities having beta value nearer to 1 such as Maruti, Tata Motors whereas less risky investors can select Bajaj securities has low beta value which is less risky. Return seeking investors can select an Eicher security which has highest return of 4.29 and Risk Sensitive investors can select the securities of Bajaj without much variation in return compared to expected return.

Table 2 - Table showing the Acceleration of Banking Sector for Short term Investors

S.No	Name of the Bank	Average Return	Beta	CAPM	Standard deviation	Ranking
1	Axis Bank	1.30	1.23	-0.39	10.26	3
2	HDFC Bank	1.79	0.66	3.40	5.74	2
3	ICICI Bank	0.92	1.20	-0.20	9.65	4
4	SBI	0.41	1.11	0.45	9.83	5
5	YES Bank	2.64	1.43	-1.69	12.30	1

Source: Secondary Data

Inference

The above table upshots that all the companies has positive beta value, Neutral risk takers can select those securities having beta value nearer to 1 such as Axis, ICICI, SBI and YES bank whereas less risky investors can select HDFC securities has low beta value which is less risky. Return seeking investors can select Yes bank securities which has highest return of 2.64 and Risk Sensitive investors can select the securities of HDFC without much variation in return compared to expected return.

Table 3 - Table showing the Boom of FMCG Sector for Short term Investors

S.No	Name of the FMCG	Average return	Beta	CAPM	Standard Deviation	Ranking
1	Britania	3.35	0.52	4.45	7.50	1
2	Dabur	1.61	0.60	3.97	5.37	3
3	Godrej	2.28	0.67	3.49	6.37	2
4	ITC	1.20	1.15	0.47	5.21	4
5	Nestle	1.15	0.64	3.69	5.52	5

Source: Secondary Data

Inference

The above table expound that all the companies has positive beta value, Neutral risk takers can select those securities having beta value nearer to 1 such as ITC whereas less risky investors can select Britania securities has low beta value which is less risky. Return seeking investors can select Britania securities which have highest return of 3.35 and Risk Sensitive investors can select the securities of ITC, Nestle without much variation in return compared to expected return.

Table 4 - Table showing the Intensification of Information Technology Sector for Short term Investors

S.No	Name of the IT Sector	Average Return	Beta	CAPM	Standard Deviations	Ranking
1	HCL	1.92	0.80	2.20	7.18	1
2	Infosys	0.67	1.22	-0.72	7.84	4
3	Tata	1.32	0.84	1.92	6.21	3
4	Tech Mahindra	1.82	0.78	2.30	8.38	2
5	Wipro	0.59	0.89	1.55	6.92	5

Source: Secondary Data

Inference

The above table upshots that all the companies has positive beta value, Neutral risk takers can select those securities having beta value nearer to 1 such as Infosys whereas less risky investors can select Tech Mahindra securities has low beta value which is less risky. Return seeking investors can select HCL securities which have highest return of 1.92 and Risk Sensitive investors can select the securities of Tata much variation in return.

Table 10- Table showing the Growth of Pharmaceutical Sector for Short term Investors

S.No	Name of the Pharmaceuticals	Average Return	Beta	CAPM	Standard Deviations	Ranking
1	Aurobindo	2.73	1.20	-0.47	12.67	1
2	Cipla	0.90	0.82	2.15	6.82	4
3	Lupin	1.07	1.13	-0.05	7.56	3
4	Dr.Reddy'sLaboratory	0.63	0.97	1.06	7.01	5
5	Sun Pharmaceuticals	1.33	1.31	-1.26	7.51	2

Source: Secondary Data

Inference

The above table upshots that all the companies has positive beta value, Neutral risk takers can select those securities having beta value nearer to 1 such as Aurobindo, Lupin, Sun Pharmaceuticals whereas less risky investors can select Cipla securities has low beta value which is less risky. Return seeking investors can select an Aurobindo security which has highest return of 2.73 and Risk Sensitive investors can select the securities of Dr.Reddy's lab without much variation in return compared to expected return.

VIII.   FINDINGS

- Risk Sensitive investors and Return seekers can invest in securities with lower risks and positive returns; it is suggested to invest in securities whose Beta is less than 1, stocks which would be considered as more conservative investments such as Eicher Motors Automobile company, HDFC Bank, Tata IT company, Cipla and Lupin Pharmaceutical companies for Long term investors and for short term investors such as Bajaj Auto, Eicher Motors, Hero MotoCorp Automobile companies, HDFC bank, Britania, Godrej, Dabur, Nestle FMCG Companies, Cipla and Dr. Reddy's lab Pharmaceutical companies.

- From the study, it is recommended that Return seekers without risk contemplation investors can invest in Eicher Motors Automobile concern, HDFC bank securities because those securities bestow profit in both short term and long term investment, so the investors who are interested in stable growth can prefer those securities.

- Based on the research analysis, Neutral Risk takers can opt the securities whose beta value is nearing to 1 with good returns such as Tata Automobile company, TCS IT Company in long term investment and for short term investment all the companies beta values are not nearer to 1.

- High risk takers can select the securities whose beta value is greater than 1 with good returns are Tata, Maruti Suzuki Automobile companies, Axis, Yes Banks, ITC Fmcg company, Infosys IT company, Aurobindo,

Lupin, Sun Pharmaceutical companies for short term investors and all the companies beta value are less than 1 in long term investment.

IX. CONCLUSION

The paper shows that information about the performance of various stocks in the market in terms of risk and return with the help of CAPM. An investor should be in a position to analyze both risk factor and return potential of various companies in order to achieve the objective of maximizing the return that will be differing from companies to companies from time to time.

Based on the research, the long term investors are able to predict about when the share will raise hence majority of Information technology, Fast Moving Consumer Goods, Pharmaceutical Sectors confer more return while compared to Banking and Automobile sector and for Short term Investors Automobile Sectors, Fast Moving Consumer Goods, Information Technology Sectors bestow more return while compared to Banking and Pharmaceutical Sectors.

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Traits, Talents and its Influence on Educational Evolvement

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ABSTRACT

Research on personality traits is certainly a bailiwick considered as a major research by the scholars in psychology. This study is made to evaluate the connection between personality and academic performance. A total of 150 students were participated in this research. The Academic Maturity Scale (101 item instrument) is used to analyze the factors like self awareness, motivation, organization, & responsibility (Addison, Althoff, & Pezold, 2009).
The level of agreement is revealed by the respondents in six point scale type 1 being strongly disagree and 6 being strongly agree for 101 items. Reverse items are also listed in the questionnaire for 16 items. Big Five Inventory includes 44 item scale which is developed to find out the variables like extraversion, neuroticism, conscientiousness, agreeableness, and openness. Correlation, regression, independent t test were used to analyze the variables. Research results reveal that extrovert, conscientiousness, neuroticism and openness are making impact on academic interest. Agreeableness is not related to academic interest. The personality traits contribute to variance in academic achievement is 52 percentages. The most reliable analyst of academic interest is openness. An academician cannot afford to overlook the given traits and talents as this can ameliorate the efficiency of a respondent.

Type of Paper: Empirical

Keywords: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness.

1. Introduction

A nation's strength is envisaged on the quality of education and constructing new skills among its students. Hence education is well thought-out as the back bone, for developed and developing nations. During the education process the students are rolled out with various knowledge, skills and creativity. Their performance is measured mostly in terms of grade point average by the educational institutions. Gone are those days where the students used to have common education and same exposure. It all depends on the analytic process of the student, the learning environment methods, demonstration,

learning etc. The transition is on the mass education; to customize education is gaining its importance; and the teachers are in constant state of repeatedly revisiting their education programs to fill the gap of slow learners and fast learners. Historically, education policy and accreditation process have been the impetus for renewal changes in education.

Even though the students are getting the same input, i.e., study material, books and teaching methods; but there is lot of differences in the performance of the students. Some students are performing extraordinarily well; some students score only average marks and some students couldn't pass the exams. There are many variations in scholastic performance of the students. Individual academic performance gets strongly influenced by the Personality. Personality envisages academic achievement that is above and ahead of intelligence. (Bergold & Steinmayr, 2018)

Personalities submit to individual dissimilarity in the way of philosophy, emotion, behavior and their characteristics. Academic performance among student is the major issue among parents and teachers. It is based on the ability and intelligence among students. O'connor & Paunonen, (2007) stated that personality variables assume a key part on academic performance. Personality means individual differences in characteristic pattern of thinking, feeling and behaviour. DeYoung, (2010) states hierarchical model for personality traits is Big Five Model with five factors extraversion, neuroticism, conscientiousness, agreeableness, and openness. Challenge of organisation relies on the identifying the personal determinants of performance. (Sellman, Born, Stricland, & Ross, 2010). Research in personality has been credited with inciting a hefty portion of the significant advances in fields, for example, organizational behaviour (Hough, 2001). The continuity from the childhood to the adulthood personality on achievement had created attention because the academic exhibitions are accepted to have aggregate impacts throughout their course time (Caspi et al. 2005).

Folks vary based on sort of personality and inspiration. Exposure of these differences between individuals gives significant evidence concerning how education environments must be prepared. Personality is a source to determine how the individual will counter to new

information and conditions the individual will come across. Academic achievement is the major issues in all the educational institutions. Relationship stays alive between the personality traits (behavior, thinking, and feeling) and academic achievement (Soraya hakimi et al, 2011, Kazdin, 2000). Much attention is given to the external factors like school, instructional materials, experience of the teachers etc (WAEC, 2005). In today's scenario lot of amount is spent to secure good schools and the affordable parents are even ready to invest on education abroad, to enhance achievement which in turn secures good employment opportunities. Subsequently this study discovers the affiliation between personality and academic maturity scale.

2. Review of Literature

Enhancing the nature of education and speculation on education is the key factor for paving the way for economic development. Personality pays a vital role in shaping the behavior of the students which reflects in the academic performance. In other words it refers to the personality characteristics, family background, age, gender, attitudes and exposure to the environment where they are. The big five personality characteristics include conscientiousness, neuroticism, , openness, extroversion and agreeableness. The relationship between personality attributes, educational anxiety and execution among college students was explored by Ahadi, Narimani (2010). The outcome demonstrated that conscientiousness, extroversion, and openness to experience, agreeableness and educational performance had huge positive correlation and neuroticism element and educational performance has noteworthy negative correlation. Educational anxiety and performance has significant negative correlation. Also, the correlation among extroversion, conscientiousness is negatively related to educational stress but neuroticism was positively correlated educational stress. Soraya hakimi et al. (2011) studied the relationship between personality traits and academic achievement and outcome illustrate that academic achievement were significantly related to personality traits. All identity variables show noteworthy relations with scholarly inspiration motivation. hsan Bozano lu, Ahmet Sapancı (2015) studied the connection stuck between personality attributes and motivation is important for successful learning and teaching. The primary reason of the above study is to decide the dealings between personality traits and motivation echelon of Turkish university students. The meticulous motive for this research is to figure out which personality aspect envisages academic motivation to what degree.

Conscientiousness is significantly correlated; neuroticism is negatively correlated with academic motivation. This correlation shows an interesting pattern of significant relationships. Interpretation shows that the role of educators ought to be vital in encouraging and nurturing the student toward their achievement; whereas Tomas Chamorro-Premuzic &, Adrian Furnham (2003) proved that conscientiousness is correlated positively; extraversion and neuroticism is correlated negatively with examination grades. It is contented that personality

inventory result may speak to an imperative commitment to the forecast of scholastic achievement and disappointment in college (Meera Komarraju et al 2009).

Eyong et al. (2014) found a noteworthy difference between student's achievement with respect to level of conscientiousness and agreeableness i.e student with elevated intensity of conscientiousness and agreeableness perform better comparing with students having undersized level of traits. Parents and teachers should play a pivotal role to encourage the students and guarantee them to be disciplined and cautious for constant achievement. Incentive ensures for continuous performance. Elham Salehi et al. (2010) have registered the impact of personality qualities on learning styles of understudies. Personality traits happen to be in medium level among majority of students with assimilator learning style. A unswerving positive affiliation with knowledge approach has been originate between the big five personality factors except neuroticism. Redhwan Naggar et al. (2015) assessed that openness and conscientiousness behavior were observed to exist decidedly connected with academic performance.

Nur Safwati Ibrahim et al. (2014) explored the association between five higher order personality dimensions and students academic achievement. This study reveals that conscientiousness is the best measurement of big five personality identities, corresponds to Grade Point Average (GPA) comparing other dimensions. The conclusions made from this review are in terms of intrinsic motivation, a profound way to deal with education and learning objectives which connected with general information, great test outcomes and all connected together by the openness quality; and extrinsic motivation which accomplishing way to deal with learning and performance goals connected to high grades and linked together by the conscientiousness trait. Openness connected to learning and general information while conscientiousness connected to scholastic accomplishment (Mikael Jensen 2015).

3. Methodology

This exploratory research comprises a Population of male and female students of an Arts and science college in Virudhunagar district. A total of 150 respondents are taken, out of which 45 males and 105 females.

3.1 Instrument

The Academic Maturity Scale (AMS) is alienated into four subscales: motivation, organization, responsibility, and self-awareness. Respondents demonstrate level of conformity with all of 101 items by means of 6-point Likert-type scale (1 being strongly disagree, 6 being strongly agree) and reverse-scored items are 19 in number. Ozer & Benet-Martinez, 2005 state that 'Big Five Traits' (neuroticism, extraversion, openness, agreeableness, and conscientiousness) have been related to a wide range of behavior, including academic achievement and job performance.

Costa et al (2007), deduced 'The Big Five Inventory' as 44-item inventory that was urbanized to review the Big Five personality area.

Respondents point toward their level of accord with each of the 44 items by means of a 5-point Likert scale (1 being disagree strongly, 6 being agree strongly); 16 items are reverse-scored. The core items are portraying the behavioral, cognitive, and affective terms.

4. Research Findings

The following table presents mean and standard deviation score of variables related to gender. It indicates that mean scores between male and female are not much dissimilar.

Table No. 1 Descriptive Indices of the Research Variables

Factors	Gender of the Respondents	N	Mean	Std. Deviation
Extravert	Male	45	3.30	.369
	Female	105	3.31	.512
Agreeableness	Male	45	3.39	.388
	Female	105	3.56	.519
Conscientiousness	Male	45	3.35	.435
	Female	105	3.36	.566
Neuroticism	Male	45	2.86	.456
	Female	105	2.75	.551
Openness	Male	45	3.53	.399
	Female	105	3.30	.499

Pearson correlation has been applied to validate the relations between extents of Big Five Personality model.

Table No. 2 a. Correlations among the factors of Big five Model

Variables	Extravert	Agreeableness	Conscientiousness	Neuroticism	Openness
Extravert	1				
Agreeableness	.301[**]	1			
Conscientiousness	.327[**]	.336[**]	1		
Neuroticism	-.277[**]	-.536[**]	-.238[**]	1	
Openness	.310[**]	-.026	.473[**]	.101	1

[**]. Correlation is significant at the 0.01 level (2-tailed).
The outcomes are shown in table 2.a. It indicates that here exists a statistically noteworthy affiliation between

extravert and all other dimensions. Neuroticism is negatively related to all the dimensions. Moreover openness is negatively related with agreeableness.

Table No. 2 b. Correlations among the factors of Academic Interest scale

Variables	Self-awareness	Motivation	Organization	Responsibility	Others
Self-awareness	1				
Motivation	.541[**]	1			
Organization	.664[**]	.494[**]	1		
Responsibility	.542[**]	.570[**]	.708[**]	1	
Others	.679[**]	.590[**]	.691[**]	.742[**]	1

[**]. Correlation is significant at the 0.01 level (2-tailed).
While executing Pearson association on amount the dimensions of academic interest scale, it is found that all factors are positively related with other factors.

Table No.3 Regression Analysis

Variables	R Square	F	Adjusted R Square	R Square Change	B Value	t-value	Sig. t
Constant	.520	31.199	.503	.520	.781	2.333	.021
Extravert					.112	2.137	.034
Agreeableness					-.014	-.253	.801
Conscientiousness					.355	6.844	.000
Neuroticism					.170	3.331	.001
Openness					.209	3.744	.000

Table no.3 reveals that conscientiousness amounts to 36% of difference in educational interest which is noteworthy. R square value has attained the considerable total of 46% by adding openness. Neuroticism added with the conscientiousness and openness. R square reaches 50% which is statistically significant. Agreeableness is not entered in this analysis, since it doesn't contributes to predict academic interest. Hence the regression equation is framed as $Y = .781 + .112x_1 - .014x_2 + .355x_3 + .170 x_4 + .209 x_5$.

Table No.4 Independent Samples Test

	Levene's Test for Equality of Variances		t	df	Sig. (2-tailed)
	F	Sig.			
Self-awareness	.181	.672	.092	148	.927
			.096	94.174	.923
Motivation	3.158	.078	-.952	148	.343
			-1.026	99.552	.307
Organization	2.274	.134	-.893	148	.373
			-.937	93.432	.351
Responsibility	4.525	.035	-.693	148	.489
			-.757	102.785	.451
Others	5.458	.021	-1.300	148	.196
			-1.438	106.279	.153

Table 4 reveals that there are no gender differences among the participants on the dimensions of academic interest; independent sample test is used to find out the differences.

5. Discussion

Academic performance among the students is predicted by their personality. This research study emphasis four traits viz., extravert, conscientiousness, neuroticism and openness, which are significant with reference to academic interest. Extrovert people are hasty, impetuous at taking care of issues, loquacious, distract and remotely motivated. Extrovert individuals are more consequently inclined to minor level on academic achievement. The same has been bolstered by different scholars who conclude the same as introvert learners are additional victorious than their extrovert corresponding person (Dunsmore, 2005). Eyong, Emmanuel Ikpi et.al, (2014), state that academic performance can be predicted especially by conscientiousness and openness to experience; individuals scoring more in conscientiousness and openness undoubtedly succeed in their studies. Social nexus is vital in educational process because college students have to communicate with individuals of different caliber such as students, teachers and college organization. Mechanism of 'Agreeableness' assists to communicate more effectively. Here agreeableness is not related to academic interest. The outcome of this research is contrary to those studies related to the trait agreeableness; the key difference is that students who are highly delightful can perform enhanced

than that of their counter parts (John Nye, Ekaterina Orel., et.al 2013). Mount, B. Steward (1998) opine that even though agreeableness is normally favored and can be an advantage in most circumstances, disagreeableness has its palpable advantage particularly in those condition which necessitates tough decision-making and complete objectivity.

Research on relationship is flanked by Personality Traits and education. Ahadi, M.Narimani (2010) reveals that neuroticism demonstrated a negative critical association with educational performance. The physical and mental illness among students are due to anxiety during stressful situation which in turn decides whether students to take the exam or not. Neuroticism's nexus is also with elevated level of bodily damage such as muscular tension and digestive disorder. Neurotic traits such as moderately abnormal state of tension, trepidation and evasion of failure are helpful in certain conditions, which in turn can lead to academic success.

These features make students to track due dates and contemplate stiff to pass the assessment, which are certainly valuable in official situations with numerous inflexible principles and policies. Personality Traits, self esteem and academic achievements among students benefit them on educational context, which promote and reward critical and original thoughts with high openness to experience (Aldia Labella, Alda Troncore Maria Letizia, Drammis, 2014).

The personality traits contribute to 52 percent of inconsistency in academic achievement. Research reveals that openness is most reliable interpreter of academic interest. Chamorro-Premuzic and Furnham (2008) propose that 'openness to experience' is a determinant of superior IQ and suggesting students who are elevated on openness tend to be mentally analytical, intellectual, understanding, imaginative, and paying attention (Asghar Hazrati-Viari., et.al 2012).

Investigation of gender orientation contrasts in personality uncovers that there is no critical distinction between the male and female members. This is also advocated by McCrae el al (2002) and Sayid Dabbagh Ghazvini et.al (2011)., state that as a component of gender orientation there is no critical distinction of academic performance among male and female students. Therefore it is worth paying attention at the initial stages of education to assess the personality traits of the individual and presenting appropriate conscientious role models for making the students to excel in their academic performance. In addition to this it is an essential of the educational program designers of personality traits and individual contrasts learners to understand & consider such contrasts and to make the curriculum more flexible while developing the same. Conscientious people are characterized as profoundly dependable, accomplished - arranged and innovative learners. Such qualities make them to decide and increase academic realization. Thus, it is no revelation that prediction of academic achievement is greatly contributed by conscientiousness. The same has been

supported by Furnham (2003a), Chomoro (2003b), Lounsbury et al (2003b) and Bratko et al (2006). The outcome demonstrate that, all behavior aspects demonstrate critical relationships with academic motivation, while conscientiousness indicates decidedly corresponded and neuroticism shows negative and fundamentally associated with academic motivation (Ihsan Bozanoglu & Ahmet Sapanci, 2015). The connection between conscientiousness and neuroticism is interceded by role balance partially whereas is not associated with college achievement (Jennifer L. Bishop et al, 2017). In today's state of affairs the students are addicted to internet and no correlation exist between academic performance and internet self – efficacy (Spiridoula et.al, 2017).

6. Conclusion

The outcome of this study endows some suggestive results as variations in big five character is inevitable in dissimilar cultural and instructive environment. There is a significant positive contrast between scholarly accomplishment of students who are extremely conscientious and those who are not. Students who are highly conscientious execute significantly superior than their corresponding person. Their academic achievement, and agreeableness are positively related; which shows that highly agreeable students and those who are not in the former performed significantly better than the latter. Teachers can look for the causal variables of personality traits. Expansion of the personality different variables like IQ, learning directions and ecological uneven further impacting academic recital can be inspected in prospect studies. Parents and teacher should persuade their children/ wards or students to set apparent target, and make certain that they are systematically tuned and cautious to constantly accomplish the goals.

An essential of an educator is to be 'an argus-eyed' on understanding these traits and talents like that of a medical practitioner who understands his/her patient before giving prescription.
These traits and talents are as crucial to an educator as 'Physics is to Engineering, or Anatomy is to Medicine'.

'Great careers often are traced back to the Traits and Talents which are duly Endorsed!'

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Ecological Human Resource Management System: A Proposed Model that Enhances Corporate Environmental Responsibility by Supporting Citizenship Behavior

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Abstract:

A lot of articles have explained the importance of eco-friendly personal administration and its practices. With the previous view, the researcher studied the relationship between some of the organizational green elements and firms organizational corporate environmental responsibility. "The green management is a part of corporate environmental responsibility" the research was conducted to test the above statement and to find the actual link between this factors 100 samples were collected and analyzed. SPSS statistical package was used to represents the result. Correlation and regression analysis tools have been used to find the relationship between the two factors.

Keywords: environment management, Green HRM, Green Management, Corporate Social Responsibility.

Introduction:

The Indian textile industry is one of the biggest in the globe with enormous raw material and textile production base. Our monetary system is mainly dependant on the textile producing and deals in accumulation to further main business industries. According to the description of the association of India textile industry regarding 27% of the overseas convertibility is on a report of the transport of clothing and textiles alone. The textile and clothing industry give about 14% to the business manufacturing and 4% to the gross domestic items of the country. Approximately 8% of the whole excess income compilation is added by the textile sector. As a result of the clothing sector reports for as large as 21% of the whole engender in the financial system.

Approximately 35 million populace is exactly working in the cloth making process. Not direct staffing includes the human resource occupied in a form-based raw material manufacture like cotton and connected business plus management could be just about 60 million. A clothing is the major single industry in India (and in the middle of major in the globe), Accounting for concerning 20% of the whole business production. Textile and clothing exports account for 1/3 of the entire value of exports from the country.

The scope of this study:

1. State the origination of Ecological Human Resource Management in the specified industry.
2. Study the level of support from the organizations for implementing the Ecological Human Resource Management in the particular industry.
3. List the common ways to connect the employees with Ecological practices.

4. Study the Organization Citizenship Behavior in the direction executing Eco-friendly practices.
5. State out the significance of Corporate Environmental Responsibility and try to find an association among the Ecological Human Force Management Policies and the Scio Ecological Accountability.

Proposed model
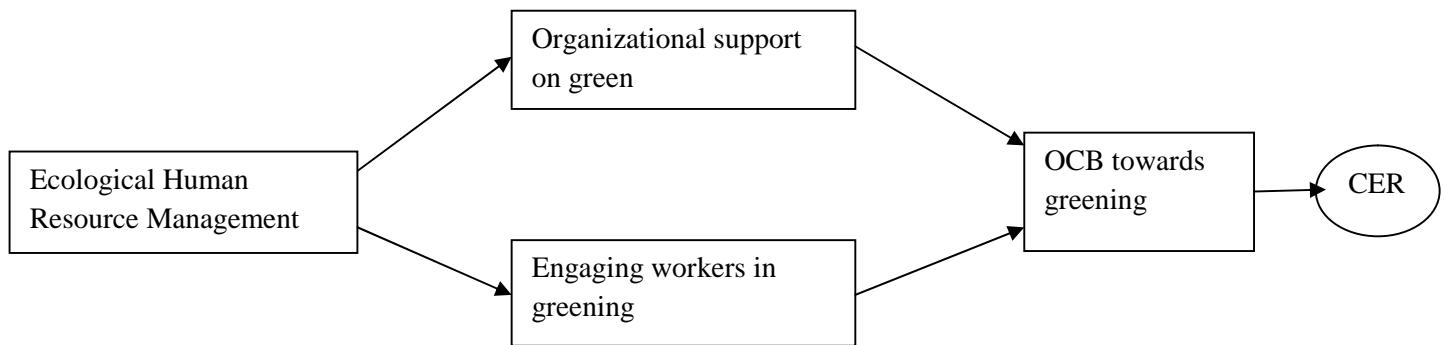
Ecological Personal Administration

The Ecological Administration is an idea for the generation of reducing world harmful damages. It is a common topic for all the human being. Without the proper knowledge all of us doing some activities which are most relevant to the ecological concept, but the earth is in the stage to urge the process which can highly effective to safeguard its natural resource, for that reason a studied and matured people make the term that is Environment Management. The Environment Management is a concept that can only cover the people who are all mostly close to the Environmental activities, for that to spread out the environmental knowledge the organizations step in to the Environment Management the organizational process is fully based on the Human Resource so the industrial people collaborate the ecological concept with the Human Resource Management that is nothing but Ecological Personal Administration. The Eco-Friendly Staff Administration gives double

benefit to the industry people there are green brand image and competitive advantage. So recent business firms are focused with loads of pressures from shareholders and stakeholders to improve ecological accountable duties (Molina-Azorı n et al.2009). Green performance replicate and result signifying the level which organizations are engaged to safeguard the natural surroundings. Ecological performance might be appraise by a set of pointer such as short ecological results, green house gas deterrence, waste reduction, plus reproducing work (Lober1996), and it can be eveloped by the execution of ecological administrative method (ESM), such as ISO 14001 certification, a device necessitate high communication among personnel management (PM) and ecological management (EM) (del Brı o et al.2007).

At present all the management and educates peoples to have a high level of craze on the combination of Human Resource Management and the Ecological Management. This is the fair

deal to getting a better result due to the ecological concerns. A few fresh papers demonstrate the cross-fertilization among ecological management and human resource management for the attainment of ecological performance. For instance, (Jabbour2008a, b) and Jabbour et al., (2008) inspect which organizations are having the ISO 14001 certification, and account that the better outcome in term of ecological performance was observed in the business where workers were the majority set up by the use of suitable human resource management practices at every level of the production processes. As a result of executing the function played by human resource management in green performance concern, suggestions acquire by Jabbour and his colleagues replicate the efficiency that has been made in this field ever since the middle of the 1990s. more than 15 years scholars focused on ecological management have intended for their awareness of human resource management and highlighted the significance of employees personal green capability in the workstation(e.g., Branzei et al.2004; Daily et al.2012; Ferna ndez et al.2003; Florida1996; Hart1995; Jabbour and Santos2008a;b ; Jabbour et al., in press; Jiang and Bansal 2003 ; King and Lenox 2001; Kitazawa and Sarkis2000 ; Walley and Stubbs2000).

Every new concepts and issue are come out to the knowledge populace by the work of research people. They make a good level of understanding among the people about the emission of greenhouses gases. And the recent climate changes and damages also make the people give respect nature. Most newly, a few human resource management scholars have wished for a enhanced assimilation of ecological concerns (Jackson et al .2011; Jackson and Seo2010; Renwick et al.2013; Wagner 2012).in spite of call for most research into the connection among human resource management

and ecological management (Muller-Camen et al.2010; Renwick et al. 2012), present particular concern on the association among human characteristics and ecological management in Brazilian organizations published in the International Journal of Environment and Sustainable Development (2012) and on the human resource management's functions in sustainability in some accessible studies screening how organizations lessen their ecological pressure when workers take ideas in their work in positive for the surroundings (Ramus and Steger2000), to date, some problematic work have openly speak outs the degree to which strategic human resource management encourage employee who directly deals with customers, employees like that, eco-friendly activities, facilitates organizations to develop their green performance.

Organizational Support on green:

The organizations have to take or start the process what we need to achieve. The management is almost inbuilt with the human force but the main and first contribution should come from the management itself. Lots of focus and observers are going on with the concept of greening the environment and the workstation there are a few new suggestions are given below with the accordance of some researchers which makes the greening process good and well.

Ecological construction

Every business associations and the other buildings are also built only with the constructor viewpoint. Still, we don't think about the harmful effort according to the construction of every building, but with the conscious of the ecological conditions we should design out working places. This will include trio concepts

there are eco-friendly, economic and brand image of the particular concern. The business association around the word noticeably goes for Ecological constructs as their workstation administrative center as an optional to workplaces. The occurrence is fairly drifted surroundings as Ecological building satisfies convinced decisive factor for lessening the development of environmental resources that are using in their buildings. In addition, ecological buildings encompass some improved measured which is directly connected to ecological strategies like as power effectiveness, reproducing power and tempest water administration. Present scenario has spectator a better expansion in the acceptance of ecological constructions by the business associations at a quick speed. The business association over the globe has turned to gradually more conscious of the important part act by the eco-friendly building whist with ecological problems. Ecological construction too serves up as the foundation for economic savings for business associations as their construction and the constructors committed with a low budget. Business associations massive like this, and involved to maintainability and contain ecological constructions modeled main beliefs into their edifices. Luckily 100 business associations are taken the maintainable organizational wide maintainable strategies that have raised the needs for work break in Ecological or maintainable edifices (ShoebAhmad 2015).

The paper-free office

When we talk and think about the eco-friendly nature we should stick with the trees and fresh surroundings. Trees are the backbone for the globe. But the proportion of trees and forest has rapidly reduced in the past few decades. That's why the globe has mostly affected by a lot of disasters like global warming, earthquake floods.

There are many causes can behind global warming but in organizational view usage of paper is one of the reasons for contaminating the environment. So lots of organization has started this paper free office. The paper-free office is a move on ecological in which the utilization of paper is eradicated or really condensed. This is ended by exchanging statements and another paper into the electronic mod, a progress known as digitized. The majority of the work in the workplace is handled with paper, however, with the foreword of information technology; the utilization of paper has been lessened. Now a day electronically based organizations and educations have modified the systems and events at the workplaces translate them into paper free workstations. Paper-free workstations where the utilization of paper is whichever limited by translating the significance of administrative statements and administrative papers into computerized workflows. The strategic significantly lessen the usage of paper, the expenses for the paper related operations are encompasses photocopying, printing, and stock-ups, and as well reserves the time utilized for seeking paper statements. Jamie Garratt started Idea Rebel, a Vancouver-based digital agency in 2008, which is an absolute workplace (Borzykowski, 2013). As per Idea insurgent, pay remains are correspondence to workers and annotations take into tablet elements and boards. The creators are permissible to bring in a pad of paper but they have to obtain to take the pad to their home at every day. Lastly, we declare that by lessening the utilization of paper, we can immediately conserve environmental resources, contaminating toxic waste, and diminish the depletion of water and force.

Preservation of resources:

Preservation of resources in the workplace has the possibility of better environmental influences. In an effect to give majority effort on

ecological beings, workplace surround the globe contain put in the operation of various power protection to lessen the ecological influences. The Human Resource Administrative departments at the United Kingdom arm of Sky has commenced a organization where the employees are asked to turn off their personal computers and light after leaving, to utilize full reproduced power, and initiating solar lighting (Davies & Smith, 2007), while the human resource department of another British company is highlighting upon their travel plans which improve car sharing and the augmented use of public transportations (Simms, 2007). In adding up, human resource methods like as E-Human Resource are observed to be capable to assist administration and workers follow their individual carbon discharges (Beechinor, 2007). Business associations too improving the enlarge the utilization of resources star rated lights and bulbs and equipment which certainly at slightest two-third lesser power than the others.

Reprocess and disposal management:

 Reproduction is the better way of reducing the wastages and it's a better plan for reducing the expenses also. In the commercial focus, we can produce two kinds of produces with the material that's always we are using for the production of our companies main product. Reprocess is the technology of computing the utilized up materials (squander) within fresh and helpful goods. Reproducing is lesser the utilization of unprocessed material that would have been otherwise exploited to make new stocks. As a result, these strategies keep the power and diminish the level of waste that is frightening into the dustbins, by this means making the nature cleanser and reduce the air pollution. As an element of their ecological proposals, most of the business associations are reproducing program to raise the level of reprocessed

produces and diminish the cost of waste. (Shoeb Ahmad 2015).

The reproduction is the process can give easy way to minimize the companies usual profit with the usual amount of raw material, most of the companies start the process with the plan of supplementary products with the less amount of investment this can help to raise the companies returns and also reduce the wastages and it also simplifies the waste disposal work. Still, as the business associations cuddle the idea of reserving cost, focalizing concurrently on the ecological and the integrality, most Human Resourcing experts were ascribed the mission of making the organizations reprocessing program and watching the workplace thermostats. In the progression, a lot of human resources specialized determined that green proposals were an essential feature of general corporate environmental responsibility. At present, the entire globe is itemizing the old hymn of Reduce, recycled, and the reuse to preserve nature. (Shoeb Ahmad 2015).

Engagement of employees with Greening practices:

The green human resource management is the nothing but it's a use of human resource practices and policies to promote the sustainable use of resources within the business. There are two major elements highly involves in green human resource management first thing the eco-friendly use of resources and the second thing preservation of knowledge capital. The engagement of employees with the firm's objectives is the major element in every day-to-day activity of the organization. And the preservation of knowledge capital is also connected with the employee's relationship. Workers connections are that appearance of Human Resource Management which is ascertaining with workers-management

affiliation. These links make possible inspiration and confidence of the workers in addition to, enhance the efficiency. It also assists to avoid and perseverance issues rising at the workstation that may perhaps have an effect on effort. In reality, the optimistic worker's dealings are insubstantial and lasting resources and a source of spirited benefits for any business associations. Workers involvement in ecological proposals raises the opportunities of good ecological administration as it lines up the workers' aims, abilities, enthusiasms, and awareness with ecological management strategies and methods.

Engaging workers in Ecological Management has to subsist stated as developing Ecological Management methods more specifically well-organized resource utilization (Florida & Davison, 2001); plummeting wastages (May & Flannery, 1995); and shortening contamination from the working area (Kitazawa & Sarkis, 2000).

More than a few workers in their learn completed that personnel authorization certainly pressures the efficiency and the concert, and helps self-patience, personal ideas, and enigma resolving abilities (Renwick, 2008; Wee & Quazi, 2005). A significant way in which workers engaged and contribution can be promoted within the business association is to look for business persons within the company who are communally and environmentally directed known as eco-friendly producer (Mandip, 2012, p.246).

Ecological ideas could be greeting from all the workers irrespective of their position which will motivate their attention in ecological problems and create a better utilization of petitioning their abilities. The Human Resource worker wants to coerce the administration to create a concerned work atmosphere where the workers are uncontrolled to give their thinking on ecological problems seeing as the employees are directly accountable for executing principled commercial attitudes in every day of work of the business association. This approach the attainment of ecological returns will highly be based on the workers' readiness to concur (Collier & Esteban, 2007), as frequently, the good thinking arrive from the work in that specific field (Casler, Gundlach, Persons, & Zivnuska, 2010).

The focus of the worker's network should be widened by beginning a recommendation scheme compasses the business association, in which each and every worker as of high most to the lowly stage obtain a chance to bestow the principles. These strategies will assist in making better consciousness on ecological problems too, at present thoughts of ecological strategies may yield up from diverse ways. IBM UK has an active team program. This provides concede to motivating workers and their relations to get committed in local eco-friendly schemes (Wehrmeyer, 1996, p. 31).

Another company's strategy that assistance workers eco-friendly inventiveness and superintendent who support workers ecological activities have been distinguishing in the organizational strategies in the United States and the Europe, where at GE Plastics in the Netherlands, Lucent Technologies in Pennsylvania, and Nestle Oy in Finland, helpful actions from superior in the direction of workers in Ecological Administration are seeing to motivate workers to give positive answers to the ecological issues (Ramus, 2001, p. 86–87).

Next reimbursements of workers commitment are development in workers and administrative health and safety, such as improvement of ecological workers. We suggest that observance the strategies in place, lasting-term belief

surrounded by the administration and the workers will be constructed which will give an opportunity to the workers to speak out their personal thinking of the workstation and assist to make weather contributing to ecological management strategies and methods.

Accordance with Lado and Wilson (1994) Human Resource Management Structure as a collection of distinct but consistent attitudes, operations, and that focus to appeal to, improve and preserve a company's Human Forces. The business associations normally categorize Human Resource strategies into a structure that are persistent with their civilization and organizational policies (Boselie et al., 2001). We may say that ecological endowments encompass in Human Resource Management policies are an element of Communal Environmental Responsibility in the long haul. At present, the business associations are applying and incorporating ecological beginnings in their schedule with the assist of their human forces. The executives create convinced that their Human Resource is using eco-friendly human Resource strategies in the apropos mod. Seeing that supplement to the declaration, more analytical peoples have recommended that it is significant to improve a better pact of scientific and administrative ability among every worker of the business association in sort to apply an efficient communal eco-friendly administrative methods in organizations (Daily, Bishop, & Govindarajulu, 2009; Unnikrishnan & Hegde, 2007).

Business associations are athwart the globe are embrace and functioning in the direction of Ecological Human Resource Management strategies to increase spirited recompense amid the commercial word. Entire implementation and incorporation of Ecological Human Resource Management in organizations are not possible other than demands a distorted move

towards the obtainable human resource strategies on the element of together the administration such as workers concurrently. The main part for human resource ecological decision makers could be to instruction to the directors in terms of obtaining a full workforce in the direction of applying ecological strategies which measure human resource demands to care of assistance and make links of issues-resolvers enthusiastic to play as alter the present status amends (Sathyapriya, Kanimozhi, & Adhilakshmi, 2014, p. 32). There are several problems connected to Ecological Human Resource Management that is to be in using into responsible by human resource department previous to applying eco-friendly proposal and, all of them can be not restricted contained y the particular statement.

Organizational citizenship behavior on greening:

Citizenship behavior is a significant tool to get a better outcome. The management can order their employees to do their work but the managerial citizenship behavior only can help to attain the goal in a proper and better way within a short time. Ecological attitudes in management are habitually founded on personal arbitrary proposals in use autonomously of proper administrative methods. Ideas in this field encompass recommendations for developing ecological effectiveness, paper reproduction, water and power reserves, and motor pooling. In supplement, the achievement of ecological programmer and behavior assumes the holdup and intentional commitment of workers. Intentional holdup can obtain an assortment of appearances, encompass contribution in ecological engagements and workers involvement to greenhouse gases avoidance procedures (Hanna, Newman and Johnson 2000; Jiang and Bansal 2003; Boiral 2007; Perez et al. 2009).

Most of the research is down with the concept of organizational citizenship behavior and customer satisfaction. Very few are available with the correlation of Green Human Resource Management and managerial citizenship behavior to bridge this review gap, this analysis discovers the consequence of professed ecological human resource management on workers non-green workplace results, as well as task performance, OCB towards the organization, and purpose to renounce. Non-green task performance may be defined as not relevant to green attitude- connected that contributes to developing business efficiencies and effectiveness. This study mainly concentrates on organization citizenship behavior may also be determined by dynamic related to co-worker such as co-workers' organization's citizenship behavior, which is Further the scope of this study. Workers purpose to quite has a major negative consequence on attaining organizational goals, therefore, it is vital to comprehend what drives a purpose to quit (Allen, Shore, & Griffeth, 2003; Maertz, Griffeth, Campbell, & Allen, 2007). Extending social identity theory (Tajfel & Turner, 1979), this study expands the arbitrating outcomes of organizational recognition (a motivational process) on the association among professed ecological human resource management and employee nonworkplace results. This examination gives a basis for complementing the underlying techniques of supposed human resource management practices in their functions of generating planned and unplanned workers workplace outcomes.

Corporate Environmental responsibility

The term Corporate Environment Relationship is derivates from the Corporate Social Responsibility. The organization has the responsibility to reduce the environmental harmfulness it's a part of CER. The organization which is following green practices they should watch their employee green activities, which in turn, the employee can take this kind of behavior in their private life also. So this work can quick reflect in the society. The Economic Times (2012), news accentuated the observation of former president Dr. APJ Abdul Kalam in Corporate Environmental Responsibility grand gathering arranged by Industry Body Assoc ham. Kalam said that business associations should dedicate some part of its aim to commercial armed forces. It could create obligatory for all the business to provide a part of its returns on Corporate Environmental Responsibility. Kalam takes about the anticipated bill on Corporate Ecological Responsibility. They counterfeit superior significance of CER in constructing the lives of the nation's citizens.

Windsor (2001), inspect the prospects of Corporate Environmental Responsibility (CER) or the link among the corporate and the community is extensive. The research populace strives to discover that whichever the business association and the civilization will come nearer to every supplementary in prospects or not and what will be the altering stage of Corporate Environmental Responsibility (CER). With the assist of a time gone by or precedent tendency of Corporate Environment Responsibility, Caroll"s method examines and in world circumstances, the researcher obligates trio nascent substitutes of Corporate Environmental Responsibility.

The perception of corporate social responsibility was acquired from organizational ethics; the concentration was at the commencement; by keep away from all category of inequity, pressuring on employees privileges in integrity, sprite, good working condition, (Tengblad & Ohlsson, 2009),and comprehensive outside to contribute in assessment conception and society welfare, donations ecological

maintenance (Sotorrıo & Sanchez, 2008). According to Campbell (2007), corporate social responsibility was illustrious all the way through; the first: business through their conclusion must not source any damage to any part of its interior and exterior shareholders, even as the second was that any unconstructive effect and damage caused by the business firm had to be thoroughly fixed.

Over the past ten years, the effects of business activities on the environment have been closely examining by various shareholders groups (Waddock, Bodwell, & Graves, 2002). Seeing these consequences, business firms are under developing force to execute ecological proposals, which are imperative features of corporate social responsibility (CSR; Jabbour & Santos, 2008). As a result, successful commitment to ecological aspects has grown to be a managerial compulsion, in addition, a vital source of managerial competitive advantage (Porter & Kramer, 2011). Efficiently organizing an organization's human resource (HR) plays an imperative role in the victorious execution of business strategies all the way through improving workers workplace approach and

behaviors (Guest, 2011; Huselid, Jackson, & Schuler, 1997; Kehoe & Wright, 2013). It has been recommended in the literature that business firms should take on effectual ecological human resource management (EHRM) to encourage and extract workers green attitude with the goal of attaining corporate green goals (Jackson & Seo, 2010; Renwick, Redman, &Maguire, 2013).

Hypotheses

Based on the reviews and the framework the hypotheses is formulated as

H1: There is a significant relationship between Green Human Resource practices and Corporate Environmental Responsibility

Research Methodology

The respondents are chosen from the textile industries of Coimbatore district. In this article, the researcher has used distributive analysis, correlation, and regression. Analysis has made with the use of Linkert scale in a structured questionnaire. The questionnaire was made with the consideration of the above model.

Demographic profile:

Attributes	Category	% of respondents
Gender	Male	72
	Female	28
Age	20-25	18
	25-30	24
	30-35	42
	35-40	16
Qualification	Under graduates	46
	Post graduates	54

The above table shows that the majority of respondents were male (72%) of the total sample and the remaining were female (28%). The employee belongs to the age of 30 to 35, 42% to the age of 25 to 30, 24% to the age of 20 to 25,

18% and the remaining are from the age of 35-40 it represents like 16%. 53% of employees are five years experienced and 32% of employees are six to ten years experienced and 8% of employees were experienced eleven to fifteen

years and the remaining are belongs to more   than fifteen years of experience category.

Association of a significant element of Green and Corporate Environmental Responsibility:

Correlation		Perceived organizational support on green	Engaging workers in greening	OCB towards greening	Corporate Environmental responsibility
Perceived organizational support on green	Pearson correlation	1	.351*	.101	.318**
	Sig.(2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Engaging workers in greening	Pearson correlation	.351*	1	.219**	.623**
	Sig.(2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
OCB towards greening	Pearson correlation	.101	.219**	1	.506**
	Sig.(2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
Corporate Environmental responsibility	Pearson correlation	.318**	.623**	.506**	1
	Sig.(2-tailed)	.000	.000	.000	.000
	N	100	100	100	100
*.correlation is significant at the level of 0.05(2-tailed)					
**.correlation is significant at the level of 0.01(2-tailed)					

Correlation analysis shows that there is a significant positive association between independent and dependent variables perceived organizational support on green (r=.318, p<0.01), engaging workers in greening (r=.623, p<0.001) and the OCB on green(r=.506, p<0.01).

The test result of regression analysis
Regression analysis
To find out the impression of Green Human Resource elements on the firm's Corporate Environmental Responsibility, regression analysis was used. In this analysis, the dependent variables were perceived organizational support, workers commitment in green, OCB towards Greening.

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.780	.518	.549	3.32009

a. predictors: (Constant), perceived organizational support, engaging workers in

Greening, OCB towards green

ANOVA (Green Elements and Corporate Environmental Responsibility)

Model		SS	df	MS	F	Sig.
1	Regression	17.214	7	14.865	54.813	.000[a]
	Residual	44.599	92	.179		
	Total	61.813	99			

a. dependent variable: Corporate Environment Responsibility

b. predictors: (constant) perceived organizational support on the green, engaging workers in Green, OCB towards green

From the result of regression analysis, the R square value is .518 and the adjusted R- square value is .549 The R-square value of 0.518 indicating that the given independent variables explain about 51.8% of the variance in Corporate Environmental Responsibility.

The ANOVA implies that the F- Statistics is 54.813 and the corresponding p-value is significant (0.05). This result indicates that there is a linear relationship between the independent variable and dependent variable. Therefore, the null hypothesis is accepted. There is a significant relationship between the firms Green Elements and the Corporate Environmental Responsibility.

Conclusion:

The green human resource management is a combination of human resource management and ecological commitment. The organization has to make plan for every new commitment. And they has to give proper assistant and their workers to follow new rules and regulations, on this basis this article has used four variables which is most relevant to the ecological studies, the result shows the ecological human resource management, organizational support on green, engaging workers in green, organizational citizenship in greening and corporate ecological responsibility are connected to each other

variables. The future direction of the study will be focused with the immediate superior support for the development of the organizational green practices.

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Leadership & Motivation

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Abstract: Leadership & Motivation are both interrelated things where Leadership reflects in physical world and Motivation is psychological process what to execute which makes the organization to run in profit section. Motivation is a internal feeling that includes every individual in an organization to perform the specific action. To cross check the action of performance or result of an action the Leadership is needed. The Leaders guide the followers not in a coercion order to achieve the specific goals.

1. **Introduction:** Leadership is the ability of an individual to influence, motivate and enable other to contributes towards the effectiveness and success of an organization. Leaders help and Motivate the employees to carry out their tasks enthusiastically and achieve the organization objective. Leaders are mainly responsible for the success or failure of the firms. An effective leader through his leadership process encourages and motivates the employees towards high performance. Motivation can be buildup in a person or a group by providing rewards and penalties, an individual with high motivation level experience high moral.

2. **Types of Leadership:**

Behavior is regarded as most important element of leadership style and distinguishes a leader from other elements

1. Autocratic leadership,
2. Participative & Democratic leadership &
3. Free rein style of leadership – Laissez – faire leadership

2.1 Autocratic leadership: In this style, leader takes decisions by own / themselves. Leaders are very confident in decision making and they feel that group members should act accordingly. Autocratic leader concentrate on completing the task oriented leader. An autocratic leader makes independent decisions, instructs and informs the employees about their task and carefully supervises them.

Ex:- China, North Korea

2.2 Participative & Democratic leadership: In this type of leadership style leader allow the group members to take part in decision making. This leadership style mainly characterized by involvement of employee in decision making. It was divided into 3 types

➔ Consultative Leadership Style

➔ Consensus Leadership Style

➔ Democratic Leadership Style Ex: India

2.3 Free Rein Style of Leadership: Free rein leadership style is also known as Laissez Faire - it is French word that "do not interface" . In this type of Leadership styles they provide complete authority to employees. These type of leaders do not take up any responsibility , they may take very huge time to take decision on regarding. This style is most suitable for the employees who seek motivation and experience to do the work.

3. Leadership Models

3.1 Ohio State Leadership Model:

By basing Leader Behavior Description Description Questionnaire (LBDQ) ,

According to this Model, superior behavior can be defined into two categories:

➔ Consideration : It is concern which a leader has towards his subordinates and

developing interpersonal relationships with them.

	High Structure & Low Consideration
HighLow Structure & High Consideration	High Structure & High Consideration
Low Structure & Low Consideration	High Structure & Low Consideration

High ... Low
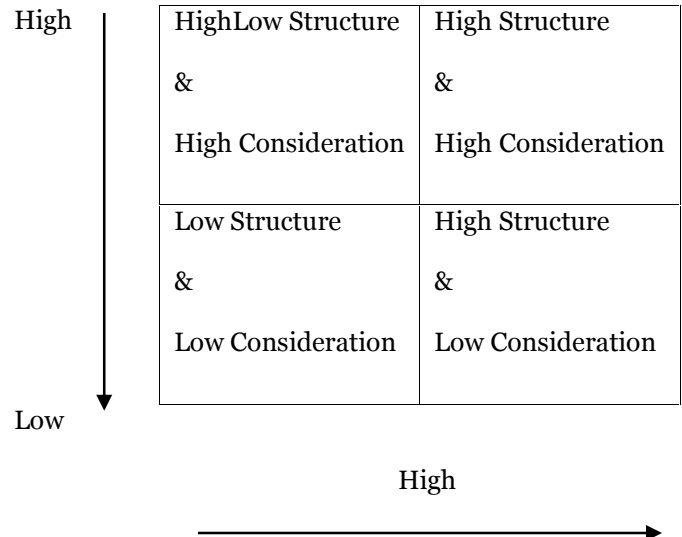
High →

1. The Leader who have high consideration are trustful, act in friendly and supportive manner, obtain respect and develop friendly relationship with the group members.

2. Whereas the leaders with low consideration are autocratic and has neutral or impersonal relationship with their group members.

➔ Initiating Structure :- This describes task oriented leaders. A leader provides guidance and direction to their subordinates, so that they can carry out their work activities in an effective manner their goals.

3.2. According to **Hersey Blanchard situational leadership model**

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Style 1	High task & Low relationship	Directing style
Style 2	High task & high relationship	Coaching Style
Style 3	High relationship & Low task	Supporting Style
Style 4	Low relationship & low task	Delegating style

3.3 According to **Path – Goal Theory of Leadership**

Leadership Style	Situation in which Appropriate
Directive	+ve effect on satisfaction and expectancies of subordinates working on unstructured task
Supportive	+ve effect on satisfaction and expectancies of subordinates working on unstructured tasks
Participative	+ve effect on satisfaction of subordinates who are ego involved with non repetitive task
Achievement	+ve effects on the confidence that the effort will lead to effective oriented performance of subordinates working on ambiguous and non repetitive

	task

4. Maslow's Hierarchy Theory for stages of climbing - Motivation

Here in this scenario of motivating the person to become or to achieve the desired stage he / she - him / her self motivate their own with the basis of

4.1 Very first to satisfy the Physiological needs to sustain him self for the lively hood which includes Shelter,Clothing, Food , Drinking Water etc.

4.2 The person Who satisfy's the first scenario then they will plan to make zone level to increase for second level where they motivate them selves to being to have a Safety life or Secured life like a Job for monthly rotation in the life etc

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4.3. The motivation as pet the Maslow's will turn up for to satisfy the desired one which is in between the Luxurious & Comfort

4.4 After Clarifying the emotional needs then plan to motivate and try to take a chance for Esteem one which is regarding with Prestigious of life purely into the High end luxurious zone

4.5 The Self desired position will reach in this stage by giving clarifying all the above stages.

5. Conclusion & Recommendation :

As Motivation is a physiological process and Leadership is a implementation for the process which motivate previously to got a Climb designation in the scenario, where the process of planning and motivating should be clear to reach the destination The Leadership skills approach takes into account the knowledge and abilities that the leader has. A leader can learn certain skills and turn himself into a remarkable one.

6. Out Comes

- Understand the nature of different approaches and models of leadership
- Understand the strengths and weaknesses of different approaches and models of leadership
- Analyse different models of leadership
- Compare different models of leadership

- Learning the Physiological motivation types and to implement

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A study on Awareness level of Ready to Eat Food Products in Rural places.

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ABSTRACT

The present article a detailed research of their awareness level of RTE product markets and their perception is done . The scope is limited to rural areas only. The entire Tamil Nadu has been considered for the study. Data were gathered from the view of the varied cross section of people with regard to the different regional categories like Villages, Panchayat union, Suburban of Rural people . Statistical Techniques such as Analysis of variance, non-parametric test was used for analysis of collected data. The Sampling technique adopted was convenient sampling. Concluded that socioeconomic changes such as lifestyle, habits and tastes, economic status, Education level, Transport Facility, Power facility, Mass media, Increase in income, and increase in expectations are more favorable towards the growth rural ready –to-eat foods market .

Keywords: *Rural places, consumers, Ready to Eat food, awareness level, perception*.

1.0 INTRODUCTION

Awareness of RTE foods in rural market refers the percentage of potential consumers or consumers who recognize the product. There are certain RTE food products frequently remembered by the consumers. A product which remembered by the consumer always is called Top-of-mind awareness (TOMA).. In Rural market TOMA is identified mainly by means of different channels of regional linguistic TV channels, whereas few advertisements in rural segments sometime may make false promises, are highly exaggerated and give incomplete descriptions of products. The consumption patterns are changing fast and rural consumers today are very clear about their choices regarding food, especially on RTE foods.

1.1 Statement of the problem: The Indian food sector growing popularity of ready-to-eat food products and the purchasing power of average Indians are increasing. The rural Indian market is very huge and hence the scope of the study is limited to Tamil Nadu state, south India. Since there is a demand in the rural areas and semi-rural areas for the RTE foods, this study was focused to consumers of RTE foods such as Confectionary Items (Biscuits, Cookies, and Bread, etc.,); through which it would explore the buying behavior of for RTE foods in rural markets of Tamil Nadu. Hence the research study was mater minded with the following objectives.

1.2Objectives of the study

1)To know the demographic profiles of rural consumers about RTE Foods.

2)To find out the RTE Foods awareness level of consumers in the rural market.

3)To suggest on the methods to improve the awareness of RTE food products in rural area.

2.0 REVIEW OF LITERATURE

Laddha.L (2012) explained that MNC's promoting Fast moving consumer goods in India promoting their products in rural areas. It created the most competitive situation between the promoters and consumers. Further Authors listed few companies such as Hindustan Unilever, Britania, Colgate and ITC are having notable presence of FMCG products where RTE Foods is not an exception. Amandeep Singh (2011), expressed that demographic factors for the market segment is independent, whereas the regular purchases are nearly same (apart from gender) for the samples collected by the author. He concluded that developing more effecting marketing segmentation basis is needed. Deccan Herald (2011) elucidated the increased lifestyle; food processing industry is critically responsible for making people nutritionally lazy.

Padmpriya Anand Irabatti (2011), explained the impact of Culture in the economic development of a country focusing food outlets. Research focuses cultural such as intermittent working hours, transit delays, and disturbed timings of meal mealtimes, increase in ready to eat meals, dual income families, purchase decisions by children, etc. and concluded that a vivid change in food habits noted that much changes at work in the society's lifestyles, perceptions. Richa, Chaudhary et al (2011) done their research by descriptive in method to achieve rural consumer market. Their research clearly states that Indian consumers are fully aware of "health is wealth". They concluded that the majority of customers feel that 'fibrous' products are key to stay in shape and there is huge growth potential for it. Ritu Anand, (2011) used primary data of youth consumers in the range of 20-40 years. According to the author variable for analysis are consumers taking food outside the home, Taste of the foods, multi-income families, school and college student's preferences of food. He concluded consumer's health should be prioritized than cost, quality, packing mode and priced to sustain in the market.

3.0 RESEARCH METHODOLOGY

3.1Sampling design: This study finds the awareness level of RTE foods market in rural areas of Tamil Nadu. Different educational level, Income level, buying pattern of consumers in Rural Tamil Nadu were considered. In this study Descriptive research was used.

3.2 Collection of data: First hand data were collected from the consumers of RTE foods from different regions through a questionnaire.

3.3. Primary data: Well-structured questionnaire designed for Primary data collection of consumers of RTE

foods. The Sampling technique adopted is convenience sampling. The whole Tamil Nadu has been considered for the study.

3.4 Secondary data: The data relating to rural markets, purchase behavior of the rural market, eating habits of Indian rural, rural marketing strategy and RTE foods market were collected from the journals, magazines, dailies, books related to rural marketing and web. The internet used after cautiously analyzing the contents and their limitations.

3.5statistical tools: Statistical Techniques such as Analysis of variance test was used for analysis of collected data.

3.6 Hypothesis: Focusing on the above research objectives, the undermentioned statistical hypotheses have been formulated to facilitate findings of the present study.

H01: The awareness of RTE foods is same irrespective of the gender of the respondents

Ho2: The awareness of RTE foods is same irrespective of regions of the Respondents.

Ho3: The awareness of RTE foods is same irrespective of place of residence respondents

4.0 ANALYSIS AND INTERPRETATION

4.1 Awareness of rural respondents

H01: Null Hypothesis: The awareness of RTE foods is same irrespective of gender of the respondents.

TABLE 4.1
ANOVA ON AWARENESS OF RTE FOODS BY RESPONDENTS' GENDER

RTE foods category	Gender	N	Mean	Std. Dev.	F Value	Sig
Potato chips (Lays, Bingo etc.,)	Male	352	3.74	1.01	5.05	.025*
	Female	125	3.98	1.02		
	Total	477	3.8	1.02		
Confectionary Items (Biscuits, Bread and cookies).	Male	352	3.78	0.98	3.579	0.059
	Female	123	3.98	0.98		
	Total	475	3.83	0.98		
Sauces,Jams,Ketchup	Male	347	3.22	0.93	0.02	0.888
	Female	121	3.24	1.16		
	Total	468	3.23	1		
Papads,Fried Dals (Haldiram, Pepsi moongdal etc.,)	Male	350	3.42	1.03	1.566	0.211
	Female	124	3.56	1.17		
	Total	474	3.45	1.07		
Readymade Masla, Pickles.	Male	348	3.2	1.26	2.366	0.125
	Female	123	3.41	1.3		
	Total	471	3.25	1.27		
Culinary Paste	Male	349	2.76	1.44	6.005	.015*
	Female	122	3.13	1.4		
	Total	471	2.86	1.44		
Readymade chappathies, Parota,Ediappam, Noodles.	Male	349	3.95	1.24	3.591	0.059
	Female	124	3.7	1.31		
	Total	473	3.89	1.26		
Any other	Male	37	3.3	1.29	0.55	0.461
	Female	23	3.57	1.47		
	Total	60	3.4	1.36		
Readymade chappathies, Parota,Ediappam, Noodles	Tirunelveli(T)	135	4.04	1.17	2.197	0.112
	Madurai(M)	156	3.89	1.3		
	Trichy (Tr)	191	3.75	1.29		
	Total	482	3.88	1.26		
Any other	Tirunelveli(T)	26	3.35	1.32	0.046	0.955
	Madurai(M)	19	3.37	1.21		
	Trichy (Tr)	17	3.47	1.55		
	Total	62	3.39	1.33		

Sources: Primary data

* Significant at 5% level.

Note: The responses do not tally with the sample as multiple of responses were received.

An analysis of the above table reveals that: Potato chips (Lays, Bingo etc.,): that the F Value is 5.050 and significance is 0.025. and it is <0.05. Hence null hypothesis is rejected and alternate hypothesis is accepted.

- Confectionary Items (Biscuits, Bread and Cookies):. The ANOVA output shows that the F Value is 3.579 and significance is 0.059. Since it is >0.05 Therefore the null hypothesis is accepted.

- Sauces, Jams, Ketchup: F Value is 0.020 and significance is 0.888. Since it is >0.05, the mean difference existing between genders about awareness of this RTE foods product is not significant at 5% level, the null hypothesis is accepted.

- Papads,Fried Dals (Haldiram, Pepsi-moongdal etc.,): F Value is 1.566 and significance is 0.211. Since it is >0.05, the mean difference existing between genders about awareness of this RTE foods product is not

significant at 5% level, the null hypothesis is accepted.

- Readymade Masala, Pickles: F Value is 2.366 and significance is 0.125. Since it is >0.05, the mean difference existing between genders about awareness of this RTE foods product is not significant at 5% level, the null hypothesis is accepted.
- Culinary Paste: F Value is 6.005 and significance is 0.015. Since it is <0.05, the mean difference existing between genders about awareness of this RTE foods product is significant at 5% level. Hence null hypothesis is rejected and, the alternate hypothesis is accepted.
- Readymade chappathies, Parota,Ediappam, Noodles: F Value is 3.591 and significance is 0.059. Since it is >0.05, the mean difference existing between genders about awareness of this RTE foods product is not significant at 5% level, the null hypothesis is accepted.

- Any other: F Value is 0.550 and significance is 0.461. Since it is >0.05, the mean difference existing between genders about awareness of this RTE foods product is not significant at 5% level, the null hypothesis is accepted.

Hence it is concluded by this research that there is no significance difference between male and female respondents about the awareness of RTE foods categories - Confectionary Items (Biscuits, Bread, cookies), Sauces, Jams,Ketchup; Papads,Fried Dals (Haldiram, Pepsi moongdal etc.,); Readymade Masala, Pickles; Readymade chappathies, Parota,Ediappam, Noodles, Any other as per their interest . But there is significance difference between male and female respondents awareness of RTE foods categories- such Potato chips (Lays, Bingo etc.,), and Culinary Paste. Perhaps the understanding of the products among the rural consumers (male and female) is not adequate and popularity of potato chips and culinary items has not significantly influenced them.

HO: 2 Null Hypothesis: The awareness of RTE foods is same irrespective of regions of the respondents.

Table 4.2Anova On Awareness Of Rte Foods By Respondents' Region

RTE foods category	Region	N	Mean	Std. Dev.	F Value	Sig
Potato chips (Lays, Bingo etc.,)	Tirunelveli(T)	137	3.96	0.97	3.255	0.039*
	Madurai(M)	157	3.66	1.03		
	Trichy (Tr)	194	3.82	1.02		
	Total	488	3.81	1.02		
Confectionary Items (Biscuits, Bread, cookies).	Tirunelveli(T)	136	3.89	0.96	1.414	0.244
	Madurai(M)	155	3.72	1.03		
	Trichy (Tr)	195	3.88	0.94		
	Total	486	3.83	0.98		
Sauces,Jams,Ketchup	Tirunelveli(T)	136	3.26	1	0.122	0.885
	Madurai(M)	156	3.24	1.07		
	Trichy (Tr)	187	3.2	0.94		
	Total	479	3.23	1		
Papads,Fried Dals (Haldiram, Pepsi moongdal etc.,)	Tirunelveli(T)	135	2.84	1.47	1.171	0.311
	Madurai(M)	155	2.72	1.43		
	Trichy (Tr)	192	2.96	1.39		
	Total	482	2.85	1.43		
Readymade Masla, Pickles	Tirunelveli(T)	136	3.31	1.27	0.636	0.53
	Madurai(M)	154	3.16	1.24		
	Trichy (Tr)	192	3.3	1.29		
	Total	482	3.26	1.27		
Culinary Paste	Tirunelveli(T)	136	3.4	1.47	5.828	0.003*
	Madurai(M)	157	3.24	1.43		
	Trichy (Tr)	192	3.63	1.39		
	Total	485	3.44	1.43		
Readymade chappathies, Parota,Ediappam, Noodles	Tirunelveli(T)	135	4.04	1.17	2.197	0.112
	Madurai(M)	156	3.89	1.3		
	Trichy (Tr)	191	3.75	1.29		
	Total	482	3.88	1.26		
Any other	Tirunelveli(T)	26	3.35	1.32	0.046	0.955
	Madurai(M)	19	3.37	1.21		
	Trichy (Tr)	17	3.47	1.55		
	Total	62	3.39	1.33		

Sources: Primary data
* Significant at 5% level.
Note: The responses do not tally with the sample as a multiple of responses were received.
After the analysis the ANNOVA table reveals that -

a)Potato chips (Lays, Bingo, etc F Value are 3.255 and significance is 0.039. Since it is <0.05, the mean differences existing between respondents' areas about awareness of this RTE foods product are significant at the

5% level, the null hypothesis is rejected and alternate hypothesis is accepted.

b)Confectionery Items (Biscuits, Bread and Cookies): F Value is 1.414 and significance is 0.244. Since it is >0.05, the mean differences exist between responses about awareness of this RTE foods product and are not significant at the 5% level. Hence the null hypothesis is accepted.

c)Sauces, Jams, Ketchup: F Value is 0.122 and significance is 0.885. Since it is >0.05, the mean differences exist between responses about awareness of this RTE food product and are not significant at 5% level. Hence the null hypothesis is accepted.

d)Papads,Fried Dals (Haldiram, Pepsi moongdal etc.,): F Value is 1.171 and the significance is 0.311. Since it is >0.05, the mean differences exist between responses' areas about awareness of this RTE foods product and are not significant at 5% level. Hence null hypothesis is accepted.

e)Readymade masala, Pickles: F Value is 0.636 and the significance is 0.530. Since it is >0.05, the mean differences exist between responses about awareness of this RTE foods product and are not significant at 5% level. Hence null hypothesis is accepted.

f)Culinary Paste: F Value is 5.828 and significance is 0.003. Since it is <0.05, the mean differences existing between responses about awareness of this RTE foods product and are significant at 5% level. Hence the null hypothesis is rejected and the alternate hypothesis is accepted.

g)Readymade chappathies, Parota, Ediappam, Noodles F Value is 2.197 and the significance is 0.112. Since it is >0.05, the mean differences exist between responses about awareness of this RTE food product and are not significant at the 5% level. Hence the null hypothesis is accepted.

Any other: F Value is 0.046 and significance is 0.955. Since it is >0.05, the mean differences existing between responses about awareness of this RTE food product and are not significant at the 5 % level. Hence the null hypothesis is accepted.

Therefore by this research study it is concluded that significance difference in awareness of RTE foods – categories- Potato chips (Lays, Bingo, etc.,); Cullinary paste among the respondents residing in different regions where the research was conducted. There is no significance difference in awareness of RTE food categories- Confectionary Items (Biscuits, Bread and Cookies); Sauces,Jams,Ketchup; Papads,Fried Dals (Haldiram, Pepsi moongdal etc.,);, Ready-made Masla, Pickles; ready-made chappathies, Parota, Ediappam, Noodles; respondents' interest in the different regions namely Madurai, Tirunelveli and Trichy.

Furhter Branded potato chips like Lays, Bingo and culinary paste likeTomato curry, Vathakulambu paste, Tamarind paste, dry fish curry, etc., were not clearly understood by the rural consumers whereas confectionary items, readymade chappathies, Idiappam, Paraota and Readymade masala, pickles, are known to them. Hence marketers should identify a proper strategy in rural areas to bring the awareness about their products.

Ho: 3 Null Hypothesis: The awareness of RTE foods is same irrespective of place of residence respondents.

.TABLE 4.3
ANOVA ON AWARENESS OF RTE FOODS BY RESPONDENTS' PLACE OF RESIDENCE

RTE foods category	Respondents' place of residence	N	Mean	Std. Dev.	F Value	Sig
Potato chips (Lays, Bingo etc.,)	Village	129	3.65	1.04	4.06	.018*
	Panchayat Union	219	3.78	1		
	Sub-urban	101	4.03	1		
	Total	449	3.8	1.02		
Confectionery Items (Biscuits, Bread, cookies).	Village	127	3.69	1.04	2.278	0.104
	Panchayat Union	218	3.83	0.96		
	Sub-urban	102	3.96	0.92		
	Total	447	3.82	0.98		
Sauces, Jams, Ketchup	Village	128	3.23	0.96	0.101	0.904
	Panchayat Union	216	3.19	1.01		
	Sub-urban	96	3.24	0.97		
	Total	440	3.22	0.98		
Papads, Fried Dals (Haldiram, Pepsi moongdal etc.,)	Village	128	3.37	1.07	0.707	0.494
	Panchayat Union	219	3.39	1		
	Sub-urban	99	3.53	1.2		
	Total	446	3.41	1.06		
Readymade Masla, Pickles	Village	128	3.87	1.29	2.188	0.113
	Panchayat Union	216	4.02	1.19		
	Sub-urban	99	3.72	1.26		
	Total	443	3.91	1.24		
Culinary Paste	Village	126	2.61	1.49	5.716	.004*
	Panchayat Union	218	2.74	1.44		
	Sub-urban	99	3.22	1.23		
	Total	443	2.81	1.43		
Readymade chappathies, Parota,Ediappam, Noodles	Village	128	3.87	1.29	2.188	0.113
	Panchayat Union	216	4.02	1.19		

	Sub-urban	99	3.72	1.26		
	Total	443	3.91	1.24		
Any other	Village	19	3.11	1.29	0.652	0.525
	Panchayat Union	32	3.53	1.34		
	Sub-urban	8	3.5	1.31		
	Total	59	3.39	1.31		

Sources: Primary data

* Significant at the 5% level.

Note: The responses do not tally with the sample as a multiple of responses were received.

An analysis of the above table reveals that:

a)Potato chips (Lays, Bingo, etc.,): F Value as 4.060 and the significance is 0.018. Since it is <0.05, the mean differences existing between respondents' category about awareness of Potato chips, which is products are significant at 5% level. Hence the null hypothesis is rejected and alternate hypothesis is accepted.

b)Confectionary Items (Biscuits, Bread and Cookies): F Value as 2.278 and the significance is 0.104. Since it is >0.05, the mean differences existing between respondents' place category about awareness of this Confectionary Items which is not significant at 5% level. Hence the null hypothesis is accepted.

c)Sauces,Jams,Ketchup: the F Value as 0.101 and the significance is 0.904. Since it is >0.05, the mean differences existing between respondents' place category about awareness of this Sauces, Jams, Ketchup which is not significant at 5% level. Hence the null hypothesis is accepted.

d)Papads,Fried Dals (Haldiram, Pepsi moongdal etc.,): F Value as 0.707 and the significance is 0.494. Since it is >0.05, the mean differences existing between respondents' place category about awareness of this Papads, Fried Dals which is not significant at 5% level. Hence the null hypothesis is accepted.

e)Readymade Masla, Pickles: F Value as 2.188 and significance is 0.113. Since it is >0.05, the mean differences existing between respondents' place category about awareness of Readymade chappathies, Parota, Ediappam, Noodles which are not significant at 5% level. Hence the null hypothesis is accepted.

f)Culinary Paste: F Value as 5.716 and significance is 0.004. Since it is <0.05, the mean differences existing between respondents' place category about awareness of Culinary paste which is significant at the 5% level. Hence the null hypothesis is rejected and the alternate hypothesis is accepted.

g)Readymade chappathies, Parota,Ediappam, Noodles: F Value as 2.188 and significance is 0.113. Since it is >0.05, the mean differences existing between respondents' place category about awareness of ready-made chappathies, Parota, Ediappam, Noodles which are not significant atthe 5% level. Hence null hypothesis is accepted.

h)Any other F Value as 0.652 and significance is 0.525. Since it is >0.05, the mean differences existing between respondents' place category about awareness of any other than mentioned above significant at 5% level. Hence null hypothesis is accepted.

5.0 FINDINGS OF THE STUDY

Awareness of RTE foods and respondents' gender, region, and place of residence.

Ho 1 - The awareness of RTE Foods is same irrespective of gender of the respondents.

1)Statistical analysis of the responses given by respondents clearly states that male and female respondents are same about the awareness of RTE food categories -Confectionary Items (Biscuits, Bread, Cookies), Sauces, Jams, Ketchup; Papads,Fried Dals (Haldiram, Pepsi moongdal etc.,), Readymade Masala, Pickles, Readymade chappathies, Parota,Ediappam, Noodles, Any other as per their interest, whereas male and female respondents awareness are different for RTE food categories- such Potato chips (Lays, Bingo etc.,), and Culinary Paste. This is due to, the understanding of the products among the rural consumers (male and female) is not adequate and popularity of potato chips(Lays, Bingo etc.,), and culinary paste has not significantly influenced them.

Ho2 - The awareness of RTE foods is same irrespective of regions of the respondents.

2)As per the analysis, respondents' awareness in the different regions namely Madurai, Tirunelveli and Trichy are same of RTE foods – categories- Confectionary Items (Biscuits, Bread, Cookies), Sauces, Jams, Ketchup; Papads, Fried Dals (Haldiram, Pepsi moongdal etc.,), Ready-made Masala, Pickles, Ready-made chappathies, Parota, Ediappam, Noodles; whereas Potato chips (Lays, Bingo etc.,); Culinary Paste are not same. Hence it is concluded that Branded potato chips like Lays, Bingo and culinary paste likeTomato, curry, Vathakulambu paste, Tamarind paste, dry fish curry etc., were not clearly understood by the rural consumers whereas confectionary items, ready-made chappathies, Idiappam, Paraota and Ready-made masala, pickles, are known to them. Hence marketers should identify a proper strategy in rural areas to bring the awareness about their products.

Ho3 - The awareness of RTE foods is same irrespective of place of residence of the respondents.

3)The respondents were grouped according to their place of residence, namely, villages, panchayats, and sub-urban and the responses were analysed on their awareness on RTE foods. Statistical analysis clearly states that respondents' awareness of RTE Foods – categories- Potato chips (Lays, Bingo etc.,), Culinary Paste are not same across the respondents different place of residence such as villages, panchayats and sub-urban of the selected sample regions however the awareness is same for Confectionary Items (Biscuits, Bread, Cookies); Sauces, Jams, Ketchup; Papads, Fried Dals (Haldiram, Pepsi moongdal), Readymade Masala, Pickles; Readymade chappathies, Parota, Ediappam, and Noodles. Therfore, all the respondent's place of residence had similar awareness about confectionary item, breads, sauces, Jams, ketchup, chips and other RTE foods items except Readymade masala, pickles and culinary paste.

6.0 SUGGESTIONS

Responses to RTE foods shows that the rural consumers population of male are higher than female , hence new variety of products attracting them to be introduced in the

market.Rural consumers are always keen on value for the money, hence more quantity than the prescribed net weight to be served not only on the specific period but also during all seasons in rural market.Unlike the individual rural consumers, always keen on price, the family purchasers are keen on quality. Hence marketers should capitalize the chance of promoting bulk-family packing with special quality RTE foods.Product visibility is a must for rural consumers. Product packing appealing is good as per the perception rural consumers.

7.0 CONCLUSION : In case of rural market Top-of-Mind of rural consumers are unpredictable due to various factors such as perceptions of the product, utility, bulk packing, money for value and location. Different mode of awareness is necessitated for the marketers to influence the customers in case of gender.Due to Income level raise and more awareness due to mass media, the rural lower middle class with monthly earnings of rupees 7500-10000 spending more on thirty five percent of their purchase occasions. Socioeconomic changes such as lifestyle, habits and tastes, economic status,, Education level, Transport Facility, Power facility, Mass media, and Increase in expectations are more favorable towards the growth of rural ready –to-eat foods market. Sustained , different and modified awareness strategies by marketers to register their product and brand name in the mind of consumers to have repeated purchases and enhance the good will of the company as well.

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Multilevel Analysis of Retail e-shopper Based on Socioeconomic Variables: An Online Shopping Perspective

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Abstract

The paper is aimed to investigate the influence of an individual's socioeconomic characteristics such as urban-rural dichotomy, education level and income on their online purchase behaviour. For accomplishing the objectives, the study adopted a survey by questionnaire method for collection of data from a sample of 660 respondents in the state of Jammu and Kashmir. Quota sampling technique was adopted for obtaining a sample from the population of consumers with some experience and knowledge about online shopping. Hypothesis testing was performed by employing one way ANOVA and Tukey's HSD. The results depict that there exists a significant difference in the perception of consumers across various education level and urban-rural dichotomy towards online purchase intention. Urban consumers were found to have a higher score for e-shopping intention than rural consumers; also higher education consumer were found to have a positive intention towards online shopping than lower education consumers. Online retailers can apply the present research

Keywords: Online purchase intention, urban-rural dichotomy, education level, income and ANOVA

Introduction

In the current scenario, the Internet is influencing the daily lives of the people to a larger extent. The successful implementation of 'Digital India' Program has resulted in internet awareness, low priced data packs and affordable smartphones (Rawat, 2018). Consequently, enhancing the accessibility of internet to cities as well boosting rural internet accessibility. According to Internet and Mobile Association of India (IAMAI), the number of internet users has reached to more than 500 million by June 2018 compared to 481 million in December 2017. Urban India has a population of 455 million with an internet user base of 295 million whereas rural India has a population of 918 million and has only 186 million internet users (Census, 2011). These data figures indicate that there is still a potential of 732 million users in rural India. To harness this rural internet potential, Reliance Jio, which has launched last year, has come up with very economical internet data packs. After this Reliance Jio's revolutionary program, all other telecom companies were forced to launch their data packs at cheaper rates (Rawat, 2018). It is revealed from the above lines that internet penetration in urban areas is much higher than rural areas as compared the population in these areas resulting in more acute Urban-Rural Digital divide (Agarwal, 2018). Digital literacy is key for internet marketing companies to ensure that everyone stays informed, safe and engaged in online shopping. Therefore, the focus should be more on bridging the digital divide that exists between the urban and rural India.

It is deciphered from the literature that relationship with internet and degree of usefulness & innovation are the key factors which determine how quickly an internet user can

become an internet shopper (Citrin *et al.*, 2000; Vrechopoulos *et al.*, 2001). In spite of these facts, there is a sizable portion of the internet users who base their purchase decision in the offline mode of establishments by taking into consideration the information they had obtained from the internet. The information made available on the online shopping portals is therefore crucial for success and failure of the internet shopping channel (Bigne-Alcaniz *et al.*, 2008). Consumers often draw comparison and nexus regarding the different brand attributes on the basis of information made available by the online marketers. India is one of the fastest growing market for e-commerce business. It has transformed the business operation in India. The e-commerce sector is expected to grow from USD 38.5 billion by 2017 to USD 200 billion by 2026. The revenues of the India's e-commerce industry is expected to jump from USD 39 billion in 2017 to USD 120 billion in 2020, with an annual growth rate of 51 per cent, which is highest in the world. The various initiatives taken by the government of India like 100 percent FDI in B2B e-commerce, Digital India, Startup India, Make in India, Skill India etc. have further boosted the e-commerce sector in India. Contrary, e-market environment poses special challenges to e-retailers thereby motivating them to continuously revise their marketing tactics and strategies for securing more competitive position in the market (Kim and Kim, 2004). Researchers (Li and Gery, 2000; Reda, 2001; Hui and Chau, 2002; Hernandez *et al.*, 2011) have contended that consumer behaviour regarding online retailing is influenced by product attributes, nature of internet, uniqueness of distribution channel and socio-economic characteristics of the consumer. Bellman *et al.* (1999) studied the relationship among demographics, personal characteristics and attitudes towards online retail shopping. It was observed that consumers with more dynamic lifestyle are more inclined towards excessive online buying, i.e., those who use the Internet as a routine tool and/ or those who are more time starved prefer shopping on the Internet. It was also examined by the researchers (Bhatnagar *et al.*, 2000) that how demographics, vendor/ service/ product attributes and website quality influence the attitudes of consumer towards online shopping. It was observed that convenience of the Internet buying and risk perceived by the consumers are related to the two dependent variables (attitudes and behavior) positively and negatively, respectively. Some studies have explained the influence of IT characteristics such as usefulness and ease of use and security on attitude of online consumer (Davis, 1989; Yu *et al.*, 2005) other schools of researchers focus on enjoyment and experience of users (Agarwal and Prasad, 2000; Fiore and Kim, 2007) and a third group attempts to investigate socioeconomic user characteristics, such as age, gender, income education level and place of residence in explained the behaviour of online consumer. Marketers have been employing the various consumer characteristics for market segmentation and targeting (Bigne *et al.*, 2005). The above discussions depict the rapid growth of online marketing business in India but has brought in both opportunities and challenges to the e-marketers operating in e-commerce

space. Therefore, it is crucial to understand the various drives which compels Indian consumers to shop online in order to frame various marketing strategies that cater their changing needs and lifestyles and improve their overall consumer's shopping experience and satisfaction.

The perusal of the majority of literature on online shopping has indicates that online shopping behaviour has mostly been studies in western context, far less is known about the other parts of world (Stafford *et al.*, 2004). Furthermore, most of the studies have taken for granted the importance of socio-economic variables while studying online consumer's attitude (Gefen *et al.*, 2003). The paper intends to fill this knowledge gap by empirically investigating the influence of socio-economic determinants on the online shopping behaviour of an Indian consumers. The objective of the present study is to test the influence of socio-economic variables such as urban–rural dichotomy, income disparity and education level on the behaviour of online consumer.

Literature Review

Urban-rural dichotomy affects the usage of information technology and attitude of consumer towards online shopping (Cullen, 2003). Accordingly, socio-economic status is an important predictor of perceived ease of incorporation web in their day to day lives (Hargittai, 2010). It has been observed that users in the same region have same background information environment, therefore while analyzing attitude of an online consumer due consideration should be given to the environment of different regions to which the consumer belongs (Hsieh *et al.*, 2013). 'Online shopping attitude' refers to the mental and psychological state of a consumer in terms of making online purchases while online purchase behaviour refers to the whole process from information search to the post purchase evaluation of a purchase made by online consumer (Li and Zhang, 2002). Bhattacherjee (2000), Lin (2007), Yulihasri (2011) and Liao and Cheung (2011) have deciphered that favourable attitude of consumer towards online shopping influences their online shopping intention and behaviour. Numerous factors have been identified in several studies by the researchers that influence the consumer's online shopping behaviour in light of consumer demographics (Brown *et al.*, 2003; Alam *et al.*, 2008), cultural factors (Ko *et al.*, 2004), psychological factors (Lin, 2007; Lian and Lin, 2008), trust factors (Teo and Liu, 2007; Phung *et al.*, 2009; Jemaa and Tournois, 2009), and perceived risk factors (Forsythe and Shi, 2003; Naiyi, 2004; Ghasemaghaei *et al.*, 2011; Almousa, 2011). Brown *et al.* (2003) have found that gender has a marginal impact on the intention of a consumer to purchase online. Ko *et al.* (2004) carried out a cross-cultural study to observe the difference towards perceived risk across different countries regarding online shopping. The various socioeconomic and online shopping variables that have been undertaken by the study are discussed below.

Socioeconomic variables

Socioeconomic variables are often being studied in online shopping research. Literature provides evidence that consumer demographics such as gender, age, income, urban-rural dichotomy, education level and marital status are

associated with online shopping behaviour (Zhou et al., 2007; Liebermann and Stashevsky, 2009).

Well-educated consumers are more likely exposed to internet technology and have more confidence in adopting the internet as a medium for shopping (Hui and Wan, 2007). Some researchers have identified mixed effects of education level on online shopping intention (Gong *et al*., 2013), while others have reported a positive effect of education level on online shopping (Liao and Cheung, 2001; Swinyard and Smith, 2003; Susskind, 2004). However, some researchers have not observed any influence of education level (Bellman *et al*., 1999; Donthu and Garcia, 1999; Mahmood *et al*., 2004, Liebermann and Stashevsky, 2009). In light of the above cited literature following hypothesis has been formulated:

> **H1**: Higher the education level of a consumer, the more likely they will prefer online shopping.

Income is another consumer characteristic that has attracted a considerable amount of research in the online shopping (Allard *et al*., 2009; Shin, 2009). Numerous studies have considered income as a determining factor of online shopping behaviour, but some studies have found contradictory results (Raijas and Tuunainem, 2001; Lu *et al*., 2003; Al-Somali *et al*., 2009). Higher income consumers show more inclination towards online purchases whereas lower income discourages online transactions, such consumers are more apprehensive towards the online risks (Hernandez *et al*., 2011). Researchers have found that income reflect the particular social class of an individual, such categories may produce different user attitudes and behaviours regarding online shopping (Hubona and Kennick, 1996; Chau and Hu, 2002). Online shoppers tend to have a higher income than traditional shoppers (Mahmood *et al*., 2004; Susskind, 2004; Doolin *et al*., 2005). Hence we propose:

> **H2**: Higher the income of a consumer, the more likely they will prefer online shopping.

Cullen (2003) has observed that urban and rural differences influence the attitude of the online consumer. Different regions have varied infrastructures, economies, populations and standard of life (Mills and Whitacre, 2003). This has a counteractive effect on the divergence among consumers' towards internet usage patterns and online shopping patterns (Wilson *et al*., 2003; Yeh *et al*., 2012). Shoppers in the same region have the same background environment; therefore marketers should take into consideration the environment while investigating the online behaviour across the different regions (like rural vs urban). It has been found that rural consumers have less exposure and are little conscious about their personal information (Potoglou *et al*., 2015). On the basis of these discussions we propose:

> **H3**: There is a significant difference in the perception of urban and rural consumers towards online shopping intention.

Purchase intention can be understood as the probability of a consumer to purchase a specific product/service. Marketers often use purchase intention as an antecedent of purchase behaviour (Morwitz and Schmittlein, 1992; Schiffman and

Kaunk, 2000). Purchase intention is influenced by a number of factors such as perceived price, perceived risk, socioeconomic characteristics of consumer etc. (Zeithaml, 1988; Garretson and Clow, 1999; Kotler, 2003). With the tremendous growth of e-commerce, the concept of purchase intention has been extended to online consumer behaviour analysis (Harris and Goode, 2010; Lim, 2015; King *et al*., 2016). In light of the above discussed literature, the study has proposed a conceptual framework which includes socioeconomic variables (income, education level and urban-rural dichotomy) and online purchase intention (Figure 1).

Socioeconomic V	Online Purchase Intention
Income Disparity	
Education Level	
Urban-Rural Dichotomy	
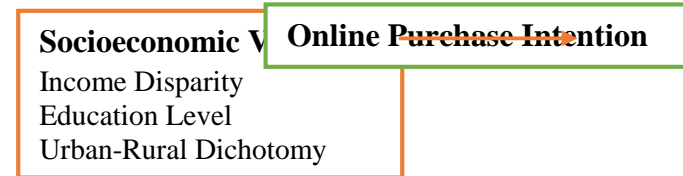
Figure 1: Conceptual Framework

Methodology

Data Collection and Sample

The data for the present study has been collected through a survey by questionnaire method from the population of e-shoppers in the state of Jammu and Kashmir by adopting both web-based as well as distributing questionnaires among the online shoppers. The questionnaire used was divided into two sections- first section includes socioeconomic variables (urban-rural dichotomy, income and education level) and the second section includes statements regarding online shopping intention. A total of 383 responses from an offline survey and 291 responses from online survey were obtained. However, 12 questionnaires from offline survey were incompletely filled so were dropped from the analysis. The final sample size from both online and offline mode was 660. The criterion adopted for sample size determination was based on the number of items in the questionnaire. For each item, there should be 5-10 respondents (Hinkin, 1995; Hair *et al*., 1998). Since the present instrument has 8 items, a sample size of 80 is appropriate according to the above mention criterion. A sample size of 660 taken by the present study is more than sufficient. Before the final data collection, pre-testing of the instrument was carried out to ensure validity and reliability. Validity was ensured through face validity and content validity by taking feedback from both the academic and industry experts regarding the contents of the questionnaire. The suggestion so received were meticulously incorporated in the questionnaire. Reliability of the instrument was established through Cronbach's Alpha which comes out to be 0.863 (above the threshold of 0.70).

In order to guarantee due to representativeness to the population, quota sampling technique was adopted, according to the market share of online retailers such as Flipkart, Amazon, Snapdeal and others. Flipkart has 45 percent market share and is assigned as sample size of 297;

Amazon has a 24 percent market share and is assigned a sample size of 159; Snapdeal has 16 percent and is assigned a sample size of 106 and others have 15 percent market share and gets 99 sample size proportion out of the total 660 (CII, 2016). The others include Jabong, Paytm, HomeShop 18, Shopclues, OLX, etc. The sample frame for the study was obtained from the parcel delivery companies such as E-com express, JV express, Bluedart etc. which provides the logistic solution to the online retailers in the state of Jammu and Kashmir.

Operationalization of Variables

Dependent Variables

The dependent variable, online purchase intention, was operationalized as a formative construct consisting of 8 items/statements measured on a 5-point Likert scale bounded between strongly agree to strongly disagree. The variable was not addressed to any specific product category or to any specific e-retailer but included broad range statement encompassed online retailing.

Socioeconomic Variables

Education level was operationalized as discrete variable with five response categories. The different response categories include- secondary, higher secondary, graduate, postgraduate and above postgraduate. Secondary and higher secondary were considered lower education level; graduation as middle education level; and post-graduation and above post-graduation as higher education level.

Income was operationalized as the monthly family income of the household to which the consumer belongs. An ordinal scale consisting of five response categories was used the measure the household income of the consumers. The response categories below the third category were encompassed as lower income and above were encompassed as higher income categories. The third category was considered as middle income category.

Urban-rural dichotomy was operationalized as a categorical variable consisting of two response categories such as urban and rural regions to which the consumer belongs. There is difference in the availability of infrastructure required for online shopping between urban and rural regions like telecommunication, internet access etc. which may influence the online shopping intention.

Results and Discussions

Descriptive analysis of both the dependent variables (online purchase intention) and predictor variables (education level, income, urban-rural dichotomy) was carried out to understand the basic underlying structure of the data. Table 1 provides the results of the descriptive analysis in the form of percentage distribution, mean and standard deviation of the 8 items under online purchase intention. Percentage distribution results reveal that 70 percent of responses fall in the strongly agree and agree region, nearly 20 percent fall in neutral region and 10 percent fall in disagree and strongly disagree region. The highest mean score was observed for OPI7 (3.85) and the lowest mean score for OPI6 (3.70). The standard deviation of OPI4 and OPI5 is slightly above 1 while the rest item have below 1, indicating less variability in the dataset. These results interpret that majority of the

consumers have positive intention towards online purchase because they feel that it is convenient and easy to buy products online than searching and buying a product through traditional means of shopping. Consumers agree that their shopping goals will be easily and quickly accomplished by online shopping. The positive intention held by the consumers will improve their shopping experience which will enhance the recommendatory power of the consumer through positive word-of-mouth. These findings are in alignment with the finding of Lee and Lin (2005) and Chiu *et al*. (2009).

Table 1: Results of Descriptive Statistics of Online Purchase Intention

Item Codes	Item Statements	SA	A	N	DA	SDA	Mean	SD
OPI 1	I will prefer online shopping in future.	25.3	43.5	22.1	5.5	3.6	3.81	.993
OPI 2	I plan to buy more products from e-stores.	22.1	48.2	18.8	7.1	3.8	3.78	.993
OPI 3	I hold a positive intention of online shopping.	20.9	46.4	21.5	7.9	3.3	3.74	.986
OPI 4	I will strongly recommend others to purchase via e-stores.	23.3	44.5	19.7	6.8	5.6	3.73	1.066
OPI 5	I believe shopping at e-stores is a wise idea.	20.9	45.8	20.6	9.1	3.6	3.71	1.012
OPI 6	The e-stores encourage and build customer confiden	19.8	43.9	24.2	9.8	2.1	3.70	.967

	ce.						
OPI 7	I feel that online shopping websites would be easy to buy products.	23.8	48.2	19.1	7.6	1.4	3.85	.914
OPI 8	Online shopping makes me accomplish my shopping goals more quickly.	20.8	45.5	22.3	9.2	2.3	3.73	.966

The descriptive analysis of socioeconomic variables i.e. urban-rural dichotomy, education level and monthly household income is being presented in the form of frequency, mean, standard deviation, percentage and cumulative percentage in Table 2. Sample results reveal that 55 percent of the consumer belong to rural areas a d 45 percent belong to urban areas. The highest mean score was observed for urban consumers (3.83) and lowest for rural consumers (3.70). The standard deviation of both the response categories was below .715, indicating less variations in the dataset. Further Z-test was applied to test the hypothesis H3 regarding the influence of urban-rural dichotomy on the online purchase intention. Hypothesis testing resulted are shown in Table 3, which depict that there exists a significant difference between the urban and rural consumers towards online purchase intention (Z-value = 2.63 and Sig. = .014). Therefore, hypothesis H3 is supported that there is significant difference in the perception of urban and rural consumers towards online shopping intention. The results can be attributed to the fact that urban residents are more familiar with the usage of credit card while using the internet and online shopping. People in urban areas use online services more often than in rural areas. This is due to the fact that infrastructure in urban areas is well established whereas people in rural areas have limited options available; therefore they are more used to the traditional mode of payment and shopping. One of the prime reason for the low mean score of rural consumers is attributed to the non-availability of parcel delivery (both pick and drop) service in the rural and far flung areas. These findings are in context to the findings of Hsieh *et al*. (2013).

Table 2: Results of Descriptive Statistics of Socioeconomic Variables

Sample Category	Frequency	Mean	Standard Deviation	Percentage	Cumulative Percentage
Urban-Rural Dichotomy					
Urban	297	3.83	.692	45	45
Rural	363	3.70	.713	55	100
Education Level					
Secondary	10	3.81	.819	1.5	1.5
Higher Secondary	87	3.43	.689	13.2	14.7
Graduate	197	3.74	.676	29.8	44.5
Post Graduate	243	3.92	.673	36.8	81.4
Above Post Graduate	123	3.68	.737	18.6	100
Monthly Family Income ( )					
Below 10000	123	3.67	.663	18.6	18.6
10001-30000	75	3.84	.667	11.4	30.0
30001-50000	51	3.74	.761	7.7	37.7
50001-70000	386	3.75	.731	58.5	96.2
Above 70000	25	3.75	.708	3.8	100

Descriptive analysis results of education level are presented in the form of percentage, mean and standard deviation across the various response categories in Table 2. Sample results reveal that highest percentage of respondents belong to Postgraduate (36.8 percent) and the lowest number of respondents belong to Secondary (1.5 percent). The highest mean score was observed for Postgraduate (3.91) and the lowest mean score was observed for Higher secondary (3.43) among the five response categories of education level. The standard deviation of all the response categories was below .820 indicating less deviation from the mean. To test whether there exists any significant difference across the various categories of education level one way ANOVA was performed to test the same. The result from ANOVA are presented in Table 3 which reveal that there exists a significant difference in the intention of consumers across the various response categories of education (F-value = 8.72 and Sig. = .000). It is clearly deciphered from both the descriptive and ANOVA tables that highly educated consumers (Postgraduate) have higher mean as compared to the less educated consumers (Secondary). Therefore, hypothesis H1 is supported that higher the education level of a consumer, the more likely they will prefer online shopping. The results are attributed to the fact that people with higher

education are more technology savvy and well interacted with the internet, therefore, adopt online shopping with greater ease than less educated consumers. The findings reinforce the results of Susskind (2004) and Hui and Wan (2007) who have found higher education develops wisdom among consumers and builds more confidence and trust in using internet channel for online shopping.

Table 3: Results of ANOVA

Dependent Variable- Online Purchase Intention						
Source of Variation	Sum of Squares	df	Mean Square	Z/ F	Sig.	Decision
Urban-Rural Dichotomy						
Equal Variance Assumed		658		2.63	.014	H3 supported
Equal Variance not Assumed		639.18		2.47	.014	
Education Level						
Between Groups	16.64	4	4.16	8.72	.000	H1 supported
Within Groups	312.25	655	.477			
Total	328.89	659				
Monthly Family Income ( )						
Between Groups	2.65	4	.664	1.33	.256	H2 not supported
Within Groups	326.23	655	.498			
Total	328.89	659				

Since a significant difference was observed across the various education levels towards online purchase intention, Post hoc (Tukey HSD) was performed for multiple comparisons to locate the combinations with a significant mean difference. Post hoc results are presented in the Table 4 which reveal that significant mean difference occurs between higher secondary and graduate; higher secondary and postgraduate; graduate and postgraduate; and postgraduate and above postgraduate. It is observed that postgraduate and above postgraduate are the two education level groups with highest mean score among all the paired combinations. This is due to the fact that most consumers prefer online shopping over offline shopping. Further, postgraduate consumers are more responsible and have a higher degree of intellect than graduate and higher secondary consumers, therefore, are more confident about online purchase and consider it a wise idea to shop online. Higher education consumers are also of the opinion that

delivery of right products should be first preference of web store. These findings are in accordance with the observations of Li *et al*. (1999), who have found a positive correlation between education and individual's level of internet literacy. Furthermore, higher education consumers prefer to have more product information available on the online shopping portals because they are more conscious about the quality, durability and usability of products displayed on the web store. However, low education group consumers access the web store for entertainment and enjoyment. Therefore, information made available on the online shopping portals is therefore crucial for success and failure of the internet shopping channel (Bigne-Alcaniz *et al*., 2008).

Table 4: Results of Multiple Comparisons of Significant Variables on the Basis of Education Level (Tukey HSD)

Dimensions	(I) Education Level	(J) Education Level	Mean Difference (I-J)
Online Purchase Intention	Secondary	Higher Secondary	.381
		Graduate	.074
		Postgraduate	-.110
		Above Postgraduate	.129
	Higher Secondary	Graduate	-.308*
		Postgraduate	-.491*
		Above Postgraduate	-.253
	Graduate	Postgraduate	-.184*
		Above Postgraduate	.055
	Postgraduate	Above Postgraduate	.238*

*Note: * indicates that mean difference is significant at the 0.05 level.*

The descriptive statistic results of monthly family income are presented in Table 3. Sample results reveal that the highest percentage of respondents fall in the 50001-70000 group (58.5 percent) and lowest percentage of respondents fall in the Above 70000 response group (3.8 percent). The highest mean score was observed for 10001-30000 income group (3.84) and the lowest mean score was observed for Below 10000 income group (3.67) among the five response categories of monthly family income. The standard deviation of all the response categories was below .760 indicating less deviation from the mean. To test whether there exists any significant difference across the various categories of monthly family income one way ANOVA was performed to test the same. The results from ANOVA are presented in Table 3 which reveal that there exists an insignificant difference in the intention of consumers across the various response categories of monthly family income (F-value = 1.33 and Sig. = .256). Therefore, hypothesis H2 is not supported that higher the income level of a consumer, the more likely they will prefer online shopping. The findings are in against the findings of Mahmood *et al*. (2004);

Susskind (2004) and Gong *et al.* (2013) who have found a positive influence of income on the usage of internet as the online shopping channel.

Conclusion and Implications

Majority of the research in this subject has mostly focused on the TAM, web design and other security measures, but the current development on the online shopping research and the electronic shopping channel nullify the importance of socioeconomic variables as predictors of online shopping intention. The study has only focused on the socioeconomic variables (urban-rural dichotomy, income, & education level) as predictors on online purchase intention. Therefore, the primary conclusion of the present study is that socioeconomic variables are having a crucial influences in the understanding of online shopping behaviour and ceased to be discriminant. The results of the study contribute to the internet shopping literature by establishing the relationship of less studied socioeconomic variables on online consumer shopping behaviour. Online retailers can apply the present research findings to renovate their business operations, consumer support services and marketing tactics. Positioning and segmentation strategies require clear understanding about consumer's needs, characteristics and requirements. The findings of the study have deciphered that among the three socioeconomic predictors only education level and urban-rural dichotomy have a significant influence on the online purchase intention. However, the income of a consumer does not influence the purchase intention of the consumer. Urban people have greater access to the infrastructure required for online shopping as compared to rural people, therefore have a positive intention towards an online purchase. Thus online users in the urban segments of the market are important clients and should be given more emphasis by the e-retailers. As the adoption of online shopping increases among consumers, it is slowly going to replace the traditional brick and mortar shopping; managers need to understand various factors, in addition to those taken in the study, that have a substantial influence on information acquisition to the consumer segments and optimize their marketing communication efforts.

One of the key findings of the study reveals that well and highly educated are more inclined towards online shopping that less educated consumers. The marketers can identify these potential segments and can design marketing strategies to cater to these rich consumer segments. This will help marketers to increase their consumer involvement and satisfaction between products and consumer needs. The multilevel analysis carried out in the study will provide useful insights to the social science scholars. The methodology adopted can be replicated by future researchers in other areas of study.

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EXPLORING THE CUSTOMER SATISFACTION TOWARDS PATANJALI AYURVEDIC PRODUCTS WITH SPECIAL REFERENCE TO MADURAI CITY, TAMIL NADU

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Abstract:

Customer satisfaction is essentially a key driver when it comes to any product. In the recent times there is increase in the sale of Ayurvedic products and the major reason being the customers awareness related to health and Hygiene. Thanks to the Government of India for promoting schemes awakening the citizens about the fitness and health. Patanjali product had captured the market with a unique offering and the sales of products ranging from edible condiments to dish wash bars has been rising from Tier-II and Tier-III cities. This study aims to investigate the consumer Satisfaction regarding the Patanjali brand through a survey in the city of Madurai in Tamilnadu . The responses suggested that reasonable price, Wide availability of products in stores were the most important reasons for the popularity of Patanjali products.

With this backdrop, this study explores the study of Customer Satisfaction towards Patanjali Products in Madurai City.

Keywords : Customer Satisfaction , Patanjali Products, Price.

1. Introduction

"Customer Satisfaction is determined by the number of satisfied customer who walk out the store with a sense of happiness".

"Customer satisfaction is the word which is frequently talked about . It is all about delighting the customer with a unique product offering. It provides marketers and business owners with a metric that they can use to manage and improve their businesses of nearly 200 senior marketing managers, 71 percent responded that they found a customer satisfaction metric very useful in managing and monitoring their businesses. One among the biggest challenge of an organization face is managing customer satisfaction. Instruments for measurement need to be well defined. Generally the companies have used following **methods to measure customer satisfaction.**
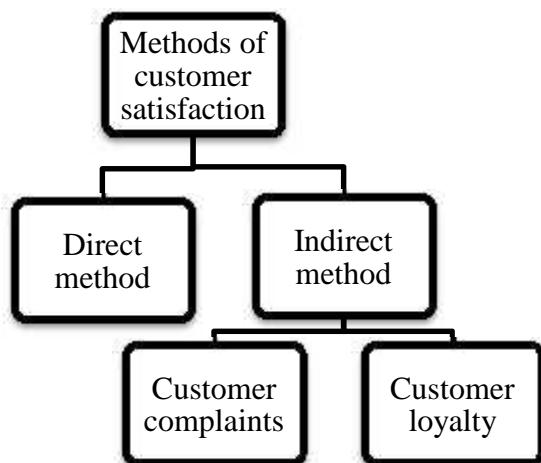
2. Objective:

The objective of this study is to find out the factors motivated to purchase patanjali products with special reference to Madurai town.

3. Hypothesis:

H1: There is a significant association between opinion about the patanjali products and price.

H2: There is a significant association between the age and marital Status wise using patanjali products.

4. Justification of the research:

Ayurveda is one among the growing industry at a faster rate and when it is observed from the point of FMCG companies, it seems to assure continuous growth and new developments. The report published by Techsci research made on 'Indian Ayurvedic Products market', states that there would be a surge in CAGR of 16% during 2016- 2021 Fast moving consumer goods which have their products in Ayurvedic segment have high

demand as the consumer preference is going more towards natural, organic and ayurvedic products.

5. Review of Literature:

In the study conducted by **Subrahmanian and Venkatesan (2011)[1],** suggested that awareness level towards ayurvedic products was more among elderly men. Lack of facility and availability was a major hindrance in the popularity of herbal products.

Roy, Lath and Sharma (2015)[2] assume that solid progression and new things pipeline, evaluating discounts to the partners, ayurvedic and regular suggestions with low A&P spends and creating indigenous credit Patanjali's things a high ground however appointment and stock outs remain a key factor. Patanjali Ayurved is one of the India's greatest sustenance and home grown stops on the planet equipped with a wonderful R&D office and world-class delivering mechanical assembly. Patanjali has completed its income center of INR 2000 crores in FY15 and now the administration has set an income center of INR 5000 crores in FY16. The organization has low A&P spends which utilize Baba Ramdev's image pull, prompts give its clients a markdown of 15-30% to competition, while diverse organizations have A&P spends running from 12-18%, as a % of offers. Notwithstanding the way that the organization's driven isn't on productivity, the organization made sense of how to coordinate 20% EBITDA edge in FY15, supported by better cost administration which fuses latest mechanical assembly and solid R&D capacities and lower A&P spends. Patanjali enrolled income CAGR of 64.7% over FY12-15.

muscle" communicating how Ramdev's Patanjali is setting design for HUL and how Baba Ramdev's unique exhibiting and solid disciple base joined with strong assessing has helped him overpower developed players in ayurvedic FMCG like Emami and Himalaya

M. Banu Rekha and K. Gokila (2015)[4] analysed the consumer perception and satisfaction of women towards cosmetics with special reference to Herbal Products. The primary objective of this study is to understand the consumer perception and satisfaction studying the awareness of the products within the consumers and the number of consumers who consumes the Herbal Cosmetics.

Gurmeet Kaur (2016)[5] examine the customer satisfaction towards selected herbal cosmetic products. The present study is based on primary data collected through questionnaire administered on 100 female respondents using herbal cosmetic products. The study depicts that majority of the respondents are satisfied with quality and price of herbal cosmetic products. First use experience, repeat purchase experience and usages experience also satisfy the respondents.

1.IRACST – *International Journal of Commerce, Business and Management (IJCBM), ISSN: 2319–2828*
   Vol. 5, No.6, Nov-Dec 2016
2. Roy, Lath, Sharma. editor-translator. 4 vols. Chowkhamba Sanskrit Series Office: Varanasi, India, 2015.

Research Gap:

The researchers have more focused on the part of awareness about herbal and ayurvedic products among **Layak and Singh (2015)**[3] report "Desi fuss v/s MNC

Research Methodology:

Research Design: Descriptive Research

Target Population and area of the study: For the purpose of this study, patanjali products customers in the Madurai town selected as a target population.

Sampling Technique: Convenience Samplings used for selection of patanjali products customers.

Size of sample: Sample size calculated by using following formula

$SS = Z2 \times (p) \times (1 – p) / C2$

SS = Sample Size

Z = Z-valueA (95 percent confidence level)

P = Percentage of population picking a choice.

C = Confidence interval

As a result, sample size is 75.

6. **Analysis and interpretation:**

Karl Pearson's Co Efficient Of Correlation

The following table gives opinion about patanjali products and price

Opinion about patanjali products	11	16	41	7
Price	31	16	13	15

$$r = \frac{\sum xy}{\sqrt{\sum x^2}\sqrt{\sum y^2}}$$

$$= \frac{256.25}{\sqrt{204.74}\sqrt{702.74}} =$$

$$\frac{256.25}{(14.31)(26.51)} = \frac{256.25}{379.36}$$

$$= +0.67$$

Result:

The relationship between opinion about patanjali products and price is positive.

Chi Square Test

Particulars	Male	Female	Total
Married	11	25	36
Unmarried	20	19	39
Total	31	44	75

HO- Null hypothesis: There is a significant association between the age and marital Status wise using patanjali products.

H1- Alternative hypothesis: There is ano significant association between the age and Marital status wise using patanjali products.

Level of significance @5%= 0.05

$$f^2 = \frac{(O - E)^2}{E}$$

O	E	(O-E)²	$\frac{(O-E)^2}{E}$
11	14.88	15.05	1.01
25	21.12	15.05	0.71
20	16.12	15.05	0.93

peoples. This study concentrates more on factors influencing on satisfaction towards ayurvedic products with special reference to Madurai town.

Calculated Karl Pearson co efficient of correlation

HO- Null hypothesis: There is a significant association between opinion about the patanjali products and price.

H1- Alternative hypothesis: There is no significant association between opinion about the patanjali products and price.

Solution:

X- Opinion about patanjali products

Y- Opinion about price

N - No. Of the respondents

$\bar{\bar{y}}$ = **18.75**

X	Y	x=X-	y=Y-	xy	x²	y²
31	34	12.25	15.25	186.81	150.06	232.56
16	28	-2.75	9.25	-25.44	7. 56	85.56
13	13	-5.75	-5.75	33.06	33.06	33.06
15	0	-3.75	-18.75	70.78	14.06	351.56
X =75	Y =75	x=0	y=0	xy= 256.25	x²= 204.74	y²=702.74

19	22.88	15.05	0.65
TOTAL	$f^2 = \frac{(O-E)^2}{E}$		3.3

Calculated value = 3.3

Degree of freedom V = (r-1) (c-1) = (2-1) (2-1)

V= 1

Table value $f^2 0.05$ = **3.84**

Result:

Calculated value 3.3 < table value 3.84

Hence, Null hypothesis is accepted. There is a significant association between the age and marital Status wise using patanjali products.

7. **Discussions of the study:**

Maximum (58.7%) of respondents are said that the price of patanjali products are reasonable. So peoples from Madurai town preferred to buy patanjali products. Age and marital status are the factors influenced on purchasing behavior of patanjali products.

8. **Conclusion:**

In a competitive marketplace where businesses compete for customers; customer satisfaction is seen as a key differentiator. Businesses who succeed in these cut-throat environments are the ones that make customer satisfaction a key element of their business strategy. Pricing are more prominent factor in buying behaviour of the customers whereas they failed to concentrate on promotional aspects.

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Employee Age and Work Engagement:
A Study of Academic Staff in Higher Education

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Abstract

This paper examines the impact of age differences on the work engagement level of the academicians in higher education institutions. The impact is examined through an empirical study involving 129 academic staff members from three universities (University of Kashmir, Central University of Kashmir and Islamic university of science and technology) of Kashmir region, using the independent samples test. The results reveal that the work engagement level of old academicians is significantly better than that of the young academicians in the sample institutions.

Keywords: Work Engagement, Age, Academic staff.

Introduction

The Organisational performance of service organisations like higher education institutions depends primarily upon the performance of their individual employees. In higher education institutions, the performance of academic staff determines the quality of academic services offered by the institution and is the pivot around which all the educational activities, such as curriculum, evaluation, etc., rotate. Therefore, to have an energetic, dedicated and focussed academic staff becomes extremely crucial for a higher educational institution to be effective and productive.

Work engagement leads to improved employee productivity because engaged employees are energized and passionate about the work they do and with passion comes excitement, enthusiasm and productivity (Kroth and Boverie, 2003). Engaged employees are willing and able to contribute to the success and are, therefore, real assets to an organization (Rama Devi, 2009). Higher education institutions therefore, need to strive to enhance work engagement of their academic staff because engagement leads to better employee performance and overall organisational productivity. Owing to its importance, the concept of work engagement is now being extensively researched. However, very few research studies have empirically examined the impact of individual characteristics such as age of the employees on their level of work engagement. Researchers tend to adopt a blanket approach to the evaluation of the work engagement levels of old and young employees and thereby ignore the influence of age differences on the said concept. The present study focuses on age of employees as individual-level variable which is made salient in organizational settings and thus produces distinct experiences for different age groups in the organizations. This study, therefore, is an attempt to fill the gap in this field and provide a new perspective to the findings of previous studies on the subject of work engagement.

Literature Review

Schaufeli et al., (2002) define employee work engagement as a positive fulfilling, work related state of mind that is characterized by vigor, dedication and absorption. They further state that engagement is not a momentary and specific state, but is a more persistent and pervasive affective – cognitive state that is not focused on any particular object, event, individual, or behaviour. Harter, et. al., (2002) define employee work engagement as the individual's involvement and satisfaction with as well as enthusiasm for work. Hewitt (2004) defines employee work engagement as the employees desire to speak positively about the organization, desire to be a member of the organization and tendency to go beyond the expected for the organization. Wellins and Concelman (2005) suggest that work engagement is the illusive force that motivates employees to higher levels of performance. This coveted energy is an amalgam of commitment, loyalty, productivity and ownership.They further added that it includes feelings and attitudes of employees having towards their jobs and their organization. Robinson, et. al., (2004), define engagement as a positive attitude held by the employee towards the organization and its values. An engaged employee is aware of the business context, works with colleagues to improve performance within the job for the benefit of the organization. They further add that organization must develop and nurture engagement which is a two way relationship between employer and employee.

Employee work engagement refers to the amount of discretionary effort exhibited by employee in their jobs (Frank, et. al., 2004). Macey and Schneider (2008) looked at engagement attitudinally and behaviourally. They distinguished three broad conceptualizations of employee work engagement, namely state, trait, and behavioural engagement. Sarkar (2011) opined that employee work engagement is a barometer that determines the association of a person with the organization.

Common to all these definitions is the idea that employee work engagement is a desirable state, having an organizational purpose. It connotes involvement, commitment, passion, dedication and enthusiasm at work.

Age & Work Engagement

Age of the employees is also considered as an important paradigm of employee engagement. James et al., (2011) explored employee engagement in five groups

of employees categorised on the basis of age. The study examined differences in employee engagement among groups as: emerging adults (less than 24 yrs), settling-in adults (25-39), prime-working years (40-54), approaching retirement (55-65), and retirement eligible (66 and older). They found that employee engagement keeps on increasing with age of the employee. Overall, the retirement eligible group reported the highest average engagement while the emerging adults reported the lowest average engagement. Swaminathan and Ananth (2009) concluded that no correlation exists between age of the employees and employee engagement. On the same note Wilson (2009) also opined that there is no significant difference in engagement level among employees of different ages. Younger workers are more future orientated and look for knowledge acquisition because this can further their careers. On the other hand, older workers (who have already acquired knowledge and experience in their years of working) are more present orientated and are more selective with their resources. Older workers also have some preconceived notions that they are not supposed to be working or are just simply waiting until they retire, and as such might be less engaged (James et al., 2011).

Based on this discussion, the study proposes the following hypothesis:

Hypothesis: Age influences the level of employee work engagement.

Research Design & Methodology
The sample

The sample of the study consisted of the respondents from three universities of Kashmir province i.e. University of Kashmir, Central University of Kashmir and Islamic university of science and technology. The elements included professors, associate professors and assistant professors of the aforementioned universities. The selection of sample was governed by the principles of judgemental sampling.

For the present research, two groups of respondents were surveyed, older and younger employees. The selection of the ages for distinguishing younger and older employees was based on the suggestions of various studies. For example, Avery, et. al,. (2007) suggested that employees begin to perceive themselves as "old" over 55 years. In addition, Ashbaugh & Fay (1987) reviewed more than 100 studies in this area and founded that the mean age when referring to older workers was 53.4 years. Finally, Kooij et al., (2008) defined old employees as working people who are between 50 and 55 years old and above. Hence, when operationalizing age, younger employees were considered under the age of 49 and older employees over the age of 50 years old and above.

A total of 150 questionnaires were administered to the potential respondents chosen from 3 sample universities (50 questionnaires in each university), out of which 129 usable responses were received, for a final response rate of 86 percent.

Data Collection Tool

Employee work engagement in this research is measured using the Utrecht Work Engagement Scale (UWES) developed by Schaufeli et al. (2002). This measure is a three-factor scale consisting of seventeen items aiming to measure the three constituting aspects of work engagement i.e. vigor, dedication and absorption. All seventeen items are scored on a six-point Likert scale ranging from 1 (never) to 6 (always).

Reliability

Cronbach's alpha ( ) values were used to test the reliability of all the constructs so as to obtain a dependable picture of internal consistency of the measuring instrument. The results of reliability test, given in Table 1, reveal that for all the constructs, alpha ( ) values are above the threshold level of 0.7, indicating a good internal consistency.

Table 1. Cronbach's Alpha values

Construct	Alpha ( )
1. Vigor	0.74
2. Dedication	0.78
3. Absorption	0.83
4. Work Engagement	0.81

Results & Discussions
Respondent Demographic Profile

Table 2 shows the distribution of respondent age groups. Out of the total 129 respondents, 69 were old (53.49%) and 60 were young (46.51%).

Table 2: Demographic profile of the respondents

Age Group	Frequency	Percent
Young	69	53.49
Old	60	46.51

Age and Work Engagement

Descriptive and group wise mean scores are presented in Table 3. Mean scores of the older academic members of the sample universities for the three dimensions of work engagement as well as for overall Work engagement is slightly higher than the reported mean scores of respondent younger academic members. It, therefore, can be said that older academic members/respondents have a higher level of work engagement than their younger counterparts.

Table 3: Descriptive Statistics of Work Engagement (N=129)

Construct	Age	Mean	Std. Deviation
VIGOR	YOUNG	4.25	.255
	OLD	4.31	.244
DEDICATION	YOUNG	4.10	.268
	OLD	4.14	.274
ABSORPTION	YOUNG	4.17	.280

	OLD	4.25	.269
WORK ENGAGEMENT	YOUNG	4.17	.281
	OLD	4.23	.289

Further, Independent sample test was utilized to ascertain whether the difference in the mean scores of the respondent old and young employees of the sample universities with respect to work engagement is statistically significant or merely an outcome of a random variation. The results indicate that the perceptual differences of employees are statistically significant when the differences are evaluated on the basis of age as the p value is less than .05 (Table 4), indicating that the old employees are more engaged in their work as compared to the young employees of the sample universities.

Table 4. Independent Samples Test (Age).

	Levene's Test for Equality of Variances		t-test for Equality of Means			
Construct	**F**	**Sig.**	**T**	**Df**	**Sig. (2-tailed)**	**Mean Difference**
VIGOR	.550	.459	-1.132	121	.259	-.04242
DEDICATION	1.162	.282	-1.867	121	.063	-.07064
ABSORPTION	1.631	.203	-1.143	121	.254	-.04541
WORK ENGAGEMENT	.016	.901	-1.998	121	**.047***	-.05282

*p<.05.

Conclusions and Implications

In view of the findings obtained in the present study, which has been detailed above, it is quite safe to conclude that the academic staff of the three sample universities under study has reported a fair level of engagement with respect to their work. Further, on basis of the results obtained in the present study through independent samples test, it is quite safe to conclude old academic members have reported higher engagement with their respective work as compared to the young faculty members and the differences in level of work engagement between the two age groups is statistically significant. Therefore hypothesis: - Age influences the level of employee Work engagement can be safely accepted.

The implication of the research for the HR practitioners is that in order to develop and engage employees, a much more flexible approach is to be adopted. An approach that takes into account the age differences that exist among the employees and is flexible enough to satisfy the needs and priorities of different groups of employees. The findings have significant bearing for both organizations and for employees. On one hand organizations would be able to develop loyalty and longevity among employees and on other hand employees' needs and aspirations could be catered in better way.

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4

An Industry-wise Comparative Study of Industry 4.0 Status of Indian Firms

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Abstract

Purpose - Industry 4.0 is reality. Indian firms must be at different stages of embracing Industry 4.0. This research paper tries to explore the status of Indian firms with regards to moving towards Industry 4.0. This paper also tries to capture the challenges companies are facing to call themselves Industry 4.0 ready. Approach –A virtual survey of Indian companies is carried out. Methodology is to survey companies by visiting their websites and other newspaper articles to collect data on various aspects of Industry 4.0 activities of top companies in two sectors.

Findings – The research result shows that the two industries studied were much ahead in adopting Industry 4.0 relevant technologies. But there were other industries which were not even near totechnologies to be Industry 4.0 ready.

Research Implications – The findings reveal there is huge scope in spreading awareness and thereby action required in several industries.

Utility of the paper – Research paper definitely provides a basic understanding of status of companies in two industries with regards to Industry 4.0 readiness.

Keywords – Industry 4.0, Artificial Intelligence, Internet of Things, Smart Factory.

1. INTRODUCTION TO INDUSTRY 4.0

First industrial revolution brought in several changes and conventional production systems into this world for the first time with steam engine and mechanical equipment during later part of 18th century. This period can be called as Industry 1.0. Then came the era of automobiles – cars, assembly line and mass production during the early part of 20th century. This period can be marked as Industry 2.0. Later part of 20th century and early part of 21st century can be called as Industry 3.0 period which saw huge advancement of computers and their uses in almost everything in our daily life. The current industrial revolution is Industry 4.0. Industry 4.0, for the first time, was used by German government to release as a memo dealing with strategy to handle a manufacturing industry with advanced technology without human intervention. They called it 'Industrie 4.0'.

Here the smart factory has machines handled by robots and computers with machine learning capabilities, which over time can run machines making human intervention obsolete (Marr, 2016). For a factory to be called Industry 4.0, it should fulfil the following characteristic requirements:

a) Interoperability: all the machines and men, devices and sensors should be able to communicate with each other. Industrial Internet of Things (IIOT) being one of the enablers of interoperability characteristic.

b) Information generation, handling and dissemination: System should be capable of handling sensor data.

c) Technical assistance: machines, over period, must be assisting men in solving technical problems and also in decision making.

d) Decentralized decision-making: machines should adapt to the environment, develop machine learning capabilities to self-diagnose and also to solve simple problems on their own.

The benefits manufacturing companies can accrue on going Industry 4.0 are, as observed:

1) Increased Productivity
2) Improved Quality
3) Increased Flexibility
4) Decreased Cost
5) Increased Speed

There are certain concerns or challenges of adopting Industry 4.0:

1) Security and privacy aspects.
2) Lack of skilled employees in this area.
3) Implementation costs are high.
4) Capital availability.

(Scalabre, n.d.) explains that there are basically nine fundamental building blocks of Industry 4.0, as shown in the Fig 1 below:

Figure 1: Nine fundamental building blocks

(Andreas Schumacher, 2016) have collected data from 23 different companies to study their maturity level using 9 different dimensions having overall around 62 maturity items. The 9 dimensions on which the companies were graded the maturity level are: Strategy, Leadership, Customers, Products, Operations, Culture, People, Governance and Technology. In this paper, an attempt has been made

to assess the current status of Indian firms embracing Industry 4.0.

2. LITERATURE REVIEW of INDUSTRY 4.0 STATUS

Literature review was done to know how the status of Industry 4.0 has been gauged and measure by other scholars and researchers. The maturity models were also looked at for the literature review. Hoffman and Rusch (2017) have studied Industry 4.0 status in logistics management as this area would have an impact and huge repercussions of Industry 4.0. Authors have studied logistics with respect to all the 9 building blocks mentioned earlier. They have found that the opportunities would be for the companies to self-regulate, de-centralize and in improving efficiency. They have further suggested Kanban systems and Just-in-sequence systems for logistics companies adopting Industry 4.0 concepts.

Weyer et. al. (2015) have proposed a SmartFactory which is standardized, multi-vendor and highly modular production system for Industry 4.0 as a contribution to current status of Industry 4.0. This has been presented as a substitute to proprietary production systems. Lee et. al (2014) have discussed the trends in manufacturing and services with reference to Industry 4.0. They have developed an advanced prediction model that help in informed decision making. The prediction tools make use of big data in order to arrive at better decisions. Sanders et. al. (2016) have discussed that companies trying to be Industry 4.0 compliant they will have to make lot of investment for the benefits which they are not sure about. Industry 4.0 being costly enough, the authors have explored if there is a chance to reduce cost and increase productivity through lean implementation. Authors have tried to investigate whether Industry 4.0 will be compatible with lean manufacturing. They have studied the barriers in implementing lean for Industry 4.0 and also the different ways of overcoming the barriers. Kolberg and Zuhlke (2015) have tried a different approach of combining automation technology and lean production system. They have later on tried to link lean automation with Industry 4.0. They have used an example of smart watches that were used with Andon system for Kanban production scheduling. Wan et. al (2016) have analyzed the IIoT architecture, physical layer, IWNs, smart terminals and industrial cloud. They have proposed IIoT which is software-defined and provides a platform for interaction between various parts for information sharing. They have also tried to foresee problems arising out of IIoT and have discussed the solutions to the problems that might arise.

Wang et. al. (2015) have discussed the current status of cyber-physical systems (CPS) for Industry 4.0 in detail. They have provided the definition of CPS, characteristics and its usage. They have also provided comparison between CPS and cloud manufacturing concept. They have also discussed the reasons for CPS being the future of manufacturing. Hermann et.

al. (2016) have discussed various literature on IoT and Industry 4.0. The design principles of Industry 4.0 have been listed after extensive survey of literature and quantitative text analysis. They have also finally provided a case study how identified design principles can help practitioners identify Industry 4.0 activities. Scheuermann et at. (2015) have explained how companies have slowly transformed from meeting linear customized demand to a non-linear dynamic demand. They have discussed about Agile Factory prototype where customers should be allowed to change their requirements to get customer oriented, customized software products. Agile Factory prototype transfers agile software engineering techniques to assembly manufacturing domain. There is a customer feedback loop fed into assembly line to track the customer changes so that it can be incorporated during assembly process. Authors have created a Cyber-Physical System to allow integration of virtual and physical world so that factory worker can communicate with the customer. The literature on status of Industry 4.0 reveals that there is relatively less research work has been carried out with reference to Indian Industry and the status of Indian companies. This paper tries to explore how in reality Indian companies are moving to Industry 4.0 by integrating 9 building blocks of Industry 4.0 into their production process and also in other areas of management.

3. METHODOLOGY

Three major companies from automobile industry and consumer durables industry have been studied with respect to their Industry 4.0 status. The status of Industry 4.0 is gauged from all the 9 building blocks shown in Figure 1. Status of Industry 4.0 is gauged to know what each of the three companies are doing in these 9 building blocks. Is there a pattern of using a technology or every company irrespective of industry uses a particular technology in a similar fashion? **Automobile Industry**

	Big Data	Autonomous Robots	Augmented Reality (AR)	Additive Manufacturing	Cloud Computing	Cyber Security	Internet of Things (IoT)	System Integration	Simulation
Tata Motors (TM)	Tata Insights and Quants (Tata iQ) helps Tata Motors with Big Data Analytics for customer targeting mainly.	TAL BRABO robot manufactured by TAL Mfg Solutions (Tata Motors Subsidiary) is used by Tata Motors.	Tata Motors is using AR to showcase its products during Motor Show. Nexon App allows customers to experience car through AR and Virtual Reality.	Prototype Development with 3D Printing.	With the help of Amazon Web Services (AWS), Tata motors helps fleet owners to monitor all the vehicles in real-time. Tata Motors is using cloud to service the customers too.	Tata Motors has Senior Manager - Information Security Operations. Beyond this not much know about cyber-security aspect of Tata Motors.	TM has tied up with Microsoft to use their IoT expertise to enhance driving experience.	TM has collaborated with WABCO for several innovative products to enhance safety of commercial vehicles. Technologies like Advanced Driver Assistance Systems, Lane Departure Warning System.	TM uses simulation for several purposes like Virtual try-out facility and virtual weld shop feasibility study.
Mahindra & Mahindra	M&M is using Big Data and Data analytics for logistics network optimization and several other areas with the help of Tech Mahindra	M&M has developed autonomous tractors which run driverless. These tractors will help Indian farmers with their enormous intelligence.	M&M uses AR mainly for outdoor publicity like in Times Square and Melbourne show.	M&M has setup 'Factory of the Future' Center at B'lore. It has 3D printing facility to print auto parts in this center.	M&M's Mahindra Tech helps its automobile unit with its cloud computing technology through 'DiGiSENSE'.	Tech Mahindra opens Cyber Security Operations Center, first of its kind in India. M&M plans to take the help for its Defense Solutions and Armored vehicles.	M&M uses IoT in trucks and tractors to identify the breakdown and thus the loss of time for drivers.	M&M Defense wing has System Integration set-up to design land-vehicles for the military (Infantry Combat Vehicle).	Mahindra Racing team uses simulator with library of Formula 1 racing tracks.
Maruti Suzuki	Maruti has adopted Big Data as back as 2013. By 2016, they had experienced immense benefits from it. They had added above 1 lakh customers.	Fanuc Robotics is the company helping Maruti with C-Series robots in their assembly plant. 104 robots are being used just for welding Dzire cars.	On-stand kiosk and in autoshow, Maruti is taking help of Xenium Digital for VR and AR display of its cars.	STRATASYS is helping Maruti in prototying new designs and visualization of new products through their 3D printing technology.	Cloud ERP helps Maruti to connect with its major suppliers and also with their tier-II suppliers.	Maruti has started digital training center but not much on cyber security. Though it says cybersecurity was successful initiative in 2016-17.	Maruti is using IoT to integrate Android Auto and Apple's CarPlay into its cars where apps get mirrored.		Maruti Driving School uses driving simulator. In operations like

Consumer Durable Industry

	Big Data	Autonomous Robots	Augmented Reality (AR)	Additive Manufacturing	Cloud Computing	Cyber Security	Internet of Things (IoT)	System Integration	Simulation
Godrej	IBM is helping Godrej to meet real-time demand using data analytics and help them in market expansion.	Godrej Consoveyo Logistics Automation Ltd. is helping them in improving supply chain efficiency.	Godrej Interio showcased its products using AR in a LIFW fashion show.	CII Naoroji Godrej Center of Excellence has program on Advanced Manufacturing to make companies industry 4.0 including 3D printing.	Godrej Infotech Ltd. is partnering with MS Azure to help Godrej with their cloud computing, consulting, and IT solutions.	Godrej has robust cyber security processes setup. Data leakage prevention and security data on mobile platforms is one of their several IT Security initiatives.	IoT is another area Godrej has taken initiative for robust security architecture	Godrej & Boyce has expertise in SCADA, PC based Controls, NC and CNC systems. Also in integrating mechanical, electrical, hydraulic sub-systems, electronics.	Godrej believes in simulating several aspects like building simulation, energy simulation etc.
Samsung India	Samsung is trying to transform itself into big data company because of its leadership on memory chip market.	Robo CV Autonomous vehicles are used in Samsung factories and warehouses.	Samsung has released S9 mobile that has AR feature in it.	Samsung is quite ahead in 3D printing. It has patented for multi-color 3D printing technology.	Samsung cloud is the feature/facility provided to all its customers of mobile phones.	For Samsung mobiles, cyber security and privacy becomes major concerns. It follows 'Nothing gets in or out on our watch' motto.	Samsung ARTIK Internet of Things (IoT) is an integrated smart platform providing secure products.	Samsung is going beyond just system integration calling it service integration.	Samsung has released smart simulator for customers. Especially trouble shooting problems.
LG India	LG CNS's Advanced Analytics Center is an integrated organization that handl	From Seoul Olympics experience, LG has introduced whole range of robots for dome	LG Optimus phone has 3D AR.	LG Chem is one which makes the parts and components of durables. They have taken	LG CNS provides cloud computing facility to LG Electronics along with other custo	LG has tied-up with Honeywell for automotive cybersecurity solutions and also for vehicle connectivity technol	LG has obtained One M2M IoT certification to integrate across IoT environme	LG provides integrated smart solutions.	

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4. CONCLUSION

From the virtual survey it appears that the top companies, in India, are quite ready for Industry 4.0 in certain industries only. But it is only at awareness, as per virtual survey, in several industries in India. It is high time for the companies to adopt and adapt Industry 4.0 technologies before they feel left out.

There is huge scope to conduct research and help the companies and also SMEs to strive to become Industry 4.0 ready at the earliest or the consequences they will have to bear would be enormously high. The research restricted itself to only two industries due to lack of data about other industries related to Industry 4.0.

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RELEVANCE OF JOINT LIABILITY GROUP CONCEPT IN CREATING EMPLOYMENT OPPORTUNITIES IN THE GIG ECONOMY

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Abstract

A gig economy is an environment in which temporary positions are common and organizations contract with independent workers for short-term engagements. With the rise of the digital revolution in India, the trend toward a gig economy has begun. With the advancement in technology, the earning opportunities and avenues are becoming plenty. It has become common among current generation people to enter into some short-term contract jobs that they can work independently to earn some money. The motives behind such upcoming trend are attributed to either 'pull factors' or 'push factors' or both. But, gig economy is going to be the future of work in India which cannot be averted. Though it throws some challenges, it also offers a lot of benefits to both the Industry and independent workforce. And, it becomes vital to rural poor students to be ready to take up the full benefits of the gig economy. Since the Finance is an essential requirement of every productive activity, the students after completing degree should able to find sources of finance to take up the full advantages of GIG economy. Until recently, aspiring but poor students applying for micro loans in order to improve their self-employment opportunities after graduation were mostly excluded from the formal credit market. As a consequence, they were either unable to be self employed, or if they had started their own micro enterprises business due to inadequacy of capital which inhibited expansion of their business. On a macro-level, the lack of financial capital for small and micro businesses has been a major obstacle not only in developing, but also in transition and, to a smaller extent, in industrialized economies. Here, the joint liability group model comes in handy for the needy and aspiring students. Joint Liability Group is a concept established in India in 2014 by the rural development agency National Bank for Agriculture and Rural Development (NABARD) to provide institutional credit to small farmers. Joint Liability Group is a group of 4-10 people of same village/locality of homogenous nature and of same Socio Economic Background who mutually come together to form a group for the purpose of availing loan from a bank without any collateral. And this paper analyses the various opportunities and challenges for the rural poor students in the changing global and economic scenario. It stresses the importance of career planning, awareness about gig economy, awareness about the joint liability group model, attitude and motives behind the independent working of the future workforce and their readiness to take up the challenges and benefits of the joint liability group model in the gig economy. The discussions in this paper will certainly benefit all the stakeholders of the gig economy and the joint liability group model such as future workforce (students), mentors (academicians), financial institutions, industries, society and the policy makers.

Key words: Gig economy, Joint Liability Group, Independent workforce, Attitude, Motives

INTRODUCTION

With the rise of the digital revolution in India, the trend toward a gig economy has begun. A study predicted that by 2020, a significant percent of Indian workers would be independent contractors. A gig economy is an environment in which temporary positions are common and organizations contract with independent workers for short-term engagements. With the advancement in technology, the earning opportunities and avenues are becoming plenty.

It has become common among current generation people to enter into some short-term contract jobs that they can work independently to earn some money. There are some forces behind the rise in short-term jobs. For one thing, in this digital age, the workforce is increasingly mobile, and work can be done from anywhere, so that job and location are decoupled. That means that freelancers can select among temporary jobs and projects around the world, while employers can find out the best individuals for specific projects from a larger pool than that available in any given area. The motives behind such upcoming trend can be attributed to either 'pull factors' or 'push factors' or both.

But, gig economy is going to be the future of work in India which cannot be averted. Though it throws some challenges it also offers a lot of benefits to both the Industry and independent workforce. And, it becomes imperative to rural poor students to be ready to take up the full benefits of the gig economy.

And this paper analyses the various opportunities and challenges for the rural poor students in the changing global and economic scenario. It stresses the importance of career planning, awareness about gig economy, and students' readiness to take up the challenges and benefits of the gig economy. The discussions in this paper will certainly benefit all the stakeholders of the gig economy such as future workforce (students), mentors (academicians), Industry, society and the policy makers.

INDIA IN CHANGING GLOBAL ECONOMIC SCENARIO

India has emerged as the fastest-growing major economy in the world as per the Central Statistics Organisation (CSO) and International Monetary Fund (IMF) and, it is expected to be one of the top three economic powers of the world over the next 10-15 years, backed by its well-built democracy and partnerships. India's GDP increased 7.1 percent in 2016-17 and is expected to reach a growth rate of 7 percent by September 2018. India's gross domestic product (GDP) grew by 6.3 percent in July-September 2017 quarter as per the Central Statistics Organisation (CSO).

Corporate earnings in India are expected to grow by over 20 percent in FY 2017-18 supported by normalization of profits, especially in sectors like automobiles and banks, according to Bloomberg consensus. India has retained its position as the third largest startup base in the world with over 4,750 technology startups, with about 1,400 new start-ups established in 2016, according to a report by NASSCOM. India's labor force is expected to touch 160-170 million by 2020, based on the rate of population growth, increased labor force participation, and higher education enrolment, among other factors, according to a study by ASSOCHAM and Thought Arbitrage Research Institute.

With the improvement in the economic scenario, there have been various investments in various sectors of the economy. The M&A activity in India increased 53.3 percent to US$ 77.6 billion in 2017 while private equity (PE) deals reached US$ 24.4 billion. Some of the significant recent developments in Indian economy are as follows:

- Indian companies raised Rs 1.6 trillion (US$ 24.96 billion) through the primary market in 2017.
- India received net investments of US$ 17.412 million from FIIs between April-October 2017.
- The top 100 companies in India are leading in the world in terms of disclosing their spending on corporate social responsibility (CSR), according to a 49-country study by global consultancy giant, KPMG.
- The bank recapitalization plan by Government of India is expected to push credit growth in the country to 15 percent, according to a report by Ambit Capital.
- India has improved its ranking in the World Bank's Doing Business Report by 30 spots over its 2017

ranking and is ranked 100 among 190 countries in 2018 edition of the report.

- India's ranking in the world has improved to 126 regarding its per capita GDP, based on purchasing power parity (PPP) as it increased to US$ 7,170 in 2017, as per data from the International Monetary Fund (IMF).
- The Government of India has saved US$ 10 billion in subsidies through direct benefit transfers with the use of technology, Aadhaar and bank accounts, as per a statement by Mr. Narendra Modi, Prime Minister of India.
- India is expected to have 1,00,000 start-ups by 2025, which will create employment for 3.25 million people and US$ 500 billion in value, as per Mr. T V Mohan Das Pai, Chairman, Manipal Global Education.
- India received the highest ever inflow of equity in the form of foreign direct investments (FDI) worth US$ 43.4 billion in 2016-17 and has become one of the most open global economies by ushering in liberalization measures, as per the mid-year economic survey of India.
- The World Bank has stated that private investments in India are expected to grow by 8.8 percent in FY 2018-19 to overtake private consumption growth of 7.4 percent, and thereby drive the growth in India's gross domestic product (GDP) in FY 2018-19.
- Indian impact investments may grow 25 percent annually to US$ 40 billion from US$ 4 billion by 2025, as per Mr. Anil Sinha, Global Impact Investing Network's (GIIN's) advisor for South Asia.
- The Union Cabinet, Government of India, has approved the Central Goods and Services Tax (CGST), Integrated GST (IGST), Union Territory GST (UTGST), and Compensation Bill.
- Indian merchandise exports in dollar terms registered a growth of 30.55 percent year-on-year in November 2017 at US$ 26.19 billion, according to the data from Ministry of Commerce & Industry

GIG ECONOMY - OPPORTUNITIES AND CHALLENGES FOR RURAL POOR STUDENTS

India's gross domestic product (GDP) is expected to reach US$ 6 trillion by FY27 and achieve upper-middle income status on the back of digitization, globalization, favorable demographics, and reforms. India will be the third largest consumer economy as its consumption may triple to US$ 4 trillion by 2025, owing to shift in consumer behaviour and expenditure pattern, according to a Boston Consulting Group (BCG) report; and is estimated to surpass USA to become the second largest economy in terms of purchasing power parity (PPP) by the year 2040, according to a report by PricewaterhouseCoopers.

The disruptive technologies, especially artificial intelligence (AI), robotics and automation, are also shaping

the future of the global workforce, giving rise to the so-called gig economy. A gig economy envisages an environment wherein temporary positions are common and organizations engage independent workers on short-term contracts. McKinsey Global Institute, in its report released this December, predicts that even if there is enough work to ensure full employment by 2030, about 75 million to 375 million workers (3-14% of the global workforce) will need to switch occupational categories because of automation technologies that include AI and robotics even as automation generates "significant benefits for users, businesses, and economies, lifting productivity and economic growth". The extent, to which these technologies displace workers, the report adds, will depend on the pace of their development and adoption, economic growth, and growth in demand for work.

The good news is that automation is expected to create new occupations that do not exist today, much as technologies of the past have done. The McKinsey report, for instance, notes that most jobs created by technology are outside the technology-producing sector itself. For instance, driverless cars, smart chat bots, smart personal assistants and algorithms that respond to customer service inquiries in retail stores or banks, are some examples of new forms of automation. However, automation will not affect all workers. For instance, the above-cited McKinsey report suggests that jobs in unpredictable environments—occupations such as gardeners, plumbers, or providers of childcare and eldercare—will generally see less automation by 2030, "because they are difficult to automate technically and often command relatively lower wages, which makes automation a less attractive business proposition".

The shared model or gig economy is on the rise in India largely fuelled by startups in Internet and technology space. Increasingly, some of the established firms in India now realize that the conventional hire-to-retire processes and singular focus on permanent employees are obsolete. They are looking to bring in external workers like freelancers, temporary staff, service providers, alumni, consultants and online talent communities into their workforce mix.

Workforce mix helps companies access specialist skills and scale according to business cycles. As firms realize this, they are no longer resistant. Information technology, shared service centers and startups are the major adopters of contingent hiring. The Workforce Agility Barometer Study by KellyOCG shows that 56% of companies in India have more than 20% of their workforce as contingent workers comprising the workforce mix mentioned earlier.

Gig economy can be the answer to talent supply chain challenges faced by professional or technology sectors. While critical roles would still be in the realm of regular employment, freelancers can reduce the burden on the supply chain, while increasing operational efficiencies and reducing the costs on projects. It could also be the answer to the acute shortage of talent in the pharmaceuticals

sector, particularly bio-pharma. Attracting and retaining top talent has been a consistent challenge not just for Indian, but even global pharma companies. Already in the US, an increasing number of highly-skilled life-sciences workers are choosing gigs. Indian pharma companies should take a cue. SMEs can tap into a global talent pool that can give them a leg up over larger rivals employing a traditional workforce. The cost benefits are lucrative; employers need not pay for health insurance, provident fund, and gratuity besides savings in training and infrastructure costs.

The advantages are aplenty for the workforce too, and not just the employers, as they can pick and choose the gigs, they want to work on. This means their skills will be current while retaining flexibility and autonomy, and avoiding the occupational hazards of a regular job. In effect, freelancers can operate as entrepreneurs. More importantly, they can have a work-life balance few can dream of. However, a freelancer's work life is fraught with uncertainties as compared to a traditional employee. So, freelancers entering the gig economy should be ready with a do-it-yourself, disruptive attitude.

JOINT LIABILITY GROUP MODEL AS SUPPORTING TOOL

Since the Finance is an essential requirement of every productive activity, the students after completing degree should able to find sources of finance to take up the full advantages of GIG economy. Until recently, aspiring but poor students applying for micro loans in order to improve their self-employment opportunities after graduation were mostly excluded from the formal credit market. As a consequence, they were either unable to be self employed, or if they had started their own micro enterprises business due to inadequacy of capital which inhibited expansion of their business. On a macro-level, the lack of financial capital for small and micro businesses has been a major obstacle not only in developing, but also in transition and, to a smaller extent, in industrialized economies. Here, the joint liability group model comes in handy for the needy and aspiring students.

What is a Joint Liability Group (JLG)?

Joint Liability Group is a concept established in India in 2014 by the rural development agency National Bank for Agriculture and Rural Development (NABARD) to provide institutional credit to small farmers. Joint Liability Group is a group of 4-10 people of same village/locality of homogenous nature and of same Socio Economic Background who mutually come together to form a group for the purpose of availing loan from a bank without any collateral.

What is the Purpose of JLG?

- Providing Credit to Small and Marginal Farmers, Tenant Farmers, Oral Lessee, Landless Labourers and Artisans
- Providing Collateral free Loan to Groups

- Building Confidence between Groups and Banks
- To mitigate the credit risk by way of group dynamics, peer pressure, credit discipline and cluster approach.
- To provide self-employment and increase production of agricultural products.

What are the features of JLGs?

1. Members should have a common activity.
2. Members need not to have a land title.
3. Members should be of the same village.
4. Only One member of a family can become a member of JLGs.
5. Members should not be a defaulter of bank loan.
6. Member should hold regular meetings.

AREAS OF CONCERNS RELATED TO JLG MODEL SUCCESS WITH THE ASPIRING STUDENTS

Awareness Issue:

Currently the students are not having much awareness about the about the Group Model of JLG. Certainly the lack of awareness will affect and restrict the impact and success of the programme. Most of the students when they want to start a business after graduation have taken individual loans and miss out the opportunities and advantages provided by the JLG model. This issue can be addressed by creating awareness programmes about the JLG model among the students during their college study itself. Including the concept of JLG model in the curriculum also will help to create awareness among the aspiring students.

Structure Issue:

When the students join together sometimes it may difficult for the members to establish the structure of the group. Chaos may arise who has the control over whom. When the Group Model is used, it is very difficult to manage a large group for a single Group Leader. But again team spirit and group cohesion will help the students to sort out this issue related to group structure.

Reach and Impact:

Further, along with the Below Poverty Line students Above Poverty Line students also availed loan under this scheme. Hence, the reach and impact have been slightly diversified. It should be given care that the below poverty line poor students are given fair advantages through this model. Because sometime the above poverty line students may not be that much serious about the intended business activities and may use the loan amount for purposes other than the purpose for which it was taken.

Lack of training

Though the students are having strong desire and great idea to start and run a business, training and education can be a strong incubator for new ventures. This includes training in technical skills, managerial skills, entrepreneurial skills and entrepreneurship. Lacking the appropriate skills and knowledge inhibits progress of the students in their ventures. The capability to start a business is propelled by previous education and work experience. Rushing into a new market because it looks attractive and rewarding without having some experience and background in it can be fatal. Experience in a related business before start-up is positively correlated to the probability of success. To address this issue the academia, industry and the government should come forward to train the aspirant in all required skills and competencies through well planned need based training programmes. Mentoring also can be encouraged to sort out this issue.

Lack of family support

When the students propose to start a new business the entire family is affected and not always in a positive way. Becoming an entrepreneur can be emotionally draining and time consuming for the rural poor students. It can turn into a very stressful situation for them and their family. This problem is aggravated when family members are unsupportive or bitter of the new business. This is why it's important that the students and the family members should be given proper counseling and the support and trust should be ensured in handling business matters from the on-start.

Lack of support from banks

It is very difficult for the students to get the bank convinced to approve the loan needed for the JLG. Though there are many reasons for bank to hesitate to provide the loan to the JLG, the main reasons are viability of the business project, intention and preparedness of the students, experience and expertise level of the students in the venture, financial and marketing skills of the group members and above all the integrity and continuity of the members in the group. But again, the banks should understand that they are not mere money lenders but are also powerful instruments of social change. Hence, banks should ensure financial inclusion through Joint Liability Groups by providing credit facilities to the needy poor students. It was found that banks and NGOs are not forming JLGs in farm and non-farm sectors with equal emphasis. Hence, it is suggested that there should be equal coverage of both farm and non-farm sectors. Banks are more encouraging towards formation of women's groups rather than men's groups. It is suggested that there should be no gender bias in encouragement towards formation of groups.

Poor career planning

The concept of JLG may look lucrative to the poor students to start some business activities with a group. But they must be aware of their suitability to the concept of JLG. Comprehensive career planning stresses the importance of knowing enough about one's unique attributes, about specific career fields, and about their life priorities. In the era gig economy, the rural poor students should able to identify the right kind of opportunities for them. Because the gig economy may provide a lot of opportunities and job avenues, but all may not suit everybody. Therefore the career planning becomes more important for the students before getting into the JLG model.

IMPORTANCE OF CAREER PLANNING

Career Success, it is the one which everyone would like to have. A career can be defined as a person's progress

within an occupation or series of occupations. Everyone wants to be successful in the chosen career. The upcoming gig economy throws opportunities for the commerce and management students. The students must be prepared well to make use of those opportunities. Of course, the years they spend in higher studies are the ideal period to sharpen their knowledge and skills to shine in the chosen career path. For this, a student should have a clear career plan. A plan which guides them in the right direction and helps for focused career preparation.

An individual could able to be successful only when they end up with the opportunities or career that are more relevant to them. For this, the students should prepare the following two profiles.

- Interests Profile
- Skills Profile &

Interests: The meaning of interests is straightforward. *What kind of activities does one likes? What types of work do one enjoys? What subject one enjoys studying? What kind of people does one enjoy being around?* Specifically, one's interests are those things that grab one's curiosity; the activities that give pleasure to that individual. They are the sum of the preferences that give definition to one who they are. Exploring different courses or types of activities are great ways to try out new interests. There is an infinite number of a subject or activities in which one might develop an interest. Here are a few examples: animals, art, books, business, computers, engineering, entertainment, environment, fashion, gardening, health, history, law, machines, mathematics, media, museums, music, outdoors, people, photography, school, science, sports, theatre, travel, and world affairs.

Skills: Skills are sometimes thought of as general talents/strengths or specific knowledge/abilities acquired through training. One's skills, however, also include a variety of attributes and personal characteristics which give them their greatest potency. The undergraduate education is more than just learning the subject matter. It also involves acquiring and developing transferable skills in a wide range of fields outside. Individuals are the best judge of their skills if they take an accurate reading of their own experiences. One should consider the skills which have contributed to their successes and likely in which they excel.

At first glance, assessing and identifying skills and interests may seem to be a simple method for matching people to career fields. But one has to constantly work for that. The students should understand that they cannot depend entirely on college degrees, reference letters, other people, good fortune, or paper qualifications to get the job that is best for them in the gig economy. They must exert more active control over the process and take initiatives as often as possible. The students' success in the gig economy will depend heavily on their ability to cope up with the expectations of the job opportunities with their job skills set.

CONCLUSION

Thus, all these developments in the gig economy give enormous opportunities to the present rural poor students of the nation. A dramatic workforce transformation is under way, one that will change the way companies find and deploy talent. The conventional recruiting methods won't work in the 'freelance economy'. The traditional engagement strategies will cut no ice with a freelance workforce. Free agents or freelancers who would like to work part-time around other responsibilities, or as a supplement to their regular full-time job, are powering this on-demand economy. And, since the finance is the core hurdle for any business venture, the concept of JLG may be a big boon to the aspiring rural poor students to start their business ventures. Though there certain concerns arise as mentioned in this paper, proper career planning, mentoring, well drafted business plan and strategies, proficiency in required competencies and skills, expertise training from the stakeholders, good support from the banks, well drafted policies of the government will make the JLG concept a big successful tool for self employment creation which in turn foster the socio economic development of the rural poor students.

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Constructing Corporate Bankruptcy Prediction Model for Indian Steel Industry

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Abstract

Steel Industry is undergoing hardest time in India. The reports of the Insolvency and Bankruptcy Board of India 2017-18 revealed that out of 525 cases were admitted under Insolvency and Bankruptcy Code (IBC) 45 cases were from steel sector and default worth of Rs.57,001 crores and 39 corporate insolvency resolution process (CIRP) is on in the case of 39 corporates. Currently, the Indian steel industry is going through a consolidation phase and debt-ridden bankrupt companies are now becomes attractive buys. Identifying the reasons for bankruptcy is the foremost step to revive the Indian Steel Industry. In this paper, the financial distress of the steel industry is analysed by taking 15 companies as a sample. Financial data from 2008 to 2017 is taken for this study. Traditional Altman's Z score and logistics regression are applied to derive the financial distress model for the steel industry. Factor analysis is applied to 44 ratios and 22 ratios were identified as relevant for the study. The study revealed that the debt ridden steel companies who made substantial investment during the last three years with souring profit and high financial cost were went to bankrupt with in short span of time.

Key words: *Bankruptcy, Steel Industry, Altman Score, Logistics Regression*

1. Introduction

Indian Steel Industry is the world third largest producer with 101.4 million tons in the year 2017 after China and Japan (Figure1.1.Steel Statistical Yearbook 2017). The world steel association Report June 2018 shows that the trend is increasing in 2018 by 7.4% compared to June 2017 with the production of 8.7 Mt of crude steel in June 2018. The growth in steel production in India is driven by low-cost labour and availability of iron ore.

Figure 1.1 Top 20 Steel Producing Countries 2017

According to Bhaskar Chatterjee (2018) Secretary General, Indian Steel Association, Indian steel industry is overcoming the challenges by strengthening itself in making investment heavily in expansion, upgrading production units in align with the environmental standards and converting them into most cost-effective and socially responsible production units. Moreover, the strategic move is to equip the steel industry to achieve the government objectives of the National Steel Policy 2017 to increase the Per Capita Steel Consumption from the current 60 kgs to 160 Kgs by 2030-31. But profitability wise the industry is sinking and more number of companies are financially distressed. The reports of the Insolvency and Bankruptcy Board of India 2017-18 shows that among the 525 cases of insolvency filing 45 companies are from the steel sector (Figure 1.2) Essar Steel, Monnet Ispat, Bhushan Power & Steel, Bhushan Steel, Electrosteel Steels are in the list of defaulters. According to Mr Seshagiri Rao, Joint MD and Group CFO of JSW Steel opinioned that the drop in steel prices, volatility in raw prices and dumping through import are the major reasons for distress in the steel industry. Moreover, depreciation of major currencies was the reason for the export by Russia and Ukraine. Due to that India saw an influx of imports from 2014-15 from several countries, including China. This created a low demand for Indian steels in the domestic market which has resulted in the erosion of margins and low demand growth.

Sushim Banerjee (2018), the surplus steel capacity was damaging the global steel producers during 2014-2017 by lowering the prices and reduces the profitability of the industry.

China has accounted for nearly 50% of the estimated surplus steel capacity and set a target to close down 150MT steel capacity during 2016-20.

Figure 1.2 Sector wise admitted cases under IBC

Sector-wise analysis of admitted cases under IBC, 2016

Sector	Total underlying default (₹ cr)	CIRP in progress	Resolution plan approved	Liquidation order passed	Closed by appeal/ review	Total
Steel	57,001	39	2	3	1	45
Retail	12,719	12				12
Capital Goods-Non Electrical Equipment	4,785	14		2	1	17
Textiles	4,679	29		3	1	33
Trading	4,560	30	3	4	2	39
Chemicals	4,433	18	1	19		
Ship Building	4,292	2				2
Construction	4,004	35		1	4	40
Computer education	2,909	1				1
Mining & Mineral Products	2,700	10	1	1	1	13
Others	26,727	261	4	16	23	304
Total	**1,28,810**	**451**	**10**	**30**	**34**	**525**

Source: IBBI

Financial distress and bankruptcy in steel company's leads to a consolidation phase and the resolution of distressed steel assets under the IBC will alter the numbers and positions of players, especially in the flat steel. Both domestic and

international steelmakers are keen on expanding in India by acquiring stressed capacities at attractive valuations to cater to the upcoming demand for steel arising from various infrastructure projects announced by the government. Surviving and leading is the vital strategy for steel companies in India. Hence studying the reason for the distress and the characteristics of the distressed company will guide the other players in the market. This research aims to identify and construct financial distress model for Indian Steel Industry by using logistics regression.

2. Review of Literature

Altman (1968) evaluated 22 financial ratios of 66 companies by applying statistical multivariate discriminant analysis and derived five component models to predict financial distress.

CH. B. Balan, et al (2015) studied the financial distress in metallurgical companies by taking 248 companies as a sample from 5208 listed companies on the major international financial markets in Amsterdam, London, Nasdaq, NYSE and Paris during 2006-2013. These samples were subgrouped into Gold, silver & other precious metals, Steel production, Mineral extractors- other. Kaplan-Meier estimator and Cox model were applied on the liquidity, solvency, leverage, and profitability ratios. They found that the Cox model revealed the significance of financial positions and performance of metallurgical companies. The leverage positions of the company in the current year create the chance of financial distress in the next year if there is no simultaneous increase in profit margin. They also found that among the sub-sector more steel production companies became distressed after the crisis but only a few companies become distressed in the extraction and processing of precious metals industry.

Mohammad Nazaripour and Aram Mohammadi (2017) examined the financial distress costs and the distance to default by taking a sample of 49 companies listed in the Tehran stock exchange representing auto, food and beverage, pharmaceuticals, basic metals and cement industries. Leland and Toft model was applied in the financial data from 2005 to 2014 and they found that the distance to default point is at a moderate level for the metal industry. The value of current equity in the basic metals industry is positive, but it is less than the leverage value.

Nicolas Emanuel Monti and Roberto Mariano Garcia (2010) studied the financial distress of companies operating in Argentia. They took a sample of 86 firms which has equal representation from financially distressed and financially sound firms during the sampling period. They developed a tool through which one can assess the financial condition by considering risk and return and through logistics regression estimated the short-term probability of financial distress. They came with the model consist of four components namely 1) Current Debt Ratio, 2) Total Cost of Debt, 3) Operating Profit Margin, and 4) ROE.

Qi Liang (2003) attempted to improvise the previous financial distress research undertaken in China by taking more sample and compared the result of MDA and logistic regression analysis in the financial distress prediction. The researcher took 138 firms from 18 sectors and equal representation from financially distressed and non-financially distressed firm. Three years financial data were used and 25 financial ratios were calculated and applied in logistics and MDA. The result shows that the logistic regression is superior to MDA to classify and predict financial distress due to high prediction accuracy and low Type I & II errors.

Ma-Ju Wang, and Heng-Ruei Shiu, (2014) studied the common characteristics of firms in financial distress into bankruptcy by taking a sample of 456 companies in Taiwan. Both financial and corporate governance data from Jan 2000 to Jul 2011 were used for this study. By applying Cox regression model investigated the whether the firms will continue to influence the probability of bankruptcy/delisting or recovery. They found that both financial variables and corporate governance variables have significant differences in their level of influences among the three models. The probability of becoming financially distressed is higher for the firm with higher debt level, lower cash and cash equivalent, less independent director, smaller control rights deviations and non-family owned business. Their research revealed that the probability of bankruptcy is lower when the outsider shareholdings are higher and high control rights deviations. The result shows that the time period for moving from distress to bankruptcy is 18 months.

Nikita Shah (2014) examined the variables contributing to the financial distress of Australian Mining companies by using financial ratios data from 2012 to 2013. She took 395 Australian mining companies as a sample among them 44 companies were financially distressed. She constructed a financial distress model by using Recursive Partitioning techniques like Discriminant Analysis, Decision Tree Method, Artificial Neural Network and Hybrid Method. The result revealed that the recursive partitioning, Decision tree and Hybrid Intelligence methods have the higher power to classify bankruptcy compare to the other methods.

The review of literature highlighted the application of logistics regression for distress model building and the influence of financial ratios to characterize the distressed firm. In this paper also researcher applied logistics regression to construct the financial distress/ bankruptcy model for Indian Steel industry.

3. Data and Methodology

Financial data of financially distressed and non-distressed companies were collected from www.money control.com for a period of 2008 to 2017. Sample of 15 Companies shown in Table - 1 representing 12 distressed companies and 3 financially healthy companies' are selected as a sample. Companies which are trading below par value in NSE, incurring continuous losses for eight quarters and filed for bankruptcy were taken as samples to represent distressed companies.

Table – 1 Sample

S. No	Company Name
1	Adhunik Metaliks Ltd
2	Ankit Metal & Power Ltd
3	Bhushan Steel Ltd
4	Jindal Steel & Power Ltd.
5	Metkore Alloys & Industries Ltd

6	Monnet Ispat & Energy Ltd.
7	OCL Iron & Steel Ltd.
8	Uttam Value Steels Ltd
9	Steel Authority of India Ltd.
10	Visa Steel Ltd
11	Electrosteel Steels Limited
12	S.A.L Steel Ltd
13	Tata Steel Ltd.
14	JSW Steel Ltd.
15	NMDC Ltd.

By analysing the existing literature (Naz Sayaria etal 2017) 44 Financial Ratios were identified and selected for analysis. The selected ratio is given in Appendix 1.

4. Methodology

Literature review revealed the application of vast model for financial distress modeling and prediction. In this research Altman Z Score (Equ 1) is applied to identify companies which are distressed, and financially strong and in a gray area. The following equation is used to calculate the Z score.

Altman Model – Public manufacturing companies

$$Z\text{-Score} = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5 \quad (1)$$

X_1 = working capital / total assets
X_2 = retained earnings / total assets
X_3 = earnings before interest and taxes / total assets
X_4 = market value of equity / total liabilities
X_5 = sales / total assets

Zones of discrimination:
$Z > 2.99$ – "Safe" Zone
$1.81 < Z < 2.99$ – "Gray" Zone
$Z < 1.81$ – "Distress" Zone

The result are taken as variable and it is further used for logistics regression.

We employed 44 ratios for study which are identified as the most informative through review of the literature. Factor analysis is conducted to determine the most appropriate set of variables for analysis. The overall sampling adequacy is tested by Kaiser-Meyer-Olkin (KMO). The result shows that KMO MSA value is 0.710 which is above 0.5 acceptable levels and Bartlett's test of sphericity is significant at 0.0001% indicates the appropriateness of a set of variables for factor analysis. In anti-image correlation matrix variables with MSAs value less than 0.5 is identified and eliminated. The reduced set of variables is examined in rotated factor analysis and the factor loading below 0.7. Finally, 22 variables under five components are derived from Factor Analysis. These variables explained the 86% variance (Table -2) and used for logistics regression analysis.

Determining financial distress and categorizing firm into categories we need proper definition of the term financial distress. Altman, (1968); Ohlson, (1980); Zmijewski, (1984) research work shows that the legal declaration of bankruptcy is used to classified as financially failed. Li and Sun, (2008) and Hill et al., (2011) research identified firms which are not declared bankrupt but experiencing financial difficulty and had negative net income for at least 3 or 5 consecutive years between the periods and classified as distressed. Following the literature review Companies which are trading below par value in National Stock Exchange (NSE), incurring continuous losses for eight quarters and companies filed for bankruptcy were taken to represent distressed companies. Moreover instead of binominal classification multinomial classification is used. Based on the calculated Altman Z score values companies are categorized into Financially Distressed - 0, Financially Sound - 1 and firms in a Gray Area - 3. This categorical variable is included along with the filtered ratio variables in ordered logistics regression model is applied.

Table -2 Results of Factor Analysis Rotated Component Matrix[a]						
Ratios	Component					
	1	2	3	4	5	6
FFOTA	0.892					
FFOTL	0.755					
SalesTA	0.711					
SalesPPE	0.746					
CATA	0.901					
QATA	0.704					
EBITSALES		-0.938				
NISales		-0.954				
InvSales		0.929				
RecSales		0.949				
TDNW			0.98			
TANW			0.984			
CANW			0.984			
CACL			0.766			
QACL			0.776			
EBITTA				0.742		

EBITIntExp			0.83		
CashTA			0.754		
CASales				0.782	
QASales				0.927	
QAnetSales				0.927	
RecInv					0.745
Kaiser-Meyer-Olkin Measure of Sampling Adequacy. Bartlett's Test of Sphericity Approx. Chi-Square Sig.				0.710 8216.462 0.0	

A multinomial logistic regression is applied for predicting the categorical outcome. The results of Altman Z score is considered for classification of companies into three categories viz 0- Distressed, 1- Sound, 2-Gray area. This categorical variable is considered as a dependent variable and the model is constructed to predict the probability of the occurrence of financial distress. The filtered 22 variables from factor analysis were taken for logistics regression. The Y_i is categorical variable financial status of the company; x_i is the chosen 22 financial ratio variables

$$y_i^* = x_i'\beta + \epsilon_i$$

(2)

where is ϵ_i are independent and identically distributed random variables. The observed y_i is determined from y_i^* using the rule:

$$y_i = \begin{cases} 0 & \text{if } y_i^* \leq \gamma_1 \\ 1 & \text{if } \gamma_1 < y_i^* \leq \gamma_2 \\ 2 & \text{if } \gamma_2 < y_i^* \leq \gamma_2 \\ \vdots & \vdots \\ M & \text{if } \gamma_M < y_i^* \end{cases}$$

It is worth noting that the actual values chosen to represent the categories in are completely arbitrary. All the ordered specification requires is for ordering to be preserved so that implies that .
       It follows that the probabilities of observing each value of are given by

$$\Pr(y_i = 0 | x_i, \beta, \gamma) = F(\gamma_1 - x_i'\beta)$$
$$\Pr(y_i = 1 | x_i, \beta, \gamma) = F(\gamma_2 - x_i'\beta) - F(\gamma_1 - x_i'\beta)$$
$$\Pr(y_i = 2 | x_i, \beta, \gamma) = F(\gamma_3 - x_i'\beta) - F(\gamma_2 - x_i'\beta)$$
$$\ldots$$
$$\Pr(y_i = M | x_i, \beta, \gamma) = 1 - F(\gamma_M - x_i'\beta)$$

where F is the cumulative distribution function of ϵ.
The threshold values γ are estimated along with the β coefficients by maximizing the log likelihood function Using logistic regression, researchers can estimate the probability of occurrence of the event.

The advantage of using Logistic regression is it does not make any assumptions of linearity, normality and homogeneity of variance for the independent variables. Since the data collected more from the distressed company in the sample application is logistic regression is suitable.

SEM model is applied to model the financial prediction model. The factors derived from the principal component model are constructed into SEM model to confirm the factors.

5. Discussion
The results of Altman Z score shown in Table 3 revealed that Bhushan Steel Ltd, Visa Steel Ltd, Electrosteel Steels Limited, S.A.L Steel Ltd, Monnet Ispat & Energy Ltd, JSW Steel Ltd were in the distressed zone for more than eight years. Z score is below 1.23. The Z score result highlighted selected steel companies which were in grey and safe zone area during the economic crisis is now distressed. It confirms the findings of CH. B. Balan, et al (2015) research who found that the financial distress occurs at a different time depends upon the level of financial erosion. The firm with a high leverage ratio in the current year has a high risk of financial distress in the next year. Increased profit margin decreases the risk of financial distress. The results of Altman Score further shows that the steel industry is in distress for a longer period of time and increase in investment in capacity expansion and modernization, leverage and reduction in sales due to the competition from other countries affected the industry. Except for NMDC Ltd, OCL Iron & Steel Ltd, and Metkore Alloys & Industries Ltd which financially healthy for the past five years are currently in distress. This needs to be addressed in term of industry policy and revival strategy for the entire industry.
Logistics regression result given in table 4 shows the significance of inventory to sales ratio, trade receivables to inventory, interest coverage ratio, sales to plant and machinery, current assets to total assets, Sales to PPE and leverage ratios. This result confirmed the three ratios among the seven ratios identified by Naz Sayari

(2016) research. She applied logistic analysis and identified the Inventory to Sales, Receivables to Inventory, Long-term debt to Total Assets, Cash to Total Assets, Sales to PPE, Cash to Total Liabilities and Cost of Goods sold to Inventory ratios are the relevant ratios for financial distress prediction. Madalina Ecaterina et al (2009) applying Principal Component Analysis and Cluster analysis indicated the Profit Margin, ROA, ROE, Profit per employee, Current Ratio, Debts on Equity and Growth rate on Total Assets ratios as relevant for prediction. Their Logit model found that the Profit Margin and Debts on Equity are relevant for predicting the financial distress in Romanian companies.

Table -3 Results of Alman Z score

Results of Altman Z Score

Company Name	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Adhunik Metaliks Ltd	-1.48	0.31	0.04	0.77	0.70	4.18	6.67	9.87	5.29	5.80
Ankit Metal & Power Ltd	-1.2	0.02	0.79	1.16	1.48					
Bhushan Steel Ltd	-0.04	-0.2	0.38	0.58	0.71	-0.11	0.01	0.16	0.01	0.30
Jindal Steel & Power Ltd.	2.12	2.09	1.65	1.81	2.18	2.66	2.94	3.50	13.5	2.95
Metkore Alloys & Industries Ltd	1.38	1.93	3.85	4.64	3.93	3.25	2.80	4.04	2.61	3.01
Monnet Ispat & Energy Ltd.	-0.8	-0.2	0.24	0.68	0.83	1.34	1.61	1.80	1.82	2.07
OCL Iron & Steel Ltd.	0.67	4.66	3.64	3.81	4.59	1.35	2.60	5.33	4.45	3.00
Uttam Value Steels Ltd	0.18	0.17	0.61	1.23	1.82	1.09	0.84	0.57	0.11	
Steel Authority of India Ltd.	0.65	0.64	1.28	1.45	1.51	2.10	2.28	2.94	2.71	1.96
Visa Steel Ltd	-0.00	-0.00	-0.00	0.0	0.0	0.0	0.5	0.8	0.4	1.0
	.62	.57	.09	1.5	1.7	0.2	4	5	5	9
Electrosteel Steels Limited	-0.43	0.05	0.09	0.14	0.06	0.24	0.43			
S.A.L Steel Ltd	0.45	0.41	0.58	0.41	0.86	1.21	1.29	1.08	1.25	1.47
Tata Steel Ltd.	1.58	1.46	1.72	1.76	1.67	1.93	2.19	2.14	1.55	2.17
JSW Steel Ltd.	1.03	0.48	0.95	0.88	0.90	0.81	1.01	1.24	0.47	1.30
NMDC Ltd.	3.11	3.18	4.06	4.34	5.52	7.13	19.88	12.14	10.15	15.81

Table – 4 Logistics regression

Method: ML - Ordered Logit (Newton-Raphson / Marquardt steps)
Coefficient covariance computed using the Huber-White method

Variable	Coefficient	Std. Error	z-Statistic	Prob.
CACL	-1.214829	2.125109	-0.571655	0.5676
CANW	0.005676	0.110249	0.051479	0.9589
CASALES	0.163753	1.936670	0.084554	0.9326
CASHTA	-0.668822	3.739203	-0.178868	0.8580
CATA	**11.03571**	**5.966481**	**1.849618**	**0.0644**
EBITINTEXP	**-0.000614**	**0.000205**	**-2.997906**	**0.0027**
EBITSALES	3.225424	3.944652	0.817670	0.4135
EBITTA	8.478883	7.590067	1.117102	0.2640
CFOTA	-1.661383	1.987885	-0.835754	0.4033
CFOTL	-0.188128	0.880198	-0.213734	0.8308
INVSALES	**-8.535491**	**4.070474**	**-2.096928**	**0.0360**
NISALES	0.396088	1.423432	0.278263	0.7808
QACL	1.519722	2.211516	0.687186	0.4920
QANETSALES	9.299141	7.270293	1.279060	0.2009
QASALES	-11.06621	8.256857	-1.340245	0.1802
QATA	-4.647546	4.861083	-0.956072	0.3390
RECINV	**-1.672437**	**0.609033**	**-2.746053**	**0.0060**
RECSALES	**7.556744**	**4.401585**	**1.716823**	**0.0860**
SALESPPE	**-0.375840**	**0.208563**	**-1.802044**	**0.0715**
SALESTA	-2.851849	2.582671	-1.104225	0.2695
TANW	0.166026	0.122938	1.350488	0.1769
TDNW	-0.153452	0.093864	-1.634834	0.1021
Limit Points				
LIMIT_1:C(23)	-0.841378	1.795591	-0.468580	0.6394

LIMIT_2:C(24)	0.822910	1.740469	0.472809	0.6363

		Akaike info	
Pseudo R-squared	0.258023	criterion	1.718418
Schwarz criterion	2.220335	Log likelihood	-97.14850
Hannan-Quinn criter.	1.922380	Restr. log likelihood	-130.9319
LR statistic	67.56685	Avg. log likelihood	-0.688996
Prob(LR statistic)	0.000002		

The Logistics model prediction evaluation result given in Table – 5 shows that the model prediction is 96% accurate for distressed firm and less for sound and firms in a gray area due to the less representation from the financially sound firm s in the sample.

Table -5 Prediction Evaluation for Ordered Specification

Prediction Evaluation for Ordered Specification					
Estimated Equation					
Dep. Value Obs.		Correct	Incorrect	% Correct	% Incorrect
0	87	84	3	96.552	3.448
1	30	9	21	30.000	70.000
2	24	9	15	37.500	62.500
Total	141	102	39	72.340	27.660
Constant Probability Spec.					
Dep. Value Obs.		Correct	Incorrect	% Correct	% Incorrect
0	87	87	0	100.000	0.000
1	30	0	30	0.000	100.000
2	24	0	24	0.000	100.000
Total	141	87	54	61.702	38.298
Gain over Constant Prob. Spec.					
Dep. Value Obs.		Equation % Incorrect	Constant % Incorrect	Total Gain*	Pct. Gain**
0	87	3.448	0.000	-3.448	NA
1	30	70.000	100.000	30.000	30.000
2	24	62.500	100.000	37.500	37.500
Total	141	27.660	38.298	10.638	27.778

*Change in "% Correct" from default (constant probability) specification

**Percent of incorrect (default) prediction corrected by equation

0- Distressed, 1- Sound, 2-Gray area

Structure equation model is estimated with the 22 variables filtered through factor analysis. The variables are grouped into six constructs namely Assets, Sales, Liability, Earnings , Liquidity, and Inventory. The ratio under each construct is given in table 6. WarPLS software is used to model SEM for financial distress prediction by using construction and the direct and indirect effects and the model results are shown in table 7. The result of the SEM model highlighted the significance of Assets and Sales construct to financial distress and confirms the findings of logistic model.

Figure 5.1 – SEM result
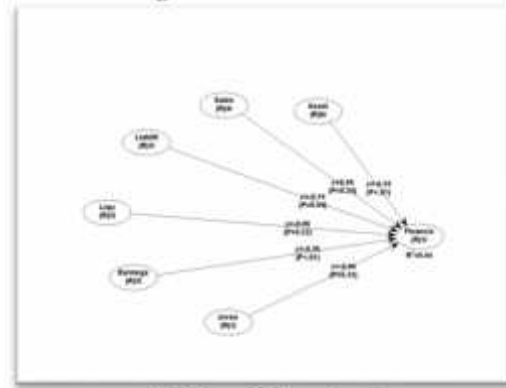
Table – 6 Constructs

Assets	Liabilities	Sales	Earnings	Liquidity	Inventory
CFOTA	TDNW	EBITSALES	**EBITTA**	CASales	RecInv
CFOTL	TANW	NISales	**EBITIntExp**	QASales	
SalesTA	CANW	InvSales	**CashTA**	QAnetSales	
SalesPPE	CACL	RecSales			
CATA	QACL				
QATA					

Table – 7 Results of SEM Model

Latent Variable Coefficient							
Particular	Ass	Sal	Liab	Earnings	Liq	Inv	Fina
R-							0.
Ad							0.
Co	0	0	0	0.893	0	1	1
Cr	0	-	0	0.819	0	1	1
Av	0	0	0	0.736	0	1	1
Ful	1	1	1	1.87	1	1	1.
Q-							0.
To	-	0	-	-0.364	-	-	
P	<	0	0	<0.001	0	0	
Sta	0	0	0	0.075	0	0	
Eff	0	0	0	0.212	0	0	

6. Conclusion

This study focused on modeling the financial distress in the Indian steel industry by taking 15 companies representing 12 distressed companies and 3 financially healthy companies as a sample. The result found that the asset utilization of generating sales, inventory level, receivables, Earnings and Interest level affect the company's financial position and leads to distress and corporate failure. The results confirmed the outcome of the previous research undertaken in other countries. Lakshan & Wijekoon (2013) research suggested that the working capital to total assets ratio, Cash flow from operating activities to total assets and Debt ratio are significant predictors of corporate failure in Srilanka.

Through this research, it is evident that a highly levered company which is inefficient in utilizing the assets and generates sales and cash flow affects the liquidity position and leads to financial distress and finally bankrupt stage. The factor analysis and logistics regression model identified these variables and confirmed its significant impact on financial distress. Emergency measures have to be initiated by the government at the industry level and corporate restructuring is needed to address this issue. The new Insolvency and Bankruptcy code 2016 immediate the process of corporate debt restructuring and liquidation process. The ways to resolve the financial distress and its success rate are summarized by Ross et al. (2002) in the following graph:

Figure 6.1 Corporate Financial Distress Genesis and Remedial measure
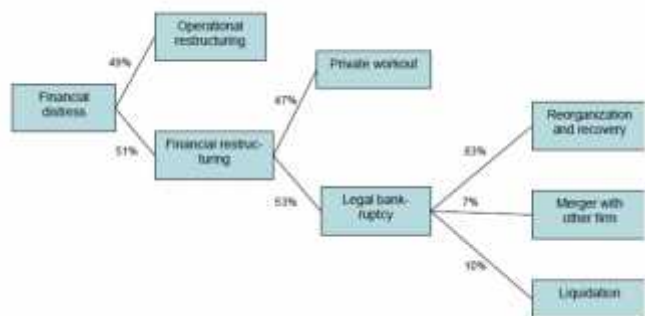
Indian Steel companies may work out the above strategies to overcome and recover from financial distress. Investors and credit rating agencies use this model for financial distress prediction. Further research can be done by including corporates at the global level in the sample. Further qualitative variables which are acting the key role in financial distress like the decision of the management, competition, international market price, technological changes can be included in the model.

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Appendix - 1

S. No	Ratios	
1	Earnings Before Interest and Taxes/Total Assets	EBITTA
2	Earnings Before Interest and Taxes/Net Sales	EBITSALES
3	Earnings Before Interest and Taxes/Interest Expense	EBITIntExp
4	Net Income/Total Assets	NITA
5	Net Income/Net Sales	NISales
6	Net Income/Net Worth	NINW
7	Net Income/Total Liabilities	NITL
8	Cash Flow from Operations/Total Assets	CFOTA
9	Cash Flow from Operations/Total Liabilities	CFOTL
10	Cash Flow from Operations/Net Worth	CFONW
11	Cash Flow from Operations/Net Sales	CFOSales
12	Cash Flow from Operations/Working Capital	CFOWC
13	Total Debt/Net Worth	TDNW
14	Total Debt/Property, Plant and Equipment	TDPPE
15	Total Debt/Total Assets	TDTA
16	Total Assets/Net Worth	TANW
17	Liabilities/Working Capital	TLWC
18	Net Sales/Working Capital	SalesWC
19	Net Sales/Total Assets	SalesTA
20	Net Sales/Property, Plant and Equipment	SalesPPE
21	Current Assets/Fund Expenditure From Operation	QAFEO
22	Current Assets/SALES	CASales
23	Current Assets/Total Assets	CATA
24	Current Assets/Net Worth	CANW
25	Current Assets/Current Liabilities	CA/CL
26	Cash and Cash Equivalents/Total Assets	CashTA
27	Cash and Cash Equivalents/Total Liabilities	CashTL
28	Cash and Cash Equivalents/Funds Expenditures for Operations	CashFEO
29	Quick Asset/Cash Flow from Operations	QACFO
30	Quick Asset/Sales	QASales
31	Quick Assets/Total Assets	QATA
32	Quick Assets/Net Sales	QANetSales
33	Quick Assets/Current Liabilities	QACL
34	Long Term Debt/Total Assets	LTDTA
35	Long Term Debt/Total Liabilities	LTDTL
36	Inventory/Working Capital	Inv WC
37	Inventory/Net Sales	InvSales
38	Inventory/Current Assets	InvCA
39	Net Worth/Net Sales	NWSales
40	Current Liabilities/Inventory	CLInv
41	Current Liability/Property, Plant and Equipment	CLPPE
42	Working Capital/Total Assets	WCTA
43	Net Receivables/Inventory	RecInv
44	Receivables/Net Sales	RecSales

HUMAN CAPITAL TALENTUM ANALYTICS -
A FOCUS STUDY ON SCHOOLS OF BUSINESS (SOBs) IN HYDERABAD & BANGLORE

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A B S T R A C T

In the Digi-Era of Internet Of Things (IOT), Virtual and Viral Technologies, Artificial Intelligence (AI), the Analytics reshaped and redefined the Science of Workforce. By the Year 2025, 75 % of the Total Workforce will be Millennials, yet, large percentage of Millennials prefer Non-Profits, Small Business or Entrepreneurship. (www.oracle.com).*An Intuit Global Study* predicts that by 2020, the 40% of the Gig Economy will be the Contingent Workers. The Golden Age of Human Capital Management shifts from Employee Engagement to Employee Experience enroute Employee Turnover. According to **Bersin by Deloitte Research (2018)**, the Average Voluntary Turnover Rate is 13 % and it impairs the growth indices (**PwC,2017**). Lack of analytic acumen or skills among HR Professionals (**HBR**)has caught fire recently with a welter of reports, books and commentary. In the light of the above, Human Capital Talentum Analytics (HCTA) emerged as one of the most predictive and a powerful tool that attracts, hires and retains talents resulting increased revenue, customer satisfaction or market share. (**Tommy Cohe, CVO, InfoMart**).

Human Capital Talentum Analytics (HCTA) can be defined as a systematic collection, analysis and interpretation of workforce data that is pivotal in identifying, tapping, recruiting and retaining the best talents in a unique manner. In the Era of Big Data, HCTA provides a blue print for Schools Of Business (SOBs) in Telangana (71) and Karnataka (115) to leverage 'Talent Pool' by the use of Data Analytics. The voluminous, velocity and variety of data is the basis for 'Talentum Analytics' and silos, skills, strategies offer solutions at every stage and entire process of 'Talent Management Cycle (TMC)'. The study is empirical and provides actionable insights on integration of HR Practices into Talentum Analytics, building-up more effective and efficient 'Talent Pipeline' and offers suggestions to enhance the performance and productivity of the organisation besides reducing time-to-hire and increasing quality of hire and revenue.

Key Words: AI, CVO, HCTA, IOT, SOBs, TMC

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Human Capital Talentum - The Primer

Whether the Artificial Intelligence (AI), Robots and Machines will take over and lead the Human Race to the Humanoids? **(The Hindu, 2018)**[1] The Pulse Feedback Tools, Employee Wellness Apps, Augmented and Virtual Reality Tools (VRTs), Human Talentum Analytics will amplify the Talent Management Process (TMP). In the Gig-Economy, there is a paradigm shift from 'Brain Drain' to 'Brain Circulation' *enroute* 'Brain Gain'. The 21st Century can be viewed replacing Low-Skilled Workers by Robots while Knowledge Workers are displaced by Algorithms. The neuroscience and the mobility develop 'Talent' while the global mindset, the networks and the innovative capabilities characterize creative talent.

By the Year 2025, 75% of the Total Workforce will be Millennials, yet, large percentage of Millennials prefer Non-Profits, Small Business or Entrepreneurship. (www.oracle.com).**An Intuit Global Study**predicts that by 2020, the 40% of the Gig Economy will be the Contingent Workers.The Golden Age of Human Capital Management shifts from Employee Engagement to Employee Experience enroute Employee Turnover, from 'Employer Brand' to 'Employer Trust', from 'Employee Engagement' to 'Employee Experience'. Employee Experience is an Eco-System that syncs the 3-Dimensions *viz.,*(a) The Employee Engagement, (b) Culture and (c) Performance Management. **(Chee Tung Leong, 2017)**[2]**.** According to **Bersin by Deloitte Research (2018),** the Average Voluntary Turnover Rate is 13% and it impairs the growth indices **(PwC, 2017)**.Lack of analytic acumen or skills among HR Professionals **(Harvard Business Review, 2017)** has caught fire recently with a welter of reports, books and commentary.

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Despite doom and gloom economic scenarios, the MNEs around the World are facing with the shortage of 'Talent' **(Farndale, Scullion, & Sparrow, 2010)**[3] and difficulty in finding Passive Talent' **(Recruiter Sentiment Study).**[4] Countries are competing globally to acquire, retain talents that contribute to competitiveness, innovation, and growth **(GTCI, 2017)**[5]. According to the GTCI, China and India are the new rising stars in the Global War for Talent. Talent is a core ingredient to all organisations and Acquisition of Talent is an art but Retention is a science of management. There is a great demand for highly valued and high-caliber managerial talent.

Talent Sourcing and Recruitment face tremendous pressure. Talent and skill shortages are widespread, hence, attract and retain talents that contribute to competitiveness, innovation, and growth **(GTCI & Deloitte, 2017)**[6]. It is the moot point of all organisations around the world to attract, develop, and retain a needed supply of critical talent **(Coy, P., & Ewing, E. 2007)**[7]. Global Talent Management (GTM) Practices are unique, vary and each country may need a different set of practices, slightly different approaches with local optimization. MNEs are encouraging the Configuration, Customisation and Consolidation (3Cs') of Talent Management Practices at Glocal Level with Enterprise Resource Planning (ERP) Software *eg.,* SAP, ORACLE, MICRO SOFT DYNAMICS etc.,

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Table - 1: Global Talent Competitive Index - A Kaleidoscope			
Rank	**Country**	**Rank**	**Country**
1	Switzerland	11	Australia
2	Singapore	12	New Zealand
3	United States of America	13	Ireland
4	Norway	14	Iceland
5	Sweden	15	Canada
6	Finland	16	Blezium
7	Denmark	17	United Arab Emirates
8	United Kingdom	18	Austria
9	Netherlands	19	Germany
10	Luxembourg	20	Japan

Source: World's Most Talent Competitive Countries, INSEAD, in partnership with Adecco and Tata Communications, 2018, p.13.

Human Capital Talentum Analytics - The Lexicon

The term 'Talent' is derived from the Latin word *'Talentum'* means 'Sum of Money', a marked ability or skill, the potential or factual ability to a skill better than most people.[8]Talent is the *High-Output Turbo-Charged 6-Cyl. Engine* that connects competitiveness and innovation for today's globally interactive connected mobile economy. The talented people are those who have exceptional abilities and they are successful in a range of activities or in a specific field. **(Rothwell, William J, 2008)**[9].Finding, having and retaining the right Talent, at the right place, at the right time, and at the right price is an important global issue for every enterprise **(Briscoe. D, Schuler. R,2004**[10]**&Tarique, 2002).**[11]

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From the perspective of pedagogical intervention, the concept of talent is considered as a component of giftedness **(Feldhusen, 1986)**[12]The phrase 'War For Talent' was at first coined by McKinsey & Company in 1998 when the economies were burning white hot, the Recruiting and Retention are in frenzy, the Dot.Com (.Com) bubble burst, the NASDAQ crumbled, and fears of recession spread.

Gary Becker developed 'Economic Theory' in 1975 and defined '**Human Capital'** is the sum of the current and future economic valuation of the skills and capabilities embodied within all the individuals that make up the total workforce of the organisation **(SSE, 2015).** Human Capital is defined as the acquisition of knowledge by an individual during his/her life and uses it for productive purposes either in market or non-market circumstances **(OECD,1996).**[13]The contribution of 'Human Capital' to organisational performance can be measured, weighed and modeled by HR Analytics.**(Boudreau and Ramstad 2007,** [14]**Hoffman** *et al*.**, 2012**[15]**, Huselid***et al*.**, 2005**[16]**, Huus, 2015**[17]**, Lawler** *et al*.**, 2004)**[18]**.Human Capital Talentum Analytics (HCTA)** can be defined as a systematic

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collection, analysis and interpretation of workforce data that is pivotal in identifying, tapping, recruiting and retaining the best talents in a unique manner.

The Human Capital Analytics for Managing Workforce from simplest to most sophisticate are classified into 6-Types *viz.,* (i) Human-Capital Facts, (ii) Human-Capital Analytics, (iii) Human-Capital Investment Analysis, (iv)Human-Capital Forecasts, (v) Talent Value Model, and (vi) Talent Supply Chain.**(Thomas H. Davenport *et al.,* 2010)**[19]. Leading-Edge Companies *viz., Google, Best Buy, Sysco*, and others adopted the **DELTA** (High Quality **D**ata, **E**nterprise Orientation, Analytical **L**eadership, Strategic **T**argets and **A**nalysts) Approach of Talentum Analytics to enhance their competitive advantage, productivity, engagement and retention of top talent, and then replicating their successes.

CHATBOT, a Singapore OCBC Bank in-house mobile app, a holistic HR in Pocket, a Resource Center for submission of Leave and Claims, Tracking Medical and Lifestyle Benefits, and Internal Job Postings. **Cognizant's Analytics** revealed that employees who blogged were more engaged and satisfied. The **Augmented Reality (AR)** and **Virtual Reality (VR) Tools** for Talent Acquisition, the **Disrupted Recruitment Practices** *viz.,* **GetLinks or Arya** are some of the HR Talentum Analytics effectively lowering costs and obtaining candidates with the better fit.

The HR Analytics Team would be responsible for devising, designing and developing Models, Dashboards and Talent Pipeline that attracts, develops and keeping workforce. Talent Decision Support Systems (DSS) must be evaluated in terms of Return on Investment (ROI). Topple HR Thinking with the Digi-Solutions, have to learn how to 'Be Digital' not

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19. Thomas H. Davenport , Jeanne Harris and Jeremy Shapiro (2010)., Competing on Talent Analytics, HBR, Oct.

just 'Buy Digi-Products', Integration of HR Analytical Framework with other functions and ensuring safety and security is the prime concern while constructing HCTA Framework.

HCTA in Schools Of Business (SOBs) - The Policies and Practices

Talent is encapsulated in individuals and as such it cannot be codified, duplicated, sold, or easily transferred from one person to another. In other words, it is the 'Humane' in 'Human Capital' that makes it a unique, distinct, and irreplaceable resource.**(Bhanu Prakash.K& Chandra Prasad. J. 2014)**[20]. India, a Global Talent Hub, the Single Largest Producer and Provider of World-Class Talent offering 1 in 4 Graduates to the World **(EY, Higher Education in India: Vision 2030)**from the Esoteric and Meta-Physical to Modern Times with over 799 Universities, 39071 Colleges and 11923 Stand-Alone Higher Educational Institutions **(AISHE, 2017)[21].** The aspects of Talent Acquisition, Development and Retention, Employee Value Proposition (EVP) in Schools Of Business are examined from the view point of Talent Management. Talent Acquisition requires thinking deeply about the EVP and Staffing Processes while EVP comprises of Organisational Culture, Work, People and Rewards to promote the organizational features that allow it outwardly and generate loyalty internally. Staffing includes both Recruitment and Selection Processes. The Talent Development Process focuses on long-term and facilitates Learning. Retaining Talent requires long-term thinking and creative planning. The designing of consistent and coherent model of HCTA can be easily aligned with business strategy **(Andres Hatum, 2010[22]).**

In the Era of Big Data, HCTA provides a blue print for Schools Of Business (SOBs) in Telangana (71) and Karnataka (115) to leverage 'Talent Pool' by the use of Data

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20 . Dr. K. Bhanu Prakash & Dr. J. Chandra Prasad (2014)., Talent Hunt - Strategies To Adopt and Adapt,ISBN.978-93-83241-63-7, Nov, p.p. 276-283.

21 . All India Survey on Higher Education, MHRD, Gov., Of India, 2017.

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Analytics. The voluminous, velocity and variety of data is the basis for 'Talentum Analytics' and silos, skills, strategies offer solutions at every stage and entire process of 'Talent Management Cycle (TMC)'.

Objectives of the Study

The study is empirical and innovative provides actionable insights on integration of HR Practices into Talentum Analytics, building-up more effective and efficient 'Talent Pipeline' and recommends policy measures to sharpen the saw for building the talent retention pipe line in Schools Of Business (SOBs) in Telangana and Karnataka that is an innovative, state-of-the art and integrated in nature. It also offers suggestions to enhance the performance and productivity of the organisation besides reducing time-to-hire and increasing quality of hire and revenue.

Methodology of the Study

The Vision, Mission, Goals and Objectives, Honorarium / Remuneration and CompensationPolicies of the SOBs are evaluated from the perspective of Strategic Planning; the Qualifications, the Teaching Pedagogy (Case Studies / Live Projects / Conceptual Focus / Content-Context/ Situation-Scenario), Competency Development Programs like participating in Conferences, Seminars, Workshops and conducting FDPs/FDWs,Industry - Academia Orientation, Mentoring, Career Counseling and Consulting and Analytical Exposure*(SAP / ORACLE/ Microsoft Dynamics)*of Faculties (Professors / Associate Professors / Assistant Professors)are considered and examined. The Admission Process and Practices *(GMAT/ GRE/CAT/MAT / Other Scores)*, Digi-Class Preparation and Participation (OHP, PPTs, MOOCs *etc.*,), SIP, Career Placements of Students forming the basis for the study.

Sample Design

The Stratified Random Sampling is adopted for collecting the data and the sample is confined to 20 SOBs in Telangana (in and around Hyderabad and Secunderabad) and 40 SOBs in Karnataka (in and around Bangalore) only. The Interview Protocol Method was

adopted for the study and the responses are elicited from the Chairman / President / BODs, Faculty, Students and Chief Human Resource Officers(CHROs')of SOBs in Telangana (20) and Karnataka (40).

Results & Discussion

The empirical evinces reveal that there are commonalities in the areas of institutional culture, leadership commitment, program implementation, and program evaluation. Talent Development Program Administratorsand Participants (CHROs')opined HCTA is considered as an investment strategy, institutional priority, engrained in the existing culture, and Retaining Talent in SOBs could have become a significant issue before CHROs'.

Exhibit-1: Incubating and Retaining Talent in SOBs - The Critical Insights
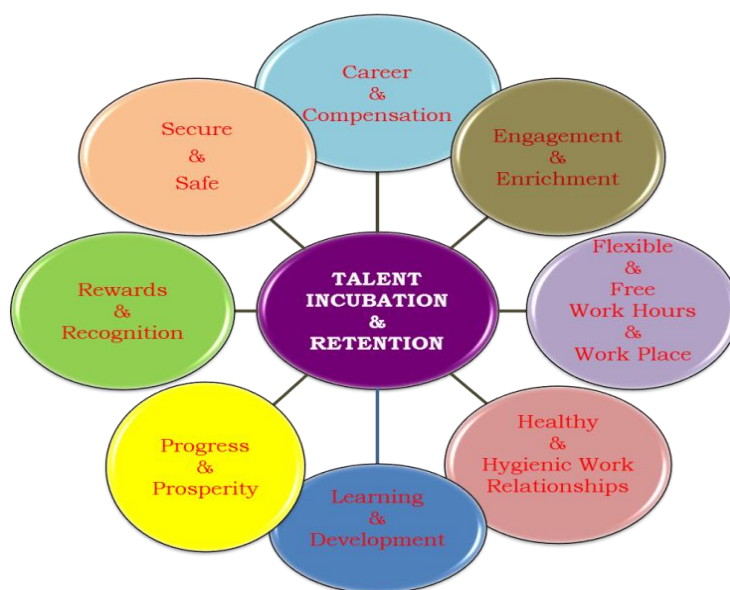
Source: HarshitBhavsar (2014)., Talent Management - Effective and Future Strategies, www.talenthunt.com

It is also observed that HCTA Practices are still relatively nascent in SOBs and 'Quality of Hire' is the most important metric. Integration HR Data with other functionsand designing of an Integrated Talent Retention System is the need which works together with coaching, career development, training, development, planning, feedback, recognition, HiPo assessment, and everything else. The 'Holistic Strategic Talent Retention Approach' which

gives a fresh lease of life to the organisation, allows people to build policies and process and instills confidence, improves morale among workforce in turn build winning culture is the need of the hour to incubate and retain talent.

It is suggested that the Mission Development, Goal Setting and Individual Assessments of the Institutions are geared up to design, develop, and implement Professional Development Programs (PDPs) across the Campuses primarily for Administrative and Support Staff Personnel. However, it would be useful for the Institutions to integrate theLeadership Development Programmes into the Critical Decision Making.Of all the Factorsaddressed, the limitations of both Executive and Supervisory Support were themost significant.

Moreover, Cultural Assessment, Institutional Transparency, Leadership Commitment, Organizational and Leadership Competencies, Talent Assessment Programs, Individual Development Planning, Coaching and Mentoring, Action Learning and Program Evaluation and Implementing Strategies develop Future Leaders with commitment and competencies embarking on a journey that provides valuable time to deepen and renew their thinking.

The Future of HCTA - Epilogue

'Talents' are unique and scarce, 'Talented' are value resources, 'Talent Management' is an espoused and enacted commitment, 'Engaging Talents' are complex but 'Retaining Talents' are crucial for the survival, success and sustainability of the Organisation. Building 'Talent Engagement Pipeline' is along-term, ongoing initiative, yet, requires a coordinated, consistent effort from organizational systems, and individuals. Human Resources Talentum Analytics provides detailed analysis on Recruitment, Selection, Training and Performance of Talents besides acquisition, development and retention. It also integrates critical data and transforming silos of information into relevant, timely, and actionable insight. To add some of the woes, the organisation's structure, culture, and approach to problem solving, Cost-

Benefit Analysis (CBA) are prominent to measure the value of HumanCapital Talentum interventions and initiatives. To sum up, HCTA emerged as a 'Nex-Gen Proactive HR Intelligence Platform' to transform Millennials as Outstanding Performers and ensure that SOBs make the right decisions today for the wellness and well-being of future generations.

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The problems: India stands behind Sudan and ahead of Namibia when it comes to its investments in education and healthcare mapped as a measurement of its commitment to economic growth (Institute of Health, Metrics and Evaluations (IHME). Touted the first ever scientific of this kind, it ranked India at 158 of 195 countries, and territories analyzed using data from various sources. Our findings show the association between investments in education and health, and improved human capital and GDP- which policy makers ignored.

Role of impact investing on SDGs

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Abstract:

In the world, number of companies are on the raise to maximize their financial returns, but also ready to contribute something for the development of the society and for the environment. To find funds for the Sustainable Developmental Goals is a very big challenge in the world but with the help of impact investing, the challenge is reduced to a large extend. In this endeavor this article is an attempt to find out the role of impact investing in Sustainable Developmental Goals, because sustainability of all living beings on the earth purely depends on the quantum of money which gets into impact investing throughout the world. SDGs came into existence soon after the MDGs-Millennium Developmental Goals, moreover it identifies the relationship between the SDGs and Impact investing and how impact financing is used as a means to reach out to SDGs in the world.

Key words: Impact Investing, MDGs, SDGs

Introduction:

Impact investments are investments made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return. Impact investments can be made in both emerging and developed markets, and target a range of returns from below market to market rate, depending on investors' strategic goals.

The growing impact investment market provides capital to address the world's most pressing challenges in sectors such as sustainable agriculture, renewable energy, conservation, microfinance, and affordable and accessible basic services including housing, healthcare, and education.

Impact Investing Nuances:
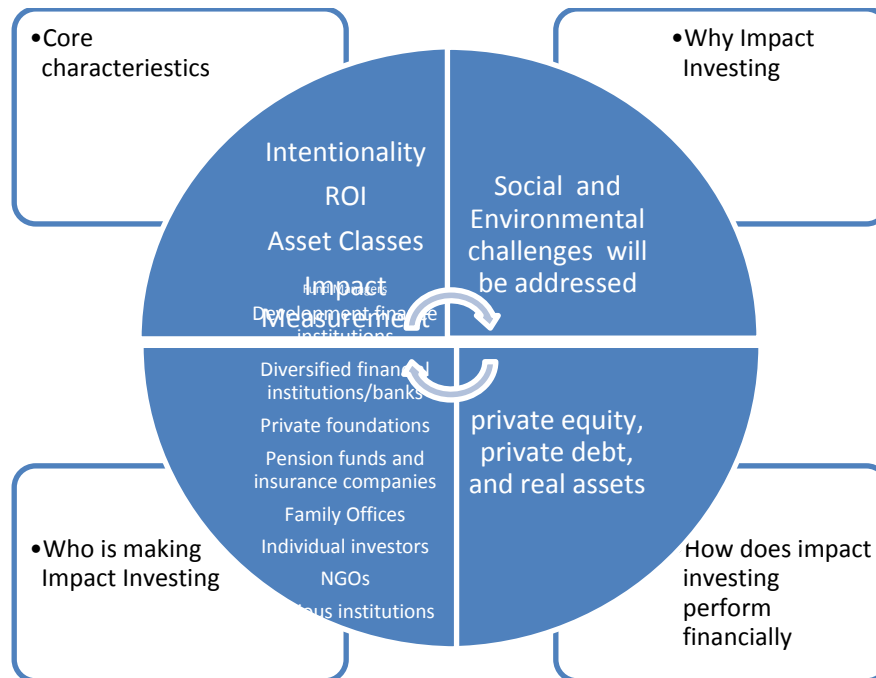
(Source:- Researcher's Model)

Core characteristics of impact investing

The practice of impact investing is further defined by the following four core characteristics:

Intentionality: An investor's intention to have a positive social or environmental impact through investments is essential to impact investing.

Investment with return expectations: Impact investments are expected to generate a financial return on capital or, at minimum, a return of capital.

Range of return expectations and asset classes: impact investments target financial returns that range from below market (sometimes called concessionary) to risk-adjusted market rate, and can be made across asset classes, including but not limited to cash equivalents, fixed income, venture capital, and private equity.

Impact measurement *is a* hallmark of impact investing is the commitment of the investor to measure and report the social and environmental performance and progress of underlying investments, ensuring transparency and accountability while informing the practice of impact investing and building the field.

Investors' approaches to impact measurement will vary based on their objectives and capacities, and the choice of what to measure usually reflects investor goals and, consequently, investor intention. In general, components of impact measurement best practices for impact investing include:

- Establishing and stating social and environmental objectives to relevant stakeholders
- Setting performance metrics/targets related to these objectives using standardized metrics wherever   possible
- Monitoring and managing the performance of investees against these targets
- Reporting on social and environmental performance to relevant stakeholders.

Why impact investing?

Impact investing challenges the long-held views that social and environmental issues should be addressed only by philanthropic donations, and that market investments should focus exclusively on achieving financial returns.

The impact investing market offers diverse and viable opportunities for investors to advance social and environmental solutions through investments that also produce financial returns.

Many types of investors are entering the growing impact investing market. Here are a few common investor motivations:

- **Banks, pension funds, financial advisors,** and **wealth managers** can *PROVIDE CLIENT INVESTMENT OPPORTUNITIES* to both individuals and institutions with an interest in general or specific social and/or environmental causes.

- **Institutional** and **family foundations** can *LEVERAGE SIGNIFICANTLY GREATER ASSETS* to advance their core social and/or environmental goals, while maintaining or growing their overall endowment.

- **Government investors** and **development finance institutions** can *PROVIDE PROOF OF FINANCIAL VIABILITY* for private-sector investors while targeting specific social and environmental goals.

Who is making impact investments?

Impact investment has attracted a wide variety of investors, both individual and institutional

- Fund Managers

- Development finance institutions

- Diversified financial institutions/banks

- Private foundations

- Pension funds and insurance companies

- Family Offices

- Individual investors

- NGOs

- Religious institutions

How do impact investments perform financially?

Impact Investors have different monetary return desires. Some deliberately contribute for beneath market-rate returns, in accordance with their key targets. Others seek after market-aggressive and advertise beating returns, some of the time required by guardian obligation. Most financial specialists overviewed in the GIIN's 2017 Annual Impact Investor Survey seek after focused, market rate returns.

A far reaching audit of accessible research to date on the budgetary returns of effect ventures are accessible in the GIIN's report, GIIN Viewpoints: Proof on the Money related Execution of Effect Speculations. The report assesses over twelve examinations—created by an extensive variety of associations—on the money related execution of interests in three regular resource classes in impact investing: private equity, private debt, and real assets, and also singular financial specialist portfolios assigned crosswise over resource classes.

More information on monetary returns of impact investments are accessible in the 2015 Presenting the Impact Investing Benchmark study, which takes a gander at money related execution of private equity and funding sway ventures, and also the second report in the budgetary execution arrangement, distributed in May 2017, The financial performance of real assets impact investments. Both of the reports were created in organization with the Global investment advisory and Cambridge Associates.

GIIN PERSPECTIVES: The Proof of the financial performance of Impact Investment in the world:

For example, these Impact investments show the differing ways that venture capital can be utilized to produce positive social as well as ecological effect close by budgetary returns.

Investigate how impact investment is enhancing the lives of ladies in Bolivia, the general population and condition of Mongolia, and bilingual networks in the Unified States.

GLOBAL PLAYERS OF IMPACT INVESTING
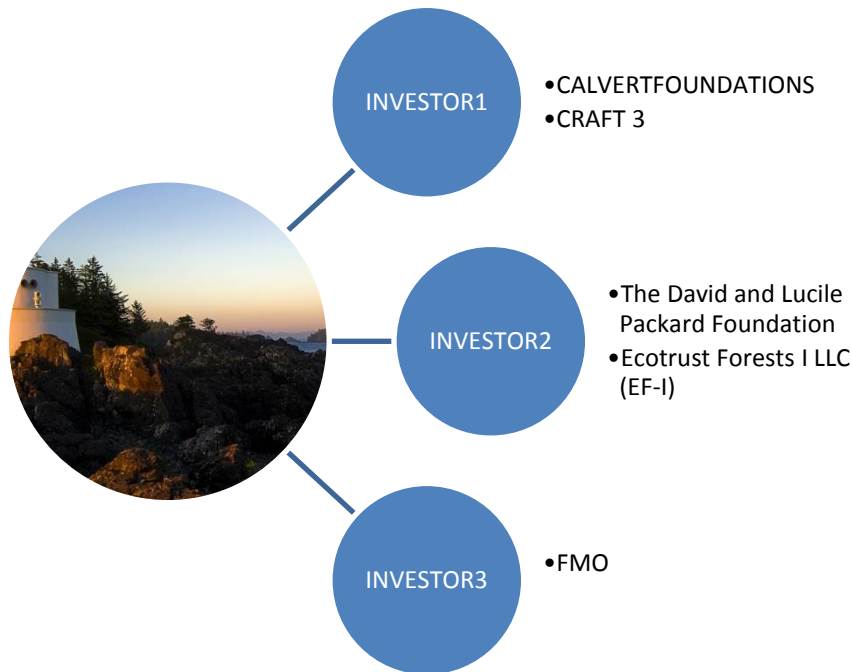
(Source:- Researcher's Model)

Clean Energy

The difficulties for preparing money related assets for reasonable improvement are immense; as per UNCTAD, an expected 5-7 trillion USD are required every year to accomplish the SDGs. Official advancement help (ODA) stays basic to many creating nations, yet ODA alone won't be sufficient to meet the SDG financing hole. Conveying assets at the scale required to accomplish the SDGs requires activity from an extensive variety of performers cooperating. Private fund will assume an inexorably essential job in conveying extra assets to enable creating nations to accomplish the SDGs. It is thusly imperative to discover better approaches for drawing in with the private segment as a key accomplice, including through effect contributing. It is progressively evident that a key to the accomplishment of Motivation 2030 lies with the private segment.

An expanding number of organizations and speculators are searching for circumstances that will produce a money related return, as well as have a positive social and ecological effect. The Addis Ababa Activity Motivation (AAAA) in passages 37 and 42 unequivocally makes reference to affect contributing as a way to accomplish the SDGs.

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Effect venture not just catalyzes private division financing to address the SDGs, yet in addition conveys inventive new ways to deal with tending to social and natural issues and also responsibility for results.

Enthusiasm for effect speculation is ascending among private, open and institutional speculators, supported by the acknowledgment of the earnestness and size of worldwide issues and the basic job of the private segment in tending to these issues. Be that as it may, there is as yet a need to enhance the empowering condition for effect speculation and create powerful proof in the field about exchange and execution information, financing approaches and compelling arrangements.

The point of this occasion is to show the significance and capability of effect venture and also to give a review of chosen activities that are being attempted to encourage the advancement of the field:

- Highlighting the significance of approach and the formation of an empowering domain for effect venture with the instances of Brazil and different nations
- Sharing solid instances of the imaginative work of social business people in the field and also encounters of effect speculators
- Presenting the effect speculation work of UNCDF which centers around Least Developed Countries (LDCs)
- Showcasing crafted by the OECD in building the proof base in the field of effect speculation and gaining from practices and rising policy suggestions.

The role of impact investing on SDGs

Roughly a year before, the Unified Countries received the Manageable Improvement Objectives (SDGs). These objectives were made as a worldwide suggestion to take action for positive change. Close to the commemoration of the foundation of the SDGs, we see how affect contributing interfaces with the SDGs and the criticalness behind it.

We can never again think and act in storehouses

As a pursue on to the Millennium Developmental Goals (MDGs), the Sustainable Developmental Goals (SDGs) were set up. These new arrangement of objectives comprise of 17 optimistic objectives with 169 focuses for the following 15 years. These SDGs and targets center around closure destitution, securing the planet, and guaranteeing success for all. The new objectives perceive that all social and natural destinations are interconnected and influence everybody in the worldwide network.

"It's about what the entire world must do to guarantee we have a liveable planet and decline imbalance. Every one of the objectives are interlinked. For example, environmental change is identified with our nourishment framework, financial development, access to clean vitality, and our dirts among numerous different issues. What is clear is that we can never again think and act in storehouses. Our general public and planet just don't have enough time," says Marilou van Golstein Brouwers, Seat of the Administration Leading body of Triodos Speculation The executives. "It's about what the entire world must do to guarantee we have a liveable planet."

How is affect contributing associated with the SDGs?

When taking a gander at the SDGs, there are such classifications as lessening neediness, expanding sex balance, giving access to spotless and reasonable vitality, and making progressively economical urban areas and networks. Each objective has focuses on that require a type of money related venture. The UN appraises that creating nations alone face a USD 2.5 trillion hole in financing.

Ventures to enhance social and ecological welfare are being begun and manufactured however require (more) financing to create. Effect speculation assumes a crucial contributing job as it has opened private cash-flow to address societal issues. For effect contributing to succeed, it requires taking a gander at contributing through a perspective and requests that the speculator question: "What is my cash improving the situation a cleaner planet or for equivalent open doors for all?" and making a move from that point.

Effect speculators lining up with SDGs to driving outcomes

The Worldwide Effect Contributing System (GIIN) discharged a report including how affect financial specialists are on the whole driving outcomes and how these outcomes adjust to the SDGs. Triodos Speculation The executives trusts that affect financial specialists that line up with the SDGs will draw in capital, in this way adding to taking care of the issues that their ventures set out to address.

Conclusion:

The SDGs have the ability to impact the monetary segment to glance through an alternate focal point and analyze the genuine benefit of contributing and invigorating financial specialists to think in an unexpected way. Marilou van Golstein Brouwers: "The earnestness to change how the monetary business takes a gander at contributing, and how financial specialists are presently utilizing their cash is obvious. We can see it in environmental change, mass relocation, and the extending social disparity on the planet. This is a desperation that specifically influences each nation and everybody – at our homes, in our families, and in our networks."

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Temporary and Seasonal Labour Migration from Marathwada Region to Western Region of Maharashtra State in India- An Exposure[1]

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Abstract:

The study of migration remains important because it is related to business cycles, supply of skilled and unskilled workers, growth of industries and the occupational and employment status of the migrants. Planners and policy makers are concerned with migration because it is associated with the socio-economic development of the country. Temporary and seasonal migration appears to be emerging as a dominant pattern of movement of specific economic groups who keep one foot in the village either by necessity or choice. The research study is concerned with temporary and seasonal migration for employment from backward area of Marathwada region to western region of Maharashtra state. Despite the vast numbers of migrant workers, the policies of the Indian state have largely failed in providing any form of legal or social protection to this vulnerable group. In a continuous state of drift, migrants are left out of the scope of state provisions at both ends - the "source" and the "destination". To deal with this social problem the researcher will throw a spotlight to analyze and reveal a range of socio economic factors responsible for this social challenge.

Keywords: Seasonal labour migration, Temporary labour migration, India, Marathwada

1.1 Introduction

The study of migration remains important because it is related to business cycles, supply of skilled and unskilled workers, growth of industries and the occupational and employment status of the migrants. Planners and policy makers are concerned with migration because it is associated with the socio-economic development of the country. Seasonal migration for work is a pervasive reality in rural India. An overwhelming 120 million people or more are estimated to migrate from rural areas to urban labour markets, industries and farms. Migration has become essential for people from regions that face frequent shortages of rainfall or suffer floods, or where population densities are high in relation to land Poverty, lack of local options and the availability of work elsewhere become the trigger and the pull for rural migration respectively. The internal movement of people due to work is not new. In last two decades the labour migration has been increased significantly. Especially striking is the increase in temporary and circular movements which include a spectrum of movements from trips that last several months, to daily commuting

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[1] The research paper is based on the study undertaken for minor research project funded by Indian Council of Social Science Research, New Delh

for work. Temporary and seasonal migration appears to be emerging as a dominant pattern of movement of specific economic groups who keep one foot in the village either by necessity or choice. The research study is concerned with temporary and seasonal migration for employment from backward area of Marathwada region to western region of Maharashtra state. Many socio economic, geographical and political factors kept Marathwada downturn in the state. The region is known for its drought, falling as it does in the rain-shadow area of Maharashtra. It is the most underdeveloped area in the state.

1.2 Socio-Economic Profile of Marathwada Region

About 95 per cent of agriculture land of Marathwada is dry land farming. It is the least urbanized area in Maharashtra with 80 % of the population living in rural areas. About 30 per cent of the population in Marathwada region is below poverty level. Its per capita GDP is only Rs. 14,220 (US$ 316). The literacy rate is the lowest in the state – 65 per cent with only 55 per cent literacy among women. All eight districts in the region figure in the list of the 100 poorest districts in the country. Maharashtra is growing as a State but Marathwada is not keeping pace with it. Marathwada's share in GDP is only 10 per cent. Incidence of poverty is more here. The average per capita income is Rs. 29,000 for state, but hovers in the range of Rs. 12,000 to Rs. 20,000 for districts in the region. Only Aurangabad, with per capita income of Rs. 19,365, is better placed.

Financial reforms are needed for bettering fortunes of the region. Economic statistics bear this out. The per capita income of Marathwada, at Rs 40,824, is the lowest of any region in Maharashtra, according to the Kelkar committee report. The eight districts of Marathwada are home to only 7.7 percent of the total number of micro, small and medium enterprises in the state.

(The Economic Survey of Maharashtra 2016-17 and Census 2011) The Marathwada region is carrying out population pressure and unemployment, poor income and poor saving, under utilization of resources, capital deficiency, low level of technology, poor economic organization, lack of suitable socio-economic set-up, mass poverty, misery and low-standard of living, slow rate of growth in agriculture, undesirable labour migration, massive rural unemployment, unbalanced growth of different districts and rural poverty etc.

1.3 Statement of the Problem

According to The Kelkar committee report of "The High Level Committee on Balanced Regional Development Issues in Maharashtra Government" submitted to Planning Department of Maharashtra Government revealed that in the absence of adequate employment and other socio economic issues, the seasonal migration is found from Marathwada region. This seasonal labour migration not only increases the existential vulnerabilities of poor families but also denies them the developmental opportunities. Migration of labour is an important factor affecting the course of socio-economic development in India.

Despite the vast numbers of migrant workers, the policies of the Indian state have largely failed in providing any form of legal or social protection to this vulnerable group. In a continuous state of drift, migrants are left out of the scope of state provisions at both ends - the "source" and the "destination". To deal with this social problem the researcher will throw a spotlight to analyze and reveal a range of socio economic factors responsible for this social challenge.

2. Objective of the Study

To explore the economic status, reasons and compelling factors for seasonal and temporary migration from Marathwada region to western region of Maharashtra state

3. Definitions

Temporary and seasonal migrants maintain continuous but temporary absences from their place of origin for more than one day (Hugo 1982). Temporary and seasonal migration is a move made for a short period of time with the intention of returning to the place of usual residence. An important group of temporary migrants consists of seasonal migrants, who combine activity at several places according to seasonal labour requirements (Keshri and Bhagat 2010)

4. Research Design

Parameter	Description
❖ **Type of Research**	Ex post facto descriptive type research
❖ **Population**	Temporary and Seasonal Migrants in Marathwada
❖ **Sampling Unit**	Temporary and Seasonal Migrants
❖ **Sample Size**	870 (from 87 Villages)
❖ **Sampling Method**	Multi-stage Sampling
❖ **Research Method**	Survey Method
❖ **Research Instrument**	Structured questionnaire
❖ **Sources of Data**	Primary and Secondary data sources
❖ **Measurement Scales**	Nominal

Table: 4.1 Research Design

5. Data Analysis and Interpretation

5.1 Economic Status of Seasonal Migrants Compared to Non-Migrants

Table 5.1

Economic Status of Migrant Compared to Non-Migrants	Count	Percentage
1. Same	261	30.00 %
2. We are relatively poor	487	55.98 %
3. We are relatively better off	62	7.13 %
4. Can't Say	60	6.90 %
	N=870	100.00 %

Unfortunately 487 out of 870 viz. 56% of the migrated labours have stated themselves with poorer life status compared to those in their respective villages while only 7.1% could sense some betterment compared to their native residents.

5.2 Who Migrates Seasonally

Observably 81.5 % respondents are migrants on account of their poor conditions of life along with the stark contrast of no rich native in the village could become a seasonal migrant.

Table 5.2

Who Migrates Seasonally	Count	Percentage
1. Poor	709	81.49 %
2. Rich	0	0.0 %
3. Middle Class	37	4.25 %
4. All	73	8.39 %
5. Can't Say	51	5.86 %
	N=870	100.00 %

5.3 Reasons of the Seasonal Migration

Graph 5.1

Pareto Chart of Reson for Migration

	Poverty	Ltd Emplo	Indebt	Better W	Ltd Land	Advance	Edu	Facility	Other
Frequency	709	292	271	196	138	136	52	48	58
Percent	37.3	15.4	14.3	10.3	7.3	7.2	2.7	2.5	3.1
Cum %	37.3	52.7	66.9	77.3	84.5	91.7	94.4	96.9	100.0
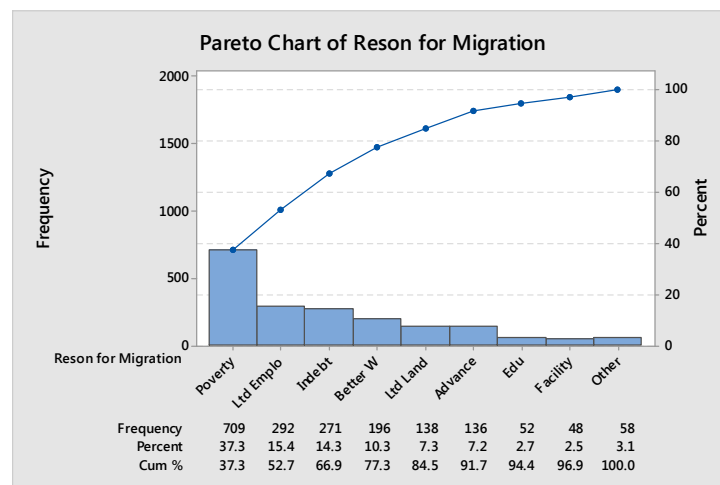
Major reason for seasonal migration is poverty i.e. 37.3 % respondents are migrating because of poverty. Further it can be said that, the poverty, limited employment indebtedness and better wages at destination are foremost reasons for the seasonal migration from this area viz. 77.3 %

5.4 Migration in Spite of Employment Scheme like MGNREGA

Table 5.3

Migration in spite of MGNREGA Scheme	Frequency	Percentage
1. Yes	552	63.40%
2. No	318	36.60 %
N=870		100.00 %

Table 5.3

The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) aims to enhance livelihood security in rural areas by providing at least 100 days of guaranteed wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work. It is expected that MGNREGA helps poor and weaker section of the community by providing employment at critical period (off season) of a year and that reduces the seasonal migration. However it is observed that 63.4 % people are migrating even if there is a government

employment scheme like MGNREGA. The MGNREGA scheme found to be   ineffective in reducing seasonal migration in the study area. It has failed to stem migration.

5.5 Reasons of Migration in spite of Employment Scheme like MGNREGA

Table 5.4

Reasons of Migration in spite of MGNREGA Scheme	Frequency	Percentage
1. In-sufficient Wages	253	24.70%
2. Work is not available for entire time	186	18.20%
3. Delayed Payment	126	12.30%
4. No such scheme Implemented or obtainable at my village	215	21.00%
5. Such works are done by Machines	244	23.80%
Number of Responses (includes multiple responses)	**1024**	**100.00 %**

It was obvious to know why MGNREGA Scheme failed to stem seasonal migration. 24.70 % respondents reported that the insufficient wages failed to prevent migrant from leaving the village. Some respondents specified that minimum agricultural wages in the village are higher than MGNREGA wages. 18.20 % participants in the study indicated that, the work provided under the scheme is not available for entire time or unavailable at least for off season and that directs them to go away. 12.30 % complained about delayed payments. 21 % respondents said that 'no such scheme implemented or obtainable at village' and this number is more which put a question mark on correct implementation of scheme in some villages. 23.80 % people are of opinion that the machines are used in this scheme and hence they are not getting jobs.

Graph 5.2
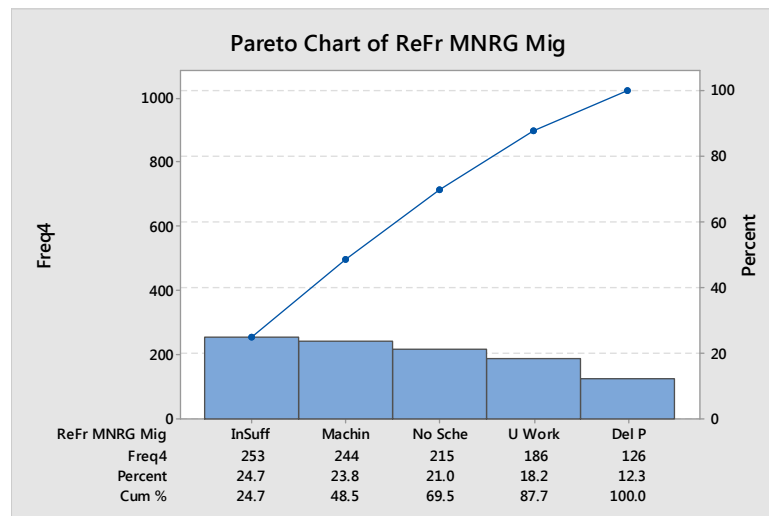
The Pareto chart shows, 69.5 % migrants indicated that 'In-sufficient wages', 'use of machines for work' and 'non-execution of the scheme' are major factors that makes MGNREGA scheme ineffective and could not stop migrants from seasonal migration. Higher wages, more opportunities for work, better implementation and a greater recognition of work may fully meet the goal of MGNREGA.

5.6 Type of Seasonal Migration

Table 5.5

Type of Seasonal Migration	Frequency	Percentage
1. Forced Migration	328	37.70%
2. Voluntary Migration	314	36.10%
3. Both	184	21.10%
4. Can't Say	44	5.10%
Number of Responses (Multiple Responses)	1024	100.00 %

Out of 870 seasonal migrants 328 (37.7 %) reported that their relocation is forced, 314 (36.1 %) reported that they are voluntarily migrating, 184 (21.1%) reported that they experienced both forced and voluntary migration, whereas 44 (5.1 %) are not able to understand the type of migration they are experiencing. The number of workers who experience their migration as forced (37.7 %) or voluntary (36.1 %) is approximately same. That means migration can be forced or voluntary but any how it compels them to leave their own village. It is the truth that their own place is not able to provide them opportunity to survive in the off season.

5.7 Factors Compelling individual for migration

Table 5.6

Factors Compelling individual for migration	Agree	Disagree	Neutral
Less land to earn sufficiently for your family, compels to migrate	85.40 %	5.29 %	9.31 %
Lack of irrigation facility affects agricultural productivity throughout the year, which compels to migrate	70.80 %	17.47 %	11.72 %
Seasonal relocation can offer something better than staying back here?	72.87 %	23.10 %	4.02 %
Bank does not give adequate opportunities for nonfarm activities, which compels to migrate	74.83 %	21.49 %	3.68 %
Migration reduces unnecessary engagement of household workforce in the agricultural sector	46.21 %	35.52 %	18.28 %
More number of dependents in the family require extra source of income through migration	48.39 %	35.86 %	15.75 %
Migration is taking place due to social conflict and caste discrimination at source (village)	25.86 %	59.08 %	15.06 %
There is no well established industry or project in your area which can provide an employment opportunity	76.90 %	20.92 %	2.18 %
Increased income due to migration helps to upgrade social status in the village	54.02 %	37.59 %	8.39 %
The migration history in the village attracts to migrate	52.99 %	40.46 %	6.55 %
Dowry and other expenses in daughters marriage increases indebtedness, which pushes for the migration	75.98 %	20.46 %	3.56 %
The works of agriculture, tanks, roads and other schemes are mainly done by machine; hence sufficient employment is not available in the village.	79.43 %	15.75 %	4.83 %

People migrate due to compelling circumstances which pushed them out of the place of origin or they are lured by the attractive conditions in the new place. 85.4 % participants in the study indicated that, they are compelled to migrate due to less land which is insufficient to earn for the family. 70.80 % reported that, they are forced to migrate seasonally because of lack of irrigation facility, which affects agricultural productivity throughout the year. 72.87 % are of opinion that seasonal relocation can offer something better than staying back here and this pushes them for the migration. 74.83 % find it difficult to get bank assistance to do something in nonfarm activities. It is the fact that banks denying loans to low-income groups, migrant labors on different grounds and that became usual to move. 46.21 % believe that the migration reduces unnecessary engagement of household workforce in the agricultural sector so they do migrate. 48.39 % are of opinion that the more number of dependents in the family require extra source of income and that can be earned through such migration. Only 25.86 % believe that the migration is taking place due to social conflict and caste discrimination at source (village). At the same time 59.08 % are denying this compelling factor. 79.60 % reported that there is no well established industry or project in the area and hence they cannot find any better employment opportunity at hometown. This pushes them to migrate. 54.02% seasonal migrants seek to upgrade social status in the village though increased income raised due to migration. The migration history in the village attracts 52.99 % workers to migrate. 75.98 % significantly indicated that dowry and other expenses in daughters marriage increases indebtedness, which pushes for the migration. 79.43 % participants were railing about the insufficient employment available in the village due to use of machines in the works of agriculture, tanks, roads and other work schemes.

Graph 5.3

Pareto Chart of Compells

Compells	Less Land	Automation	No Ind	Dawrey	Bank Loan	Better	Lack Irri	Status	History	Extra Inc	Unnec Force	Other
Freq6	85.40	79.40	76.90	76.00	74.80	72.90	70.80	54.00	53.00	48.40	46.26	25.90
Percent	11.2	10.4	10.1	10.0	9.8	9.5	9.3	7.1	6.9	6.3	6.1	3.4
Cum %	11.2	21.6	31.6	41.6	51.4	60.9	70.2	77.3	84.2	90.6	96.6	100.0
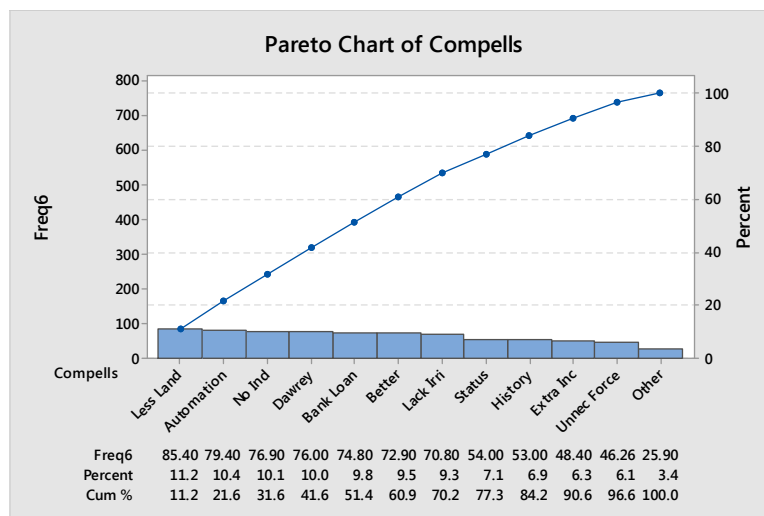
Further Pareto chart highlights the most important compelling factors among a set of factors. Significant factors that compels for migration are 'Less land to earn sufficiently', 'Automation of work', 'no well established industry or project', 'Dowry and other expenses in daughters marriage', 'no bank assistance', 'sense of betterment' and ' Lack of Irrigation facility'.

6. Conclusion

The seasonal and temporary labour migration from Marathwada region to western region of Maharashtra state can be underlined with respect to the economic status, reasons and compelling factors of migration. It is the truth that their own place is not able to provide them opportunity to survive in the off season. The migrants live a poorer life compared to those in their respective villages who are not migrating. The poverty, limited employment indebtedness and better wages at destination are foremost reasons for the seasonal migration from this area. In the present time rate of migration is increasing and the people are compelled to leave their villages. Significant factors that compels for migration are 'Less land to earn sufficiently', 'Automation of work', 'no well established industry or project', 'Dowry and other expenses in daughters marriage', 'no bank assistance', 'sense of betterment' and ' Lack of Irrigation facility'. On the contrary MGNREGA scheme has failed to stem migration due to 'In-sufficient wages', 'use of machines for work' and 'non-execution of the scheme'.

To overcome this social problem, it is necessary to focus socio economic parameters identified and construct policies to focus grey areas of backward Marathwada region. The education, irrigation, industrial development, financial support should be brought into a sharper focus of planning department. The state government should look after the problem of regional disparities in the state.

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Employee Relation in India – A Theoretical approach

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ABSTRACT

Employee relation is the vital in an organization for the climbing as per marketing standards because the employee's work is investment to the organization where the employee should feel to work as per the Henry Fayol's 14th Management principle Esprit decorps which means feeling pride regarding to an organization to maintain sustainability internally which reflects the output of an organization. When employee relations maintains in harmony environment then the Industrial environment will be in top ward direction. Reducing the levels of conflicts in employee working place is the main agenda of Employee relations.

KEY WORDS: Employee Relations, Workplaces, Industrial Relations, Harmony, Esprit decorps,

1.INTRODUCTION:

The success and failure of any organization is directly proportional to the labor put by each and every employee. The human beings working together towards a common goal at

a common place (organization) are called employees. Infact the employees are the major assets of an organization.

Every individual shares a certain relationship with his colleagues at the workplace. The relationship is either warm or so-so or bad. The relationship can be between anyone in the organization - between co workers, between an employee and his superior, between two members in the management and so on. It is important that the employees share a healthy relationship with each other to deliver their best performances.

Employee relations refer to the relationship shared among the employees in an organization. The employees must be comfortable with each other for a healthy environment at work One needs to enter his office with a positive frame of mind and should not unnecessarily make issues out of small things. It is natural that every human being can not think the way you think, or

behave the way you behave. If you also behave in the similar way the other person is behaving, there is hardly any difference between you and him. Counsel the other person and correct him wherever he is wrong.

2.REASONS OF GOOD EMPLOYEE RELATIONS:

- There are several issues on which an individual cannot take decisions alone.

- Work becomes easy if it is shared among all.

- The organization becomes a happy place to work if the employees work together as a family.

- An individual feels motivated in the company of others whom he can trust and fall back on whenever needed

- Healthy employee relations also discourage conflicts and fights among individuals.

- A healthy employee relation reduces the problem of absenteeism at the work place.

3.STRATEGIES TO IMPROVE EMPLOYEE RELATIONS:

It is important that the management promotes healthy employee relations at workplace to extract the best out of each

individual. Competition is essential but it should not promote negativity or any kind of enmity among the employees.

4.METHODOLOGY:

The following are the steps and strategies for a healthy employee relationship in the organization.

- Involve your team members
- Encourage individuals to share their work with each other.
- Assign them targets and ask all your team members to contribute equally and achieve the target within the desired time frame
- One should try his level best that all the employees must have their lunch together at the same time**.**
- Encourage effective communication among the team members**.**

4.1 **Involve your team members:**

They should feel important and indispensable for the organization. An individual must be assigned responsibilities according to their interests and responsibilities. Don't impose work on them. Let them willingly accept challenges. They must enjoy whatever they do otherwise they would end up fighting with their superiors and fellow workers.

4.2 **Encourage individuals to share their work with each other:**

This way people tend to talk with each other more, discuss things among themselves and thus the comfort level increases. Let them work together and take decisions on their own. A team leader should intervene only in extreme cases of conflicts and severe misunderstandings.

4.3 **Assign them targets and ask all your team members to contribute equally and achieve the target within the desired time frame:**

Motivate them to work in groups. This way employees have no other choice than to trust their fellow

workers take each other's help as well. An employee must have the liberty to express his ideas and all of them should sit together to decide on something which would be beneficial to all.

4.4 One should try his level best that all the employees must have their lunch together at the same time:

Half an hour to forty five minutes must be dedicated to lunch and one should not discuss work during lunch time. There are other topics as well. Discuss movies, sports, shopping or any other thing under the sun. There will be no harm if the employees go out together once in a while for get together, picnics or shopping. Ask them to bring their family members as well.

4.5 Encourage effective communication among the team members:

It has been observed that poor communication leads to confusions and misunderstandings. The communication has to be precise and relevant. One should not play with words and be very specific about his expectations from his fellow workers as well as the organization. If you are not very happy with your colleague's proposal, don't keep things to yourself. Voice your opinion and do express your displeasure. It will definitely prevent a conflict among employees later and improve the relations among them. Be straightforward. Don't pretend things just to please your boss. If you find anything unacceptable, discuss with your superior but in a polite way.

4.6 Written modes of communication must be promoted among the

employees for better transparency:

Verbal communication is not as reliable as written communication. The agendas, minutes of the meeting, important issues must be circulated among all through emails. Make sure that all the related employees are in the loop. Don't communicate individually with any of the employees as the other one might feel neglected and left out.

5. ROLE OF COMMUNICATION IN EMPLOYEE RELATIONSHIP:

The communication has to be transparent and precise for a warm relationship among employees. Clarity in thoughts is important. Don't assume that the other person will come to know on his own what is going on in your mind. The thoughts must be converted sensibly into relevant words such that the other person is able to understand you well.

The employees must be very clear about what is being expected from them. Their key responsibility areas, roles and responsibilities must be communicated to them in the desired form for them to perform their level best. Don't play with words. Be straightforward and precise in what you expect from your team members. Don't blame them later. Haphazard thoughts and abstract ideas only lead to confusions and spoil the relationship among the employees.

5.1 EXAMPLE:

Peter was working as a branch manager with a leading company. First he wanted James to prepare a report on marketing and sales strategies undertaken by her organization, then he wanted him to prepare a report on the branding techniques and finally he asked him to also include the promotion strategies. he himself was not very clear about his expectations. Poor James was so confused that he submitted an incomplete report to peter . He was not at all

happy with James performance and always side-lined him in future. In the above example, peter was not very clear about the content of the report and also confused James. One needs to express his ideas clearly for the other person to understand it correctly. Poor communication in this case spoiled the relation between Peter and James who were once good friends.

Had Peter told James to prepare an exhaustive report on Marketing, sales, branding as well as the promotion techniques undertaken by the organization, things would been crystal clear and James would not have made any mistakes. One should be first very clear about his needs, expectations and then only communicate it to the other person.

Don't change statements quite often. Be firm. One should not tamper any data or manipulate truth. You would never gain anything out of it. Be honest and pass on information in its desired form. If your boss

has asked you to download some information to your fellow team members, please do pass it on as it is. Don't try to add or delete words as it would earn you a bad name. No one would trust you in future or come to your help whenever required. Remember honesty always pays in the long run.

Important information should be passed on in the presence of each and every employee for better clarity. Every employee should have the liberty to express his views and ideas. Don't expect you would clear your doubts later on, ask questions then and there. No one would feel bad, rather appreciate your interest and attentiveness but do not jump in between. Do wait for your turn to speak. Don't meet anyone separately as the other person might feel neglected or left out resulting in major displeasure and conflict among the team members. Do take care of

your pitch and tone. It should not be too loud.

Depend more on written modes of communication as they are more reliable as compared to verbal communication. An individual might back out if the information is passed on to him verbally as there are no records, but it never happens in written modes of communication. Prefer passing on information through Emails. All the related team members must be marked a carbon copy so that everyone knows what is being communicated to his fellow member. One should master the art of writing emails. Remember an email is nothing but a mirror image of one's thoughts. Make sure that your mail is self-explanatory and everyone is clear about your ideas and opinions**.**

has performed exceptionally well, do not hesitate to praise him. Words like "Well done", "Bravo", "Great Performance" go a long way in making the individual happy. If you are satisfied with your team member's

performance, do communicate your feelings to him/her

Communicate effectively with your fellow team members and you would never have a problem with anyone. People would respect you and work would be fun for you.

6.ROLE OF MOTIVATION IN EMPLOYEE RELATIONSHIP:

A healthy employee relationship leads to an increased level of satisfaction among the employees and in turn an increased productivity. Workplace becomes a much happier place and employees tend to concentrate more on work rather than unproductive things.

A motivated employee works better and at a much faster rate as compared to others. Motivating the employee would in turn benefit the organization only. You need to charge your cell phone after sometime for it to operate well, similarly a human being needs to be motivated from time to time to avoid a dip in his performance and for him

to remain loyal towards the management. Motivation acts as a catalyst for organization's success and helps the individuals to remain productive and deliver better results every time.

Simple words like "Well done", "Bravo", "Great", "Wow" can actually work wonders and go a long way in motivating an individual. If any employee has done exceptionally well, do appreciate him. Give him a pat on his back. The employees feel contended at work and thus share a warm relationship with their superiors. A token of appreciation is a must. Cash prize, gift vouchers and shopping coupons help in motivating the employees to a great extent. They get a motive to work. The employees must be motivated not to spread negativity around. They should be encouraged not to make issues out of small things and do not bring their personal tensions to work. They should be made to realize the importance of team work at the workplace and healthy

relation with colleagues. No one should forget their purpose of coming to the organization.

Motivate employees to work in a group rather than working alone. They must realize that working in a group means a better exchange of ideas and thoughts to come to an unique idea fruitful for them as well as the organization. Employees should be motivated to help each other and treat their team members as a part of their extended family. Individuals should complement each other at work but one should not forget his limit. Too much of a friendly nature again leads to problems and unrealistic expectations.

Award ceremonies must be organized at the workplace every month or after every three months to acknowledge the top performers. Call them on the dais and honour them. Display their names on the company's main notice board so that every employee gets to know about it. Give the top performers

badges for them to flaunt and do this activity in the presence of all. Don't do it separately as the other employee might get hurt and start fighting with his team members. These kinds of activities slightly give an upper edge to the employees who have worked hard and performed well. Others also feel inspired to perform better next time.
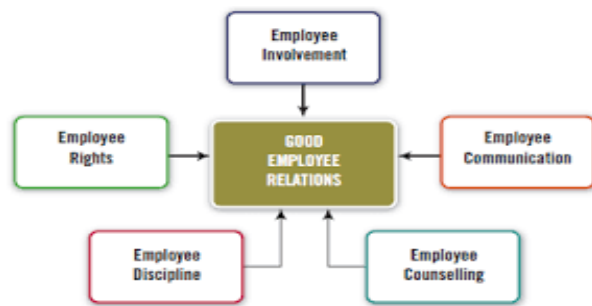
7.ROLE OF ATTITUDE IN EMPLOYEE RELATIONSHIP:

Attitude plays an important role in improving the relationship among the individuals. Nothing is possible unless and until an individual has a positive attitude towards life. You might have excellent communication skills, might be an intelligent worker, but if you don't have a positive attitude; you would definitely fail to create an impression of yours. People would be reluctant to speak to you and you would be left all alone.

Julie and jenny were team members and sat at adjacent workstations. Julie had a habit of constantly chatting over the phone with his friends and family, which sometimes irritated Jenny.

Case - 1 Julie always thought that Jenny did it intentionally to disturb her. She fought with julie terribly and now has strained relationship with her team member.

Case - 2 Jenny spoke to Julie about her displeasure, convinced him and requested him to either speak a little low or go outside for attending calls. Now a days Julie and Jenny are best of friends and together they contribute effectively to their team's targets.

Case 2 is any day a far better option.

One should not be too rigid or adamant. Be a little more flexible. Don't always assume that the other person is wrong and only you are correct. You may be wrong sometimes.

Listen to what the other person has to say and then only come to a conclusion. Don't take any decisions with a blocked mind.

An individual should not make issues out of small things. It is always better to forget things. Ignore things as long as they are not affecting your team's performance. Don't take things to heart. The more you become negative for your colleagues, the more you fight with them and in turn spoil your relationship.

One should be forgiving. If your boss is angry with you over something, do take the initiative and say a sorry to him. A simple "Sorry" can actually do wonders. If you do not have the courage to talk to him, send him a sms. Saying sorry will not lower your self-esteem, instead it would strengthen the bond between you and your superior.

One should never backstab anyone just for the sake of a mere promotion or some

money. It is unethical. Human relationships are more important and should be valued.

Treat your colleagues as your friends. Give them time and try to mingle with them as much as you can. Go out together for shopping or for a movie once in a while. You will feel attached to them. The trust factor and the comfort level increases. (employee relations) (employee relations) (employee relations).

Remember there is always some light at the end of a dark tunnel. Never lose hope in life. Stay positive, be good to others and enjoy a healthy relation with one and all.

8.ROLE OF MANAGERS IN EMPLOYEE RELATIONSHIP:

A healthy employee relationship is essential for the employees to find their work interesting and perform their level best. It is important for everyone to understand that one goes to his organization to work and conflicts must be avoided as it is nothing but a mere waste of time. Employees must be comfortable with each other and work in unison towards a common goal. An individual cannot remain tightlipped and work for infinite hours, he needs people around to talk to and discuss his ideas.

A team leader should be a role model to his team members. He should treat each and every individual as one and avoid partialities at work. Do not give anyone a special treatment just because he drops your son to school every day or says a yes to whatever you say. Appreciate if someone has done exceptionally well but do make sure to correct him if he is wrong somewhere. The team leader should not be rude or harsh to anyone. There is a correct way for everything and one should not insult any team member. It is strictly unethical. Sit with him and make him realize his mistakes. He would definitely look up to you in future. The superior must not act pricy and should always be accessible to his employees. The individuals must have the liberty to walk up to their immediate bosses in case of a doubt and clear things. The hierarchy should not be too complicated as it leads to confusions and disputes among employees.

9.CONCLUSION& RECOMMENDATIONS:

Employment relations and employee engagement began with a critical consideration of employee engagement in the context of employment relations, exploring the broader issues raised by both positive and negative conceptions of experience at work. The concept of emotional labour was introduced as highlighting the complex challenges of these

issues in practice. Only with healthy employee relation Organization structure will get good value in the market, which means Employee relation is the internal functioning structure which gives result for the Global market standards.

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Benchmarking Process in Organizations

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Benchmarking is a technique for assessing a firm's performance against the performance of other firms.

It is used to find the best practice and to take necessary actions to improve the firm's own performance so that it meets or exceeds that of its competitors.

The article highlights the significance of using benchmarking as performance indicators, process re-engineering and quality improvement in organizations.

The article depicts the difficulties of reaching an agreement when starting an initiative business unit and points to results and success and to problems that occurred in the benchmarking process.

The article provides useful information for organizations with existing competitive advantage and helps to find adequate methods for different purposes.

INTRODUCTION

Organizations benefit by learning from similar organizations in the industry or from other industries. They can modify their current practices in terms of the best practices available to others. This purpose is essentially served by benchmarking. Benchmarking is a comparative method where a firm finds the best practices in an area and then attempts to bring its own performance in that area in line with the best practice. It is a reference point for the purpose of measuring and when applied to work processes yields superior results. In order to excel, a firm shall have to exceed the benchmarks.

According to American productivity and quality center (APQC), "benchmarking is the process of identifying, understanding and adapting outstanding practices and processes from organization anywhere in the world by

a firm to improve its performance" (APQC, 1993). In other words, best practices are the benchmarks that should be adopted by a firm as the standards to exercise operational control. The performance of an organization can be evaluated continually till it reaches the best practice level by using benchmarking. However, benchmarking offers firms a tangible method to evaluate performance.

What is to be benchmarked?

Benchmarks are set with respect to critical areas of strategic and operational significance that influence an organization's performance. These could be well-known problem areas in an organization that could be clearly defined or activities/processes where improvements result in maximum benefits (according to Pareto's 80/20 rule). Benchmarking may be carried out with respect to activities and processes such as; strategic planning, decision processes, accounting systems, internal communication systems, manufacturing processes, reward systems, strategic HRM, employee training, distribution logistics, customer service, etc. For example, Xerox Corporation routinely buys copiers made by other firms and takes them apart to see how they work. This helps the firms to stay abreast of its competitor's improvements and changes.

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Benchmarking against whom?

It is natural but prime competitors are the reference points for benchmarking. But what extent the prime competitors are willing to share information about their best practices is also a factor to be considered. Benchmarking could be internal to the organization. Best practices in a division could form the basis for benchmarking similar activities in other divisions. Rentokil benchmarks its branches against each other, identifies 'best practices' and spreads them from one branch to another through training or the transfer of managers to ensure a consistent quality of service to its 1.5 million customers worldwide. At shell, internal best practices are identified and shared through its units worldwide. IMR global, an IT service provider, incorporates the best practices of each of the firms it has acquired over different continents in its global operations. At Corning Inc., business- specific best practices are identified and shared across the company's multiple businesses and plant locations across the world.

Outstanding companies/world-class performers in the industry may be willing to share information about their best practices. Sometimes, benchmarking against the best companies may not be plausible as they may be swamped with similar requests from a number of companies and hence unable to oblige all of them. Companies in the number two or three position in the industry could also provide a valuable benchmarking experience to generate incremental gains in a firm's activities/processes. Since certain approaches and gene- ric or core processes could be similar across different industries, the best companies in other industries can also meet the purpose of benchmarking. This may serve to break the current industry paradigms in search of new, world-class levels of performance. For example, a medical center may benchmark against a hotel industry.

Types of benchmarking

A firm could attempt benchmarking at several levels using all the different types of benchmarking. The main purpose should be to find out the best practices so that one could confirm to it. But before one does this, benchmarking is enough to show where a firm excels or lags behind. This is helpful in assessing the strengths and weaknesses of an organization and determining its capability. The following are the various types of benchmarking.

Performance benchmarking

This is to compare one's own performance with that of some other organization or the purpose of determining how good one's own organization is. It allows the initiator firm to assess their competitive position by comparing products and services with those or target firms.

Best practice benchmarking or process benchmarking

This is to compare the methods and practices for performing processes. It is used in the strategic management, in which the initiating firm focuses its observation and investigation of business processes with a goal of identifying and observing the best practices from one or more benchmark firms. Activity analysis will be required where the objective is to benchmark cost and efficiency; increasingly applied to back-office processes where outsourcing may be a consideration.

Strategic benchmarking

This is to compare the long-term, significant decisions and actions undertaken by other organizations to achieve their objectives.

Internal benchmarking

This is a comparison between units or departments of the same organization.

Competitive benchmarking

This is a direct comparison of one's own performance against the best competitors and restricts the search for best practices to competitors.

Functional benchmarking

This endeavors to determine best practices regardless of industry. It is a comparison of functions against non-competitive organizations within the same sector or technological area. Complex functions such as human resources, finance and accounting and information and communication technology are unlikely to be directly comparable in cost and efficiency terms and may need to be disaggregated into processes to make valid comparison.

Financial benchmarking

This performs a financial analysis and compares the results in an effort to assess your overall competitiveness.

Generic benchmarking

This is a comparison of one's own processes against the best practices anywhere in any type of organization.

Product benchmarking

This is the process of designing new products or upgrades to current ones. This process can sometimes involve reverse engineering which is taking apart competitors products to find strengths and weaknesses.

Cost of benchmarking

Benchmarking is a moderate expensive process. The costs involved in the process of benchmarking are visit costs like hotel rooms, travel costs, meals, token gifts and lost labor time; time costs like researching problems, employee time devoted to travel and discussion meetings, finding exceptional companies to study and information processing, etc, and database costs in order to know the best practices and maintenance etc. They help in balancing the costs with the knowledge gained.

MEASURE

PLAN AND COLLECT

ANALYZE AND IMPLEMENT
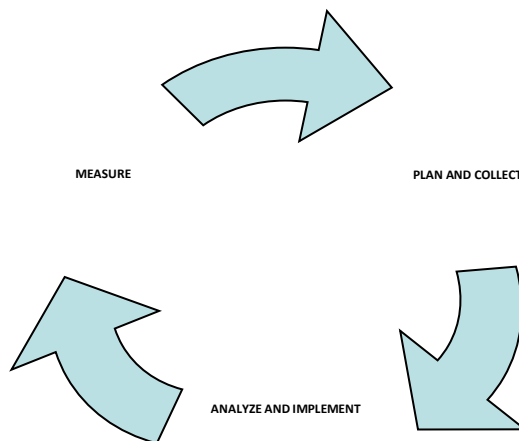
POPULARITY AND METHODOLOGY

In 2008, a comprehensive survey on benchmarking was commissioned by the Global Benchmarking Network (a network of benchmarking centers representing 22 countries and for which the founder of benchmarking, Dr Robert Camp, is the honorary President). Over 450 organizations responded from over 40 countries. The results showed that: Mission and Vision Statements and Customer (Client) Surveys are the most used (by 77% of organizations) or 20 improvement tools, followed by Strengths, Weaknesses, Opportunities and Threats SWOT (72%) and informal benchmarking (68%).

Performance Benchmarking was used by 49% and Best Practice Benchmarking by 39%. The tools that are likely to increase the most in popularity over the next three years are Performance Benchmarking, Informal Benchmarking, SWOT and Best Practice Benchmarking. Over 60% of organizations that are not currently using these tools indicated they are likely to use them in the next three years. When Best Practice Benchmarking is done well significant benefits are obtained with 20% of projects resulting in benefits worth US\$ 250,000.

The benchmarking process involves a questionnaire that helps to define the focus, criteria and context for practices and provides information about the incidents that led to adopting the practices. The required information was gathered by using questionnaires geared towards the activities being benchmarked, conducting study visits to companies, holding discussions with the concerned host managers and looking at available company documents and publications. The success of benchmarking, however, does not lie in the data collected but in understanding the best practices and the processes of implementing them. Indeed, there is no universally accepted benchmarking process. It is originally invented as a formal process by Rank Xerox and noticed that it was used by individual companies. The wide appeal and acceptance of benchmarking has led to various benchmarking methodologies emerging. The most prominent methodology is the 12 stage methodology propounded by Robert Camp, who wrote the first book on benchmarking in 1989.

Robert Camp's 12 stage methodology includes:
1. Select subject ahead,
2. Define the process,
3. Identify potential partners,
4. Identify data sources,
5. Collect data and select partners,
6. Determine the gap,
7. Establish process differences,
8. Target future performance,
9. Communicate,
10. Adjust goal,
11. Implement, and
12. Review/recalibrate.

Benchmarking forum

American Society for Training and Development (ASTD) has established a "Benchmarking Forum" for the purpose of identifying and learning about the so-called best practices among member organizations so that they can be adopted by other organizations. The Benchmarking Forum has identified that Boeing Corporation for adopting a unique task analysis approach involving engineers who were being trained to use computer-aided drafting and computer-aided manufacturing (CAD-CAM) software.

Management tool

Benchmarking is an effective management tool to identify changed ideas and brings changes to achieve continuous improvements in the way an existing activity, function, or process is performed. It is basic to strategic business process improvement and reengineering. In employing this method, a

company compares its performance with its strong and more successful competitors in the industry. It helps a company not only assess its current performance relative to other companies, but also learn from others and generate new ideas, methods and practices to improve its functioning. This, productivity and cost reduction can be enhanced and new performance targets which are practical and achievable can be set to give itself a competitive edge.

Planning will be a sterile exercise if it does not lead to organizational benchmarking. McCormack says, 'of all the management buzzwords of the last two decades, the only one that thrills me is benchmarking…' In a competitive market environment, benchmarking is about matching and exceeding the competitors' best practices. Managers benchmark when:

1. They praise a manager's excellent work publicly and credibly.

2. They work the hardest and smartest.

3. They share organizational success experiences and what went into them.

4. Some examples of companies that stand out for their best practices are: a) Microsoft – creativity and innovation, globalization, entrepreneurship, b) 3M – new product development, entrepreneurial spirit

5. Motorola – six sigma quality culture, c) Mc Kinsey – high level strategic consultancy services, d) Compaq and Dell computers – marketing and distribution system, e) Johnson and Johnson – ethics.

6.

Advantages of benchmarking

The advantages are:

a. Minimizes the costs and saves time to adapt the best practices of other companies rather than re-invent them in-house.

b. Helps in implementation of upcoming changes and sophisticated technological improvements, arising out of change across industries.

c. Bridges the competitive gaps in one's own concern from other competing firms.

d. Initiates the formulation of strategic goals and objectives based on the external models for improving activities and processes in the organization.

e. Stimulates an organization to overcome its inertia and think differently in the context of the brand-new approaches/models implemented elsewhere.

f. Facilitates organizational learning and,

g. Drags improvement in critical areas within the organization by adapting best practices and processes.

Key drivers in making success of benchmarking

a. Identifying other companies which are role models for learning,

b. Acquiring reliable and valid data from these companies about their best practices and standards and how these are set in the critical areas of one's concern,

c. Determining current competitive gaps and understanding the strategic and tactical reasons for the gaps,

d. Reengineering, improving, or innovating upon existing practices and processes to achieve better standards in critical areas,

e. Set up an action plan to induct the identified betterments,

f. Motivating the employees for effective implementation of the process of benchmarking.

If the same set of people are involved in benchmarking and in implementing the identified changes, managing change does not run the risk of resistance. On the other hand, it may even inspire creativity and commitment to change. The abilities, experience, professional competence, influence and commitment of the people involved in benchmarking are the other factors critical to its success. A majority of employees can be tuned to benchmarking if its success can be exemplified with respect to a particular activity or process. The progress should be regularly monitored and the standards recalibrated to achieve continuous improvement.

Benchmarking provides a good learning opportunity for those involved in the process, in addition to stimulating their creativity and stretching their cognitive ability. The possibilities of bringing about useful changes in the organization and the benefits of such change also become evident. 'Seeing is believing' as the saying goes, seeing the viability of certain ideas, processes and activities and their successful implementation by other companies, tends to bolster one's self-confidence and the belief that what other can do, one can do even better. It assists in improving internally and in getting even with others. But to gain the competitive edge, a company has to identify what it can do differently, how it can be a trendsetter and perhaps even redefine or invent the rules of the game. Significant favorable differences from competitors are potential cornerstones of a firm's strategy.

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RURAL MARKETING IN INDIA

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ABSTRACT :

In Indian Market structure in India is dictomous, there are two extreme end markets namely urban and rural market. The Indian rural market with its vast size and demand base offers great opportunities to Companies. In terms of number of people, the Indian rural market is arguably almost three times larger than its urban counter parts and possibly the largest untapped market in the world. The rural economy contributes nearly half of the country's GDP which is mainly agriculture driven and monsoon dependant. More than 50 percent of the sales FMCG and Durable companies come from the rural areas. The Indian market is undergoing vast changes especially after economic liberalization and globalization. The Indian rural market is grown in size and demand base offer great opportunities to the companies.

1. INTRODUCTION :

Rural Marketing - Introduction. Marketing may be described as the process of defining, anticipating and knowing customer needs, and managing all the resources of the organizing to satisfy them. The satisfaction of customer's needs and wants provides the existence for the organization. The **Rural Marketing** refers to the activities undertaken by the marketers to encourage the people, living in rural areas to convert their purchasing power into an effective demand for the goods and services and making these available in the rural areas, with the intention to improve their standard of living and achieving the company's objective, as a whole.

2. Key Words:

Urban Marketing, Rural marketing, Network Marketing, Effective demand, Consumer

3. TYPES OF MARKETING :

The Rural Marketing is a two-way process, i.e.,

- **3.1 Urban to Rural:** FMCG Goods, Agricultural fertilizers, automobiles, etc. are offered by the urban market to the rural market.

- **3.2 Rural to Urban:** The agricultural supplies viz. Fruits, vegetables, flowers, milk, etc. is offered from the rural market to the urban market.

4. GO RURAL

The marketers are following the strategy to *"Go Rural"* because of the following attractions in the rural market:

1. **Large Population:** Still, the majority of the population in India resides in Villages and therefore, the marketers find more potential in the rural areas and direct their efforts to penetrate the rural market.

2. **Increased Income:** The income and the purchasing power of the rural people have increased. With the use of modern agricultural equipment and technology, the farmers can produce more and can get better returns for their agricultural produce.The increased income motivates a farmer to improve his livelihood by purchasing a good quality product and thus, the marketer gets an opportunity to enter into the rural market.

3. **Competition in Urban Market:** There is a lot of competition in the Urban market, where people are well aware of the goods and services and have created a brand loyalty.Therefore, the marketers move to the rural market to escape the intense completion and generate revenues from the untapped areas.

4. **Improved Infrastructure facilities:** Today, many villages are well connected with the roads and transportation facilities that enables the marketer to access the rural market and promote his goods and services. With the growth in telecom services, the rural people can be reached easily via mobile phones.

5. **Saturated Urban Market:** Also, the marketers may move to the rural markets, when the urban market has reached the saturation point, the i.e. market is well stuffed with the products, and the consumers are not likely to make a frequent purchase due to the varied options available in the market.

6. **Support of Financial Institutions:** Several Co-operative banks and public sector banks offer the loan facility to the rural people at low-interest rates. With the loan, the purchasing power of an individual increases, thus resulting in a better standard of living.

7. **New Employment Opportunities:** The Government is running several employment

opportunity programmes, with the intention to engage people in other activities apart from the agriculture occupation. The Integrated Rural Development Programme (IRDP), Jawahar Rozgar Yojana (JRY), Training Rural Youth for self-Employment are the certain programmes, designed to increase the livelihood of rural people.

Due to so much potential in the rural areas, the companies are focusing more on the needs and desires of people living in here and are taking every possible step to stimulate people to buy products and services and improve their livelihood

5. SHADES OF STYLE:

Age	Life cycle	Urban	Rural
Below 12 Years	Child	Toys, Ice candy,	Video games
13 -19	Teenage	Cycle , TV's	Cell phones, motor cycles
20 -40	Young	Motor cycle, LPG, Clothes	Car, High end mobiles, Branded clothing
41—60	Middle aged	Tractor, postal saving , Kissan criedt,	Credit cards, houses, holiday trips
Above 60	Old	Playing cards, gossips, agriculture	Parks, clubs

6.RURAL CONSUMER BEHAVIOUR LIFE STYLE IN RURAL MARKETING

Evaluating the Results
How do you measure the success of your rural campaign? This is a question which many companies ask and there are no standard answers. However, there are three areas where you can study the impact of your rural campaign.

a. Brand Awareness
b. Brand Conversion
c. Increase in sales

Ideally, you should do a benchmark study before the start of the campaign to check on specific parameters. Further, conduct post studies to find out if the desired objectives have been achieved . Do not judge a campaign, only by the cost per contact approach. Results vary depending on the task and support given to the efforts. And in

assessing the cost per contact, remember to include the approximate number of eyeballs and ears that your campaign may be getting, while going around a village or en route to a market.

several barriers to this – the fragmented nature of development

and execution in the absence of strategic co-ordination, rivalries between different communications disciplines, and short-term Many companies do not have a system of archiving case studies in rural marketing–the lessons learnt from various efforts in the form of reports must be available for future brand managers so that past mistakes are not repeated. Or else, the experience gained by a manager on the job, is lost to the company, when he moves on to another job. This is particularly true of large professionally managed organizations.

'Rural Marketing' is a marriage, which to be successful, needs sustained efforts and long term investments in terms of company's resources, to keep it going. If it is treated as a flirtation or a one-night stand, the results will be temporary and unsustainable.

CONCLUSION

Rural marketing has examined marketing communications' claims to strategic credentials. Historically there have been in the marketing communications industry itself which has led to communications being seen as a tactical rather than strategic resource. finally customer satisfaction is the base for Rural marketing.

The traditional hierarchy of strategy has, however, been challenged by the increasing importance of brands as a source of competitive advantage. As a result, organisations are recognizing communications as a strategic issue and re configuring their internal and external relationships accordingly. The traditional distinctions between push, pull and profile strategies (focusing communications on channel intermediaries, end-users, and stakeholders respectively) are giving way to ways of analyzing and planning marketing communications which recognize the complexity of how customers receive messages.

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SIX SIGMA –AN APPROACH

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ABSTRACT :

This concise and practical presentation will guide attendees on how to apply key principles of creating a roadmap to world class performance utilizing Operational Excellence. The presenter will explain the importance of a solid foundation or common operating picture for the organization to rally around, while driving People, Process and System engagement. Just like building a structure, it is necessary to have a solid foundation. This is no different when designing a roadmap utilizing a methodical approach the entire organization will play a part in creating and owning. Many organizations rely on Lean/Six Sigma tools and techniques alone to drive transformational results. This can initially drive efficiency gains; however, it is often not sustainable and will result in pockets of excellence, driven by a continuous improvement team and not the organizational Leadership team. Operational Excellence should be driven and owned by the entire organization to ensure transformational results, leading to world class performance. Attendees of this presentation will learn to identify a methodical approach to building a roadmap to their journey to world class performance. set of management techniques intended to improve business processes by greatly reducing the probability that an error or defect will occur.

I.   INTRODUCTION: Increasingly, healthcare work forces have begun borrowing strategies from industry to increase efficiency while improving quality. These include Six Sigma, which uses a define, measure, analyze, improve and contrl.. l n 1986, Bill Smith, a senior engineer and scientist at Motorola, introduced the concept of Six Sigma to standardize the way defects are counted.

Six Sigma provided Motorola the key to addressing quality concerns throughout the organization, from manufacturing to support functions. The application of Six Sigma also contributed to Motorola winning the Malcolm Baldrige National Quality award in 1988.

Since then, the impact of the Six Sigma process on improving business performance has been dramatic and well documented by other leading global organizations, such as General Electric, Allied Signal, and Citibank. That's why investing in Six Sigma programs is increasingly considered a mission-critical best practice, even among mid-sized and smaller firms.

Today, Motorola continues to implement Six Sigma throughout its own enterprise, and extends the benefit of its Six Sigma expertise to other organizations worldwide through Motorola University.

I. (DMAIC) methodology to address waste, system utilization, and error. In order to reduce preventable patient errors and minimize resident fatigue this methodology was introduced to a high volume surgical service.

Key Words : Balance Score Cards, Business Improvement Campaign, standard devation , Sigma level, DMADV

II. METHODS: Over a four-month period, a Quality Improvement (QI) initiative was implemented for the Limb Salvage service at MedStar Georgetown Hospital. DMAIC methodology was introduced to assess and improve patient related outcomes, as well as ameliorate resident burnout. Core problems that were initially addressed included work-hour violations, pages due to order errors, and inappropriate patient care at the admission or pre-operative stage. Residents were encouraged to note all errors or areas for improvement in real-time, and these were presented at a weekly QI conference. A hand-off system was introduced in order to minimize burnout and duty hour violations. A standardized resident guide was created with a template for how to manage common problems, admit, and pre-operatively manage patients. Where additional areas were noted for improvement in the weekly QI conference, these were implemented immediately, and refreshed each week with a QI review. A resident survey was performed at the end of the implementation cycle to analyze the results.

III. DMAIC is a data-driven Six Sigma methodology for improving existing products and processes. The **DMAIC** process should be used when an existing product or process can be improved to meet or exceed the customer's requirements. **DMAIC** methodology consists of five phases: D – Define, M – Measure, A – Analyze, I – Improve, C – Control.

- Define – Define the project targets and customer (internal and external) deliverables.

- Measure – Measure the process to determine the current process performance (baseline).

- Analyze – Find out the root causes of the defects.

- Improve – Improve the process by eliminating defects.

- Control – Control the future performance.

DMADV is a common DFSS (Design for Six Sigma) methodology used to develop a process or product which does not exist in the company. DFSS is an application of Six Sigma which focuses on the design or redesign of the different processes used in product manufacturing or service delivery by taking into account the customer needs and expectations. **DMADV** is used when the existing product or process does not meet the level of customer specification or Six Sigma level even after optimization with or without using **DMAIC**. **DMAIC** methodology consists of five phases: D – Define, M – Measure, A – Analyze, D – Design, V – Validate.

- DEFINE the project goals and customer deliverables

- MEASURE the process to determine the current performance level

- ANALYZE and determine the root causes of the defects

- DESIGN the process in detail to meet customer needs

- VALIDATE the design performance and its ability to meet the customer needs

Six Sigma Methodologies

Design new products & processes that meet customer needs

DFSS

DMAIC

Six Sigma

Improve existing processes so that their outputs meet customer requirements

Process Management

Control and manage cross-function processes to meet business goals

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IV. Six Sigma doctrine asserts:

- Continuous efforts to achieve stable and predictable process results (e.g. by reducing process variation) are of vital importance to business success.
- Manufacturing and business processes have characteristics that can be defined, measured, analyzed, improved, and controlled.
- Achieving sustained quality improvement requires commitment from the entire organization, particularly from top-level management.

Features that set Six Sigma apart from previous quality-improvement initiatives include:

- A clear focus on achieving measurable and quantifiable financial returns from any Six Sigma project.
- An increased emphasis on strong and passionate management leadership and support.
- A clear commitment to making decisions on the basis of verifiable data and statistical methods, rather than assumptions and guesswork.

V. Road Map of DMADV :

Design for Six Sigma: DMADV roadmap
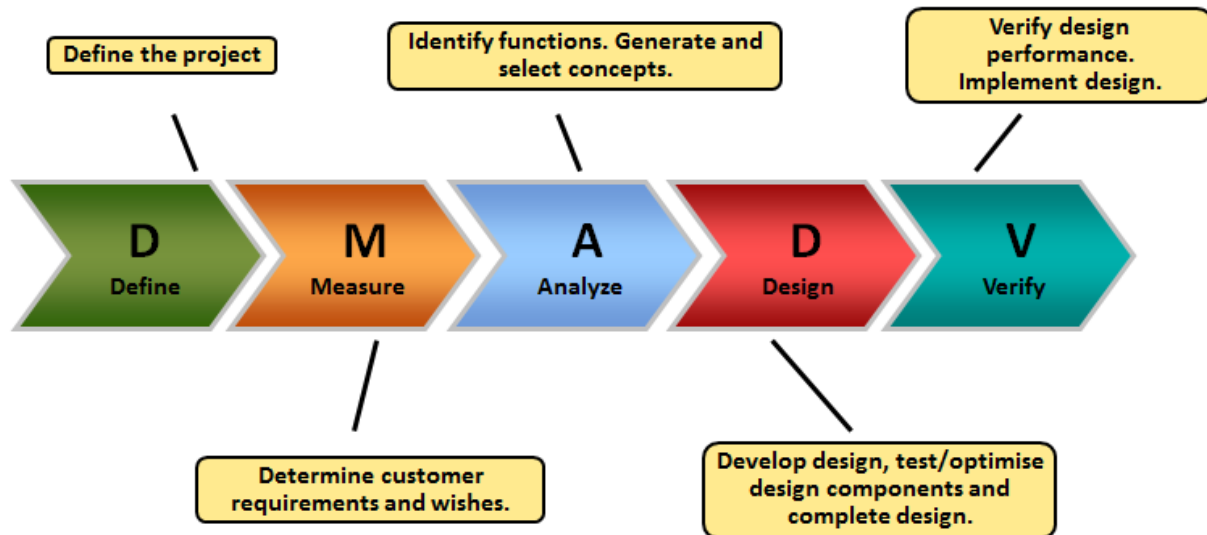
The DMADV project methodology, known as DFSS ("**D**esign **F**or **S**ix **S**igma"),[7] features five phases:

- **D**efine design goals that are consistent with customer demands and the enterprise strategy.
- **M**easure and identify CTQs (characteristics that are **C**ritical **T**o **Q**uality), measure product

capabilities, production process capability, and measure risks.

- **A**nalyze to develop and design alternatives
- **D**esign an improved alternative, best suited per analysis in the previous step
- **V**erify the design, set up pilot runs, implement the production process and hand it over to the process owner(

VI. Quality management tools and methods

Within the individual phases of a DMAIC or DMADV project, Six Sigma utilizes many established quality-management tools that are also used outside Six Sigma. The following table shows an overview of the main methods used.

- Analysis of variance
- General linear model

- ANOVA Gauge R&R
- Regression analysis
- Correlation
- Scatter diagram
- Chi-squared test
- 5 Whys
- Statically variance data

VII. Etymology of Six Sigma Process

The term "six sigma process" comes from the notion that if one has six standard deviations between the process mean and the nearest specification limit, as shown in the graph, practically no items will fail to meet specifications. This is based on the calculation method employed in process capability studies.

Capability studies measure the number of standard deviations between the process mean and the nearest specification limit in sigma units, represented by the Greek letter σ (sigma). As process standard deviation goes up, or the mean of the process moves away from

Conculsion:

While studying it was observed that majority of the operators are aware of the problem solving tool i.e. DMAIC but they have not received training of it. Since training plays important role in persons career company should take measures to introduce the eligible operator/employee for such type of training programme as it is fruitful to company. 1. It was observed that trained and experience person contributes more in the profitability of the company. 'Training makes man perfect' is as very true as they give their 100 percent and trained people are aware of timely work. They are much keen on reducing wastage of raw materials and it also saves rework. 2. It was observed that the outlook of operators for

the center of the tolerance, fewer standard deviations will fit between the mean and the nearest specification limit, decreasing the sigma number and increasing the likelihood of items outside specification. One should also note that calculation of Sigma levels for a process data is independent of the data being normally distributed. In one of the criticisms to Six Sigma, practitioners using this approach spend a lot of time transforming data from non-normal to normal using transformation techniques. It must be said that Sigma levels can be determined for process data that has evidence of non-analyzing business operations has been changed by application of six sigma methodology operators, staff and managers are more dedicated to work. Six sigma methodology has been applied only in two sections of production department and has succeeded too. 3. It was observed that the higher age group persons are the guiding force to the younger member in Rishabh. Senior staff member do guide the young member in the day to day operation of the company. They train them in the methodology and try them to keep them in pace with the changing demands of the customers. 4. Most employees articulated their opinion that they got full support and assistance from management while doing the project and most of the respondents/employees expressed their positive response regarding six sigma implementation in their

company, Operators, those who have undergone training programme associated with six sigma are more to take action to the challenges which come their way while working or solving day to day problems. Though the percentages of the operators who are not the part of the training programmed are more, but they are aware of the technique and they are also responsive in their day to day work. 6. It was observed that the methodology has helped in improving the design processes, in reducing the defect rate of the products, in reducing rejection rate of the products, in improving the outlook towards work/business, in improving product quality, in improving customer's satisfaction level, in gaining customers trust back, etc.

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Employees Motivation and Morale Effect

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Abstract

The current study aims to examine the effect of low morale and motivation on employees' productivity and competitiveness. Low productivity and loss of competitiveness are outcomes of low morale and low motivation and may sometimes lead to further undesired symptoms such as absenteeism and sabotage.

Introduction

In general, high morale leads to high productivity; but there is not always a positive correlation between the two. Close supervision, time studies, and scientific management can be applied in order to reach a high level of productivity, but sometimes, we can reach a high productivity by low morale. We can say that managers have to work for improving the morale of their employees, as high morale makes for a better working environment, and it helps the organization to attain its goals easily.

Organizations want its employees to be more productive. But will motivation be enough to get things done? And what motivates our behavior? Employees are considered the most important resources, and the winning card in the hands of management. Low productivity may be traceable to poor employee motivation. The success and effectiveness of any firm depend to a large extent, on how well employees are motivated. Theories of human resource management, as well as theories of motivation, suggest that motivated employees tend to be more creative and productive, and it is wise for any management to use these theories in order to increase productivity and competitiveness.

Competition can be defined as a contest between individuals or groups where they strive to attain and reach particular goals. The concept of competitiveness has been linked to early socialization processes between parents and children. Parents often teach individualism to their children and this is often characterized by making distinctions between themselves and others. Motivation and competitiveness go hand in hand. Individuals who are extremely motivated are also extremely competitive as they know the way and the means to accomplish their goals. On the other hand, other individuals use competition in a negative way. These individuals use competition selfishly to achieve their goals without considering the consequences to themselves and others.

Society places great emphasis and pressure on competition. There is a controlling focus on being competitive

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and successfu. This kind of focus can cause low intrinsic motivation as individuals may feel lost between the ways (please confirm) and the gains. This concept is known as the hidden cost of reward; that is, reward is having the opposite effect on the individual. So, instead of motivating them to win, it causes them lower intrinsic motivation.

The current research problem focuses on how low morale and motivation of employees, who feel they are not being recognized as valuable contributors to the system, and hence get no rewards for the good work that they do, may lead to low productivity, loss of competitiveness, and sometimes, further undesired symptoms such as absenteeism and sabotage.

2. Literature Review

Morale is an elusive quality which involves feelings, emotions, attitude and perception towards the organization and its members. Positive morale is usually characterized by discipline, confidence and willingness to perform.

Low morale can be attributed to many factors such as job insecurity, lack of fair compensation policy, uncertain business conditions, and excessive outsourcing practices. Low morale affects company income, productivity, financial competitiveness and organizational objectives. Low morale is an outcome of managerial behavior where managers address their employees from a top-down command and refuse to communicate directly on workplace issues. This kind of communication results in a gap between employees and managers, which in turn leads to employee distrust, disrespect, and reduction of morale and workforce motivation. Low morale also causes employees to lose interest, especially when managers don't appreciate their efforts and the tasks performed. A costly indicator of low morale is high employee

In order not to lose focus of the study's importance, the current research is going to cover all aspects of low morale and motivation and their effects on productivity and competitiveness. These two important aspects are attributed to employee's negative psychology. From the researchers' point of view, these two factors are very important and are worth discussing.

The objectives of the current study aim to examine the effect of low morale and motivation on employee's productivity and competitiveness. This research will try to attain the following objectives:

1- To stand on the causes of low morale and motivation;

2- To point out the effect of low morale and motivation on employee's productivity and competitiveness.

turnover. This happens when employees leave their jobs because they feel unhappy and have no incentives to stay. The negative effect of employee turnover is disconcerting because of its great implication both on financial and on productivity levels. Financially means the company has to hire new employees either with payment of higher salaries or by additional recruiting expenses. At the production level, the employees who leave will take with them the knowledge, skills and ability that helped contribute to the goals, profit and performance of the organization.

Absenteeism is another costly indicator of low morale. Unjustified absenteeism increases cost and decreases productivity. According to an article in 'The Leading Edge', "dissatisfied employees who are discontented with their bosses can have a high price tag". Management should work on controlling the effects of low morale through the understanding of their employees' potentials and their core work processes, understanding their abilities, enriching employees' job and recognizing their achievements.

Achieving sustained high levels of performance is usually the aim of every organization. Employees are considered the main tools of such aimed performance, and motivation is considered the means to achieve such performance. In other words, high attention should be given to methods of motivating individuals in order to achieve the desired goals.

The current research study links motivation with productivity. It indicated a positive correlation between motivation and the level of productivity in many organizations. Companies that use motivation to enhance a higher level of productivity are considered world class and compete globally, and this in-turn creates sustained competitiveness. Also, researches indicate that a person who is motivated works hard, sustains a pace of hard work, and has self-directed behavior to achieve the desired goals. On the other hand, low motivation with low productivity is often considered a problem. To fully understand motivation, studies state that, there are two types of motivation: extrinsic and intrinsic. Extrinsic motivation concerns tangible, real rewards that are received by the employees, while intrinsic motivation is built inside the person and is natural to him. According to the individual's psychology, there is an inherent set of needs through which an individual can be satisfied through rewards for his work performance.

The other element concerning this study is productivity. Productivity is defined as the effective and efficient utilization of all resources; material, labor, capital, information and time. Low productivity is indicated through many signs which include poor quality of domestic outputs, lack of competitiveness of products in international markets, shortages of skills, low production technology, poor industrial relations, and poor human resource management. Research findings indicate that there is a link between motivation and productivity in the industrial sector. When an employee's needs are met, it means that he derives satisfaction from the job and eventually, this creates a motivated employee. All motivation theories tend to support the idea that a motivated worker willingly uses his ability in a constructive way to accomplish the tasks assigned to him. A motivated employee's work attitude is wholesome and tends toward high performance and productivity.

In General, high motivation and high morale lead to high productivity as it was mentioned in the introduction of this research paper. However, there is not always a positive correlation between them.

The final element of the study variables is competitiveness. As earlier stated, motivation and competitiveness go hand in hand together; competition is found in all aspects of life; even among brothers and sisters. Competition has a great impact on the motivation of an individual. Some individuals use competition in a positive way. They use it in order to gain personal growth and to help themselves in reaching their potential goals. Other individuals use competition in a negative way. They

use competition selfishly to achieve their goals without considering the consequences on themselves and others. Individuals who are extremely motivated are also extremely competitive as they know the way and the means to accomplish their goals.

3. Method

The primary data needed for the study objectives were collected through a survey conducted among different Jordanian industrial companies. The total listed industrial companies in Jordan are 64 companies, with a total of 580 employees working at different managerial levels. The research study sample size is 295 employees which were determined using the sample size formula at 95% confidence level, and 4% confidence interval, and a total of 580 employees which constitute the study population.

Conclusions & Recommendations

Conclusions:

1) The results show that the relationship between the three variables is statistically significant. Based on their path coefficient scores, it would appear that the influence of Low Morale and Low Motivation on Productivity and Competitiveness is significant, so the research hypothesis stating that Low Morale and Low Motivation affects Productivity and Competitiveness and makes on limiting its consequences.

2) The Real cause behind low employee morale can include uncertain business conditions, limited upward rewards, job security issues, lack of fair compensation policy, and excessive outsourcing policy.

Recommendations:

1) Management should ensure a positive work environment which encourages confidence, discipline, and willingness to perform the job in the best possible manner.

2) Management should also work on strong and sustained compensation policies that bridge the gap between the payrolls of the employees.

3) Management should work on increasing productivity by increasing employees' satisfaction through re-engineering systems and processes, providing education and training.

4) Encouraging practices that focus on learning of personal development competitive attitudes.

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Business Environment

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ABSTRACT: *Businesses do not operate in a vacuum; they operate in an environment. In this lesson, you will learn about the business environment, including what makes it up. The objectives of this paper are to develop ability to understand and scan business environment in order to analyses opportunities and take decisions under uncertainty; and to study the nature, scope and importance of business environment. Business environment is dynamic concept or a phenomenon what with emerging trends in business ethics, corporate social responsibility, corporate governance, consumer citizenship etc. Every from/manager should have a strong conceptual and policy framework to support development and use of business and environmental information in decision-making.*

Introduction

'Business and society should be setting higher horizons when considering ethical values in business. Society should not opt out from setting the framework within which business operates. Business would then be set free to generate surpluses and dispose of them within that framework, in the best possible ethical taste of human relations' - Peter Miles.

The formula for business success requires two elements – the individual and the environment. Business means an economic activity of generating income through buying and selling, manufacturing and rendering auxiliary services to trade. The term "Environment" refers to anything which surrounds a system. Therefore Business Environment means the surroundings (including human beings) in which business exists.

Every business operates in a particular environment and each business unit has its own environment. A change in environment presents opportunity to some and threats to others. Business environment is defined as the combination of internal and external factors that influence a company's operating situation, including employees, customers, management, supply and demand and business regulations. The business environment can include factors such as: clients and suppliers; its competition, and owners; improvements in technology; laws and government activities; and market, social and economic trends. Another expert has defines business environment as 'the forces, factors and institutions with which the businessman has to deal with to achieve its objectives'.

Thus, Business Environment is the sum total of all external and internal factors that influence or affect a business together. Business environment being a dynamic concept or a phenomenon what with emerging trends in business ethics, corporate social responsibility, corporate governance, consumer citizenship etc. every firm/manager

should have a strong conceptual and policy framework to support development and use of business and environmental information (e.g. geo-spatial data) in decision-making. The framework would help identify business/environmental values, goals and priorities on a geographical basis at various spatial scales. According to Miller and Redding, 'In any field of study or activity, including financial accounting, there are a number of reasons for developing a conceptual framework, which is a collection of broad rules, guidelines, accepted truths, and other basic ideas about the field.[1]

Approaches to and Factors of Business

Traditional managerial models typically assume that managers, instead of maximising profit, maximise a simple objective utility function (this may include salary, perks, security, power, prestige) subject to an arbitrarily given profit constraint (profit satisficing). The behavioural approach, as developed in particular by

and internal factors could influence each other and work beyond your control. External factors are often called external constraints. Let us take a look at some key environmental factors.

(A) External Factors

1. Political factors are governmental activities and political conditions that may affect your business. Examples include laws, regulations, tariffs and other trade barriers, war, and social unrest. For example, a change in legislation such as the smoking ban indirectly affects pubs and restaurants.

2. Economic Factors (a) Macroeconomic factors i.e. factors that affect the entire economy, not just your business. Examples include things like interest rates, unemployment rates, currency exchange rates, consumer confidence, consumer discretionary income, consumer savings rates, recessions, and depressions; and

   (b) Microeconomic factors i.e. factors that can affect your business, such as market size, demand, supply, relationships with suppliers and your distribution chain, such as retail stores that sell your products, and the number and strength of your competition.

3. Social factors are basically sociological factors related to general society and social relations that affect your business. Social factors include social movements, such as environmental movements, as well as changes in fashion and consumer preferences. For example, clothing fashions change with the season, and there is a current trend towards green construction and organic foods.

4. Technological factors are technological innovations that can either benefit or hurt your business. Some technological innovations can increase your productivity and profit margins, such as computer software and automated production. On the other hand, some technological innovations pose an existential threat to a business, such as

Richard Cyert and James G. March of the Carnegie School places emphasis on explaining how decisions are taken within the firm, and goes well beyond neo-classical economics. Much of this depended on Herbert A. Simon's work in the 1950s concerning behaviour in situations of uncertainty, which argued that 'people possess limited cognitive ability and so can exercise only 'bounded rationality' when making decisions in complex, uncertain situations'. Recently, Yochai Benkler further questioned the rigid distinction between firms and markets based on the increasing salience of "commons-based peer production" systems such as open source software (e.g. Linux), Wikipedia, Creative Commons, etc.

Many factors influence the firm in inclusive and integrated business. This happens in a continuum of clusters. For instance, a healthy and safety regulation is an external factor that influences the internal environment of business operations. You should keep in mind that external factors

Internet streaming challenging the DVD rental business.

Thus, external factors are factors which are beyond the control of the business: (STEP) – social, Technological, Economic and Political Changes in the macro environment.

(B) Internal Factors

The internal business environment includes factors within the organisation that impact the approach and success of your operations. They are as follows.

1. **Organisational Culture: -** This factor is also referred to as "value system". It is the framework of values[2], vision, norms, and customs shared by the members of an organisation. Your business culture affects how the employees in your business interact with each other, its customers,

and other stakeholders.[3] The value system and ethical standards are also among the factors evaluated by many companies in the selection of the suppliers, distributors, collaborators etc. Corporate Social Responsibility (CRS) emerges from this system.

2. **Organisational Direction: -** It can also be called as "company leadership". The role of company leadership – along with internal power relationship (i.e. management structure) – is an important internal business factor. Your leadership style and the styles of other company management impact organisational culture. The positive or negative nature, level of family-friendliness, effectiveness of communication and value of employees are cultural implications that result from leadership approaches. Companies often provide formal structure or direction with mission and vision statements. These forward-looking statements provide the business for company decisions and activities.

3. **Mission and Objectives: -** This factor is known as the "Vision and Mission" of the company. The mission and objectives of the company guide the business domain of the company, and its priorities, directions of development, business philosophy, business policy etc. Ranbaxy's thrust in to the foreign markets and development have been driven by its mission "to become a research based international pharmaceutical company." Arvind Mills' mission – "to achieve global dominance in select businesses built around our core competencies through continuous product and technical innovation, customer orientation and focus on cost effectiveness" – has driven its future development strategy including the portfolio strategy, and indicated the thrusts required in the functional areas to help achieve the mission.

4. **Management Structure and Nature: -** Structure is the manner or hierarchical relationship in which the tasks and sub-tasks of the organisation are related. The organisational structure, the composition of the Board of Directors, professionalization of management etc., are important factors influencing business decisions. Some management structures and styles delay decision making while some others facilitate quick decision-making. The Board of Directors being the highest decision making body which sets the direction for the development of the organisation and which oversees the performance of the organisation, so the quality of the board is very critical factor for the development and performance of the company.

5. **Human Resources: -** The characteristics of the human resource like skill, quality, morale,

commitment, attitude etc., could contribute to the strength and weaknesses of an organisation. Some organisations find it difficult to carry out restructuring or modernisation because of resistance by employees whereas they are smoothly done in some others. Human Resource Management (HRM) has become more relevant in business management together with business intelligence and business ethics.

6. **Miscellaneous factors: -** Other common internal factors fall into several categories, including (a) firm's business intelligence, (b) company's brand image and brand equity[4] etc.

In conclusion, we may state that –

The internal environment = RESOURCES & LEADERSHIP

The external environment = GENERAL & COMPETITIVE

Features of Business Environment

The characteristics of business environment are –

- The environment of business is not a 'one' thing; it is **totality of forces or factors, some specific, some general, yet co-related**

- The business environment is dynamic in nature, which means, it keeps on changing.

- The changes in business environment are unpredictable. It is very difficult to predict the exact nature of future happenings and the changes in economic and social environment

- Business Environment differs from place to place, region to region and country to country. Political conditions in India differ from those in Pakistan. Taste and values cherished by people in India and China vary considerably.

Thus, business environment is complex, dynamic, relative and multifaceted. It has far-reaching impact on organisations in that the growth and profitability of an organisation depends critically on the environment in which it exists; may be an opportunity or a threat. For example, the liberalisation in 1991 opened lot of opportunities for companies like Hindustan Uniliver, which took the advantage to acquire companies like Lakme, TOMCO, and KISSAN etc.

Importance of Business Environment

- **Image Building:** Environmental understanding helps the business organisations in improving their image (reputation) by showing their sensitivity to the environment within which they are working. For example, in view of the shortage of power, many companies have set up Captive Power Plants (CPP) in their factories to meet their own requirement of power. Similarly, GE is said to be image conscious. It divested its computer and air-conditioning business because they could not attain 1st or 2nd position in the business as per their policy. Now they are snickering to out

sourcing in India, aircraft engineering, plastic etc.

- **Meeting Competition:** It helps the firms to analyse the competitors' strategies and formulate their own strategies accordingly. Competition becomes meaningful where there is competitiveness. Strategists can gather qualitative information regarding business environment and utilising them in formulating effective plants. For example: ITC Hotels foresaw bright opportunities in the travel and tourism industry and started building hotels in India and abroad.

- **Identifying Firm's Strength and Weakness:** Business environment helps to identify the individual strengths and weaknesses in view of the technological and global developments. SWOT (strengths, weaknesses, opportunities, threats) analysis is integral to a firm's potential and performance. Business Environments provide constraints as well as opportunities for the businessperson. For example, the regulation such as MRTP Act and wealth restriction put constraints on the businessperson. On the other hand, the liberalisation policies, import relaxation policies bring opportunities for the businessperson.

Dimensions of Business Environment

Business environment is not one-dimensional. There are five dimensions of business environment. They are: (i) revenue, (ii) cost, (iii) assets and liabilities, and (iv) strategy

1. **Revenue**: -business revenue depends on several factors, such as pricing power, competition and product quality. A business with a reputation for high-quality products may have pricing power, which means that it may be able to increase selling prices to offset increases in raw material costs and wages. The competitive environment can affect revenue in two ways: First, a small business may not be able to increase prices if it is in a very competitive market; second, a business may have to change its product mix and product designs to respond to the competition.

2. **Cost**: Cost and revenue are important dimensions because they determine profitability. During economic downturns, businesses reduce costs to maintain profitability. During periods of strong economic growth, a small business may experience increases in input costs, such as raw materials prices and wages. However, during economic downturns, input cost pressures may ease as businesses scale back manufacturing operations and lay off staff. Supply contracts may also affect cost. For example, if a restaurant owner can negotiate discount prices for flour and eggs, operating costs would drop and profits would rise.

3. **Asset & Liabilities**: Assets include cash and

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inventory, while liabilities include short-term and long-term debt. Small businesses that have too much debt may lose operational flexibility because of interest expenses, especially in a period of rising rates. Although significant cash balance acts as a safety cushion during downturns, companies with too much inventory and accounts receivable may risk cash flow shortfalls.

4. **Strategy**: - Successful businesses anticipate and embrace change. They know how to balance day-to-day operational management with long-term strategic thinking, which includes forming partnerships and exploring mergers to grow market share. Strategic management also involves communicating plans and expectations to stakeholders, especially during uncertain economic times.

5. **Stakeholders**: - Stakeholders are another important dimension of the business environment. In addition to the founders, suppliers, customers and employees, public companies must deal with boards of directors, investors, stock market analysts, business reporters, and regulatory authorities.

Environmental Scanning of Business

Environmental scanning refers to careful monitoring of an organisation's internal and external environments for detecting early signs of opportunities and threats that may influence its current and future plans. In comparison, surveillance is confined to a specific objective or a narrow sector. When a firm undertakes the monitoring, assessing and forecasting of business environment it is called as environmental scanning of business.

Environmental scanning is a process of gathering, analysing, and dispensing information for tactical or strategic purposes. The environmental scanning process entails obtaining both factual and subjective information on the business environments in which a company is operating or considering entering

Chun Wei Choo, Faculty of Information Studies, University of Toronto, Canada writes, "Environmental scanning is the acquisition and use of information about events, trends, and relationships in an organisation's external environment, the knowledge of which would assist management in planning the organisation's future course of action".

Thus, environmental scanning means viewing the (business) world by undirected viewing or conditioned viewing or informal searching or formal searching. In simple, it means methods of gathering the relevant information for appraising the environment.

Need for and Importance of Scanning of Business

William Glueck mentions four techniques for environmental analysis verbal and written information;

search and scanning; spying; and forecasting and formal studies. Environmental analysis will help the firm to understand what is happening both inside and outside the organisation and to increase the probability that the organisational strategies developed will appropriately reflect the organisational environment. Even when the required information is out there (somewhere!), it may not become readily available. Search and scanning, therefore, are needed to identify the sources of information and the methods to manage the available information – ranging from clipping service (e.g. scan newspapers) to management information system (MIS),

Environmental scanning is necessary because there are rapid changes taking place in the environment that has a great impact on the working of the business firm. Analysis of business environment helps to identify strength weakness, opportunities and threats. SWOT analysis is necessary for the survival and growth of every business enterprise. It is important due to the following reasons.

1. Identification of strength:

Strength of the business firm means capacity of the firm to gain advantage over its competitors. Analysis of internal business environment helps to identify strength of the firm. After identifying the strength, the firm must try to consolidate or maximise its strength by further improvement in its existing plans, policies and resources.

2. Identification of weakness:

Weakness of the firm means limitations of the firm. Monitoring internal environment helps to identify not only the strength but also the weakness of the firm. A firm may be strong in certain areas but may be weak in some other areas. For further growth and expansion, the weakness should be identified so as to correct them as soon as possible.

3. Identification of opportunities:

Environmental analyses helps to identify the opportunities in the market. The firm should make every possible effort to grab the opportunities as and when they come.

4. Identification of threat:

Business is subject to threat from competitors and various factors. Environmental analyses help them to identify threat from the external environment. Early identification of threat is always beneficial as it helps to diffuse off some threat.

5. Optimum use of resources:

Proper environmental assessment helps to make optimum utilisation of scare human, natural and capital resources. Systematic analyses of business environment helps the firm to reduce wastage and make optimum use of available resources, without understanding the internal and external environment resources cannot be used in an effective manner.

6. Survival and growth:

Systematic analyses of business environment help the firm

To maximise their strength, minimise the weakness, grab the opportunities and diffuse threats. This enables the firm to survive and grow in the competitive business world.

7. To plan long-term business strategy:

A business organisation has short term and long-term objectives. Proper analyses of environmental factors help the business firm to frame plans and policies that could help in easy accomplishment of those organisational objectives. Without undertaking environmental scanning, the firm cannot develop a strategy for business success.

8. Environmental scanning aids decision-making:

Decision-making is a process of selecting the best alternative from among various available alternatives. An environmental analysis is an extremely important tool in understanding and decision-making in all situation of the business. Success of the firm depends upon the precise decision making ability. Study of environmental analyses enables the firm to select the best option for the success and growth of the firm.

Objectives and Goal of Environmental Scanning

The main objectives are –

- detecting scientific, technical, economic, social, and political trends and events important to the institution,

- defining the potential threats, opportunities, or changes for the institution implied by those trends and events,

- promoting a future orientation in the thinking of management and staff, and

- alerting management and staff to trends that are converging, diverging, speeding up, slowing down, or interacting

The goal of environmental scanning is to alert decision-makers to potentially significant external changes before they crystallize so that decision-makers have sufficient lead-time to react to the change.

Approaches to and Techniques of

Environmental Scanning and Monitoring

Experts have suggested three approaches, which could be adopted for, sort out information for environmental scanning. They are as follows.

1. *Systematic Approach:*

   Under this approach, information for environmental scanning is collected systematically. Information related to markets and customers, changes in legislation and regulations that have a direct impact on an organisation's activities, government policy statements pertaining the organisation's business and industry, etc., could be collected continuous updating such information is necessary not only for strategic management but also for operational activities.

2. *Ad hoc Approach:*

   Using this approach, an organisation may conduct special surveys and studies to deal with specific environmental issues from time to time. Such studies may be conducted, for instance, when organisation has to undertake special projects, evaluate existing strategy or devise new strategies. Changes and unforeseen developments may be investigated with regard to their impact on the organisation.

3. *Processed-form Approach:*

   For adopting this approach, the organisation uses information in a processed form available from different sources both inside and outside the organisation. When an organisation uses information supplied by government agencies or private institutions, it uses secondary sources of data and the information is available in processed form.

DIGITAL MARKETING

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Digital marketing is the marketing of products or services using digital technologies, mainly on Internet, but also including mobile phones, display advertising, and any other digital medium.

Digital marketing's development since the 1990s and 2000s has changed the way brands and businesses use technology for marketing. As digital platforms are increasingly incorporated into marketing plans and everyday life, and as people use digital devices instead of visiting physical shops, digital marketing campaigns are becoming more prevalent and efficient.

Digital marketing methods such as search engine optimization (SEO), search engine marketing (SEM), content marketing, influencer marketing, content automation, campaign marketing, data-driven marketing, e-commerce marketing, social media marketing, social media optimization, e-mail direct marketing, display advertising, e–books, and optical disks

and games are becoming more common in our advancing technology. In fact, digital marketing now extends to non-Internet channels that provide digital media, such as mobile phones (SMS and MMS), callback, and on-hold mobile ring tones. In essence, this extension to *non*-Internet channels helps to differentiate digital marketing from online marketing, another catch-all term for the marketing methods mentioned above, which strictly occur online.

History

The development of digital marketing is inseparable from technology development. One of the key points in the start of was in 1971, where Ray Tomlinson sent the very first email and his technology set the platform to allow people to send and receive files through different machines.However, the more recognisable period as being the start of Digital Marketing is 1990 as this was where the Archie search engine was created as an index for FTP sites. In the 1980s, the storage capacity of computer

was already big enough to store huge volumes of customer information. Companies started choosing online techniques, such as database marketing, rather than limited list broker. This kind of databases allowed companies to track customers' information more effectively, thus transforming the relationship between buyer and seller. However, the manual process was not so efficient.

In the 1990s, the term *Digital Marketing* was first coined, With the debut of server/client architecture and the popularity of personal computers, the Customer Relationship Management (CRM) applications became a significant part of marketing technology. Fierce competition forced vendors to include more service into their software, for example, marketing, sales and service applications. Marketers were also able to own huge online customer data by eCRM software after the Internet was born. Companies could update the data of customer needs and obtain the priorities of their experience. This led to the first clickable banner ad being going live in 1994, which was the **"You Will"** campaign by AT&T

In the 2000s, with more and more Internet users and the birth of iPhone, customers started searching products and making decisions about their needs online first, instead of consulting a salesperson, which created a new problem for the marketing department of a company. In addition, a survey in 2000 in the United Kingdom found that most retailers had not registered their own domain address.These problems made marketers find the digital ways for market development.

In 2007, the concept of marketing automation was raised to solve the problem above. Marketing automation helped companies segment customers, launch multichannel marketingcampaigns and provide personalized information for customers. However, the speed of its adaptability to consumer devices was not fast enough.

Digital marketing became more sophisticated in the 2000s and the 2010s, when the proliferation of devices' capable of accessing digital media led to sudden growth.Statistics produced in 2012 and 2013 showed that digital marketing was still growing.With the development of social media in the 2000s, such as LinkedIn, Facebook, YouTube and Twitter, consumers became highly dependent on digital electronics in daily lives. Therefore, they expected a seamless user experience across different channels for searching product's information. The change of customer behavior improved the diversification of marketing technology.

Digital marketing is also referred to as 'online marketing', 'internet marketing' or 'web marketing'. The term *digital marketing* has grown in popularity over time. In the USA *online marketing* is still a popular term. In Italy, digital marketing is referred to as *web marketing.* Worldwide *digital marketing* has become the most common term, especially after the year 2013.

Digital media growth was estimated at 4.5 trillion online ads served annually with digital media spend at 48% growth in 2010.An increasing portion of advertising stems from businesses employing Online Behavioural

Advertising (OBA) to tailor advertising for internet users, but OBA raises concern of [consumer privacy](#) and [data protection](#).

New non-linear marketing approach

In order to [engage customers](#), retailers must shift from a linear marketing approach of one-way communication to a value exchange model of mutual dialogue and benefit-sharing between provider and consumer. Exchanges are more non-linear, free flowing, and both one-to-many or one-on-one. The spread of information and awareness can occur across numerous channels, such as the blogosphere, YouTube, Facebook, Instagram, Snapchat, Pinterest, and a variety of other platforms. Online communities and social networks allow individuals to easily create content and publicly publish their opinions, experiences, and thoughts and feelings about many topics and products, hyper-accelerating the diffusion of information.

The Nielsen Global Connected Commerce Survey conducted interviews in 26 countries to observe how consumers are using the Internet to make shopping decisions in stores and online. Online shoppers are increasingly looking to purchase internationally, with over 50% in the study who purchased online in the last six months stating they bought from an overseas retailer.

Using an omni-channel strategy is becoming increasingly important for enterprises who must adapt to the changing expectations of consumers who want ever-more sophisticated offerings throughout the purchasing journey. Retailers are increasingly focusing on their online presence, including online shops that operate alongside existing store-based outlets. The "endless aisle" within the retail space can lead consumers to purchase products online that fit their needs while retailers do not have to carry the inventory within the physical location of the store. Solely Internet-based retailers are also entering the market; some are establishing corresponding store-based outlets to provide personal services, professional help, and tangible experiences with their products.

An omni-channel approach not only benefits consumers but also benefits business bottom line: Research suggests that customers spend more than double when purchasing through an omni-channel retailer as opposed to a single-channel retailer, and are often more loyal. This could be due to the ease of purchase and the wider availability of products.

Customers are often researching online and then buying in stores and also browsing in stores and then searching for other options online. Online customer research into products is particularly popular for higher-priced items as well as consumable goods like groceries and makeup. Consumers are increasingly using the Internet to look up product information, compare prices, and search for deals and promotions.

Use in the digital era

There are a number of ways brands can use digital marketing to benefit their marketing efforts. The use of digital marketing in the digital era not only allows for brands to market their products and services, but also allows for online customer support through 24/7 services to make customers feel supported and valued. The use of social

media interaction allows brands to receive both positive and negative feedback from their customers as well as determining what media platforms work well for them. As such, digital marketing has become an increased advantage for brands and businesses. It is now common for consumers to post feedback online through social media sources, blogs and websites on their experience with a product or brand.It has become increasingly popular for businesses to use and encourage these conversations through their social media channels to have direct contact with the customers and manage the feedback they receive appropriately.

Word of mouth communications and peer-to-peer dialogue often have a greater effect on customers, since they are not sent directly from the company and are therefore not planned. Customers are more likely to trust other customers' experience.Examples can be that social media users share food products and meal experiences highlighting certain brands and franchises. This was noted in a study on Instagram, where researchers observed that adolescent Instagram users' posted images of food-related experiences within their social networks, providing free advertising for the products.

It is increasingly advantageous for companies to use social media platforms to connect with their customers and create these dialogues and discussions. The potential reach of social media is indicated by the fact that in 2015, each month the Facebook app had more than 126 million average unique users and YouTube had over 97 million average unique users.

Brand awareness

Ease of access

A key objective is engaging digital marketing customers and allowing them to interact with the brand through servicing and delivery of digital media. Information is easy to access at a fast rate through the use of digital communications. Users with access to the Internet can use many digital mediums, such as Facebook, YouTube, Forums, and Email etc. Through Digital communications it creates a Multi-communication channel where information can be quickly exchanged around the world by anyone without any regard to whom they are.Social segregation plays no part through social mediums due to lack of face to face communication and information being wide spread instead to a selective audience. This interactive nature allows consumers create conversation in which the targeted audience is able to ask questions about the brand and get familiar with it which traditional forms of Marketing may not offer.

Competitive advantage

By using Internet platforms, businesses can create competitive advantage through various means. To reach the maximum potential of digital marketing, firms use social media as its main tool to create a channel of information. Through this a business can create a system in which they are able to pinpoint behavioral patterns of clients and feedback on their needs.This means of content has shown to have a larger impingement on those who have a long-standing relationship with the firm and with consumers who are relatively active social media users. Relative to this, creating a social media page will further increase relation quality between

new consumers and existing consumers as well as consistent brand reinforcement therefore improving brand awareness resulting in a possible rise for consumers up the Brand Awareness Pyramid.[31] Although there may be inconstancy with product images,maintaining a successful social media presence requires a business to be consistent in interactions through creating a two way feed of information; firms consider their content based on the feedback received through this channel, this is a result of the environment being dynamic due to the global nature of the internet.Effective use of digital marketing can result in relatively lowered costs in relation to traditional means of marketing; Lowered external service costs, advertising costs, promotion costs, processing costs, interface design costs and control costs.

Effectiveness

Brand awareness has been proven to work with more effectiveness in countries that are high in uncertainty avoidance, also these countries that have uncertainty avoidance; social media marketing works effectively. Yet brands must be careful not to be excessive on the use of this type of marketing, as well as solely relying on it as it may have implications that could negatively harness their image. Brands that represent themselves in an anthropomorphizing manner are more likely to succeed in situations where a brand is marketing to this demographic. "Since social media use can enhance the knowledge of the brand and thus decrease the uncertainty, it is possible that people with high uncertainty avoidance, such as the French, will particularly appreciate the high social

media interaction with an anthropomorphized brand." Moreover, digital platform provides an ease to the brand and its customers to interact directly and exchange their motives virtually.

Latest developments and strategies

One of the major changes that occurred in traditional marketing was the "emergence of digital marketing" (Patrutiu Baltes, Loredana, 2015), this led to the reinvention of marketing strategies in order to adapt to this major change in traditional marketing (Patrutiu Baltes, Loredana, 2015) .

As digital marketing is dependent on technology which is ever-evolving and fast-changing, the same features should be expected from digital marketing developments and strategies. This portion is an attempt to qualify or segregate the notable highlights existing and being used as of press time.

 Segmentation: more focus has been placed on segmentation within digital marketing, in order to target specific markets in both business-to-business and business-to-consumer sectors.

1. **Influencer marketing**: Important nodes are identified within related communities, known as influencers. This is becoming an important concept in digital targeting. It is possible to reach influencers via paid advertising, such as Facebook Advertising or Google Adwords campaigns, or through sophisticated sCRM (social customer relationship management) software, such as SAP C4C, Microsoft Dynamics, Sage CRM and Salesforce CRM.

Many universities now focus, at Masters level, on engagement strategies for influencers.

To summarize, Pull digital marketing is characterized by consumers actively seeking marketing content while Push digital marketing occurs when marketers send messages without that content being actively sought by the recipients.

1. **Online behavioural advertising** is the practice of collecting information about a user's online activity over time, "on a particular device and across different, unrelated websites, in order to deliver advertisements tailored to that user's interests and preferences.

2. **Collaborative Environment**: A collaborative environment can be set up between the organization, the technology service provider, and the digital agencies to optimize effort, resource sharing, reusability and communications. Additionally, organizations are inviting their customers to help them better understand how to service them. This source of data is called User Generated Content. Much of this is acquired via company websites where the organization invites people to share ideas that are then evaluated by other users of the site. The most popular ideas are evaluated and implemented in some form. Using this method of acquiring data and developing new products can foster the organizations relationship with their customer as well as spawn ideas that would otherwise be overlooked. UGC is low-cost

advertising as it is directly from the consumers and can save advertising costs for the organisation.

3. **Data-driven advertising:** Users generate a lot of data in every step they take on the path of customer journey and Brands can now use that data to activate their known audience with data-driven programmatic media buying. Without exposing customers' privacy, users' Data can be collected from digital channels (e.g.: when customer visits a website, reads an e-mail, or launches and interact with brand's mobile app), brands can also collect data from real world customer interactions, such as brick and mortar stores visits and from CRM and Sales engines datasets. Also known as People-based marketing or addressable media, Data-driven advertising is empowering brands to find their loyal customers in their audience and deliver in real time a much more personal communication, highly relevant to each customers' moment and actions.

An important consideration today while deciding on a strategy is that the digital tools have democratized the promotional landscape.

5. **Remarketing:** Remarketing plays a major role in digital marketing. This tactic allows marketers to publish targeted ads in front of an interest category or a defined audience, generally called searchers in web speak, they have either searched for particular products or services or visited a website for some purpose.

6. **Game advertising**: Game ads are advertisements that exist within computer or video games. One of the most common examples of in-game advertising is billboards appearing in sports games. In-game ads also might appear as brand-name products like guns, cars, or clothing that exist as gaming status symbols.

The new digital era has enabled brands to selectively target their customers that may potentially be interested in their brand or based on previous browsing interests. Businesses can now use social media to select the age range, location, gender and interests of whom they would like their targeted post to be seen by. Furthermore, based on a customer's recent search history they can be 'followed' on the internet so they see advertisements from similar brands, products and services.This allows businesses to target the specific customers that they know and feel will most benefit from their product or service, something that had limited capabilities up until the digital era. Advantages and limitations

The whole idea of digital marketing can be a very important aspect in the overall communication between the consumer and the organisation. This is due to digital marketing being able to reach vast numbers of potential consumers at one time.

Another advantage of digital marketing is that consumers are exposed to the brand and the product that is being advertised directly. To clarify the advertisement is easy to access as well it can be accessed any time any place.

However, with digital marketing there are some setbacks to this type of strategy. One major setback that is identified, is that Digital marketing is highly dependent on the internet. This can be considered as a setback because the internet may not be accessible in certain areas or consumers may have poor internet connection.

As well as digital marketing being highly dependent on the Internet is that it is subject to a lot of clutter, so it marketers may find it hard to make their advertisements stand out, as well as get consumers to start conversations about an organisations brand image or products.

As digital marketing continues to grow and develop, brands take great advantage of using technology and the Internet as a successful way to communicate with its clients and allows them to increase the reach of who they can interact with and how they go about doing so. There are however disadvantages that are not commonly looked into due to how much a business relies on it. It is important for marketers to take into consideration both advantages and disadvantages of digital marketing when considering their marketing strategy and business goals.

An advantage of digital marketing is that the reach is so large that there are no limitations on the geographical reach it can have. This allows companies to become international and expand their customer reach to other countries other than the country it is based or originates from.

As mentioned earlier, technology and the internet allows for 24 hours a day, 7 days a week service for customers as

well as enabling them to shop online at any hour of that day or night, not just when the shops are over and across the whole world. This is a huge advantage for retailers to use it and direct customers from the store to its online store. It has also opened up an opportunity for companies to only be online based rather than having an outlet or store due to the popularity and capabilities of digital marketing.

Another advantage is that digital marketing is easy to be measured allowing businesses to know the reach that their marketing is making, whether the digital marketing is working or not and the amount of activity and conversation that is involved.

With brands using the Internet space to reach their target customers; digital marketing has become a beneficial career option as well. At present, companies are more into hiring individuals familiar in implementing digital marketing strategies and this has led the stream to become a preferred choice amongst individuals inspiring institutes to come up and offer professional courses in Digital Marketing.

A disadvantage of digital advertising is the large amount of competing goods and services that are also using the same digital marketing strategies. For example, when someone searches for a specific product from a specific company online, if a similar company uses targeted advertising online then they can appear on the customer's home page, allowing the customer to look at alternative options for a cheaper price or better quality of the same product or a quicker way of finding what they want online.

Some companies can be portrayed by customers negatively as some consumers lack trust online due to the amount of advertising that appears on websites and social media that can be considered frauds. This can affect their image and reputation and make them out to look like a dishonest brand.

Another disadvantage is that even an individual or small group of people can harm image of an established brand. For instance *Dopplegnager* is a term that is used to disapprove an image about a certain brand that is spread by anti-brand activists, bloggers, and opinion leaders. The word *Doppelganger* is a combination of two German words *Doppel* (double) and *Ganger* (walker), thus it means double walker or as in English it is said alter ego. Generally brand creates images for itself to emotionally appeal to their customers. However some would disagree with this image and make alterations to this image and present in funny or cynical way, hence distorting the brand image, hence creating a Doppelganger image, blog or content (Rindfleisch, 2016).

Two other practical limitations can be seen in the case of digital marketing. One,digital marketing is useful for specific categories of products,meaning only consumer goods can be propagated through digital channels.Industrial goods and pharmaceutical products can not be marketed through digital channels. Secondly, digital marketing disseminates only the information to the prospects most of whom do not have the purchasing authority/power. And hence the reflection of digital marketing into real sales volume is skeptical.

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Brand Heritage

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Abstract—Purpose – Brand heritage is acknowledged as one of the future priorities in branding research. Adopting it in an international context is challenging. In order to maximise its use it is necessary to know how strong it and the target country's cultural heritage are. Accordingly, the aim of the study is to construct a pioneering operationalisation of both brand and cultural heritage.

Design/methodology/approach – The study begins with a discussion on the focal concepts. Definitions are proposed and suggestions for operationalisation put forward. Thereafter, the concepts are applied in an analysis of brand heritage in different countries.

Findings – It is suggested that brand heritage is a mixture of the history as well as the consistency and continuity of core values, product brands, and visual symbols. A country's cultural heritage could be conceived of as homogeneity and endurance.

Research limitations/implications – The preliminary operationalisation of the concept needs to be further tested. Nevertheless, the clarification and suggestions offered here should open up opportunities for further research.

Practical implications – The exploitation of brand heritage in international markets is likely to be further accentuated. The operationalisations generated are easy for practitioners to apply, enabling companies to better evaluate what brand heritage means for them and to effectively plan its use in an international setting.

Originality/value – To the authors' knowledge, this study is the first to suggest operationalisations of brand heritage and cultural heritage.

Keywords: Brand heritage, Cultural heritage, International branding, Brands, Heritage Paper type Research paper

Introduction

As businesses currently face the challenge of keeping up with rapid change in areas such as technology, the brand has become one of the few resources to provide long-term competitive advantage (Lindemann, 2003). One way of dealing with the environmental turbulence is to accentuate historical elements and thereby convey stability and confidence. It has become trendy for consumers to seek consolation in the past, and brands with an image including elements such as authenticity, heritage and stability are gaining in popularity (Brown et al., 2003; Loveland et al., 2010). It has also been argued that symbolic and emotional attachment between a brand and a consumer is more probable with brands that connect heritage and authenticity to their image (Ballantyne et al., 2006).

Coincident with its current attraction to marketers, heritage is acknowledged as a key organisational resource imparting long-lasting strategic value: companies are unique in terms of their heritage, and the heritage can provide the basis for superior performance (Balmer, 2009; Balmer and Gray, 2003). Unlocking the potential hidden value of a brand's heritage may be one way of harnessing the past and the present in order to safeguard the future (Urde et al., 2007). Managers today face the challenge of marketing a brand's heritage in a way that brings out its historical reliability but does not make it appear out-dated. Indeed, it is argued that this will be the key to building successful brands in the future: due to the abundance of choice, today's marketing environment demands strong brand identities and decries imitation (Aaker, 1996; Ballantyne et al., 2006).

Coincident with the extensive research interest in brands in general is a growing fascination with nostalgia and retro brands (cf. Boutlis, 2000; Brown, 2001; Brown et al., 2003; Kessous and Roux, 2008; Loveland et al., 2010). However, research from the conceptual perspective of brand heritage is still scarce (e.g. Liebrenz-Himes et al., 2007). The studies conducted by Urde et al. (2007) and Greyser et al. (2006) are among the few thus far focusing specifically on this, whereas others only mention it in passing, and the concept still lacks operationalisation.

Despite, or perhaps because of globalisation, there is an increasing need for research on cultural differences between nations in the business context (Leung et al., 2005). There have been many attempts to measure national cultures. Most cultural mappings (e.g. Hofstede, 2001; Schwartz, 1994) emphasise differences in value priorities between individuals in a given national group in comparison with individuals inother national groups. They do not take into account how deeply rooted – or strongly inherited – these values are within a nation, however. Studies on national cultural heritage are scarce. The few that exist tend to consider heritage a cultural resource (i.e. cultural capital) and thus evaluate its benefits to a country/region (e.g. Bostedt and Lundgren, 2010), or they analyse it as a determinant of organisational behaviour (e.g. Fargher et al., 2008).

However, national cultural heritage is rarely discussed in the academic literature on marketing, except for brief references to

the cultural heritage in the country of origin (e.g. Tellströ¨m et al., 2006), and is largely neglected as far as the target country is concerned. This is surprising given the large amount of literature on adaptation vs. standardisation of the different elements of marketing in target markets (Ryans et al., 2003): one would assume that knowledge about cultural heritage would be a prerequisite. Like brand heritage, cultural heritage lacks operationalisation. Discussion of the two concepts that is restricted to definitions is pointless, however, without an understanding of their practical application. Moreover, combining these concepts in one study will enhance knowledge of brand management across cultures.

As a pioneer in this respect, Banerjee (2008) considered the cultural heritage of the target country in relation to branding. His conceptual framework for matching brand heritage and cultural heritage, although seemingly a valuable tool for enhancing understanding of brand heritage in international markets, has not, to our knowledge, been applied empirically. Its application is complicated, however, because of the lack of measurements for the two concepts. This constitutes the research gap for this study, the aim of which is to construct a preliminary operationalisation of brand heritage and cultural heritage.

Thus, the constructed operationalisations will constitute the main contribution of the study, and will be a major step forward in terms of theory development. Moreover, it will be of use to researchers focusing on international branding, allowing more systematic comparison of the strength of brand heritage in different brands and of the strength of the national cultural heritage in different countries.

The article proceeds as follows. First we define and discuss the concepts of brand heritage and cultural heritage, and suggest how they might best be operationalised. We then briefly evaluate the usability of the suggested measures in line with Banerjee's (2008) framework. Empirical cases are used to illustrate the theoretical discussion and to support the operationalisation. Finally, we suggest theoretical implications in the form of propositions, which lead us to the practical implications.

Brand heritage

Defining a brand and brand associations

A brand is often defined as a set of functional attributes and symbolic values, branding being the process of associating the attributes with the product in order to add value to it (e.g. Simo˜es and Dibb, 2001; Knox and Bickerton, 2003). According to Kapferer (2004), a brand's success is based on its saliency, differentiability and intensity, and on the trust attached to the associations. In addition to these, Davis (2010) emphasises the role and accumulation of experiences in brand recognition. Brand preference ultimately depends on

what the brand means to the customer and on the strength of its emotional effect, in other words on its place in the heart (e.g. Ballantyne et al., 2006). Brands are intangible assets (Kapferer, 2004), and have traditionally been associated with physical goods, but the notion of branding has been extended to companies as well. A company brand is defined primarily in terms of organisational associations.

Brand intangibles cover a wide range of associations and represent a significant element and future priority in branding research. Brand heritage is one of the associations that marketers can use to differentiate their brands from those of their competitors, ultimately helping them to create a unique image for the offering (Keller and Lehmann, 2006). In turbulent times consumers become less confident in the future, wishing to protect themselves from the harsh, unpredictable realities of the outside world and seeking reassurance from the products they buy. This increases interest in brands with a heritage: skilfully exploited

they can evoke past events (Brown et al., 2003). Going back to one's roots and seeking comfort in the past in order to be ready for the future appears to be a growing trend. Brands representing stability, familiarity and trust can speak to people in periods of uncertainty, helping to create an image of authenticity and integrity that is likely to appeal to today's consumers. According to Ballantyne etal. (2006), in difficult times brand heritage offers a basis for stabilisation and growth. Indeed, Aaker (2004) recommends "going back to the roots" particularly for companies that are struggling. When external circumstances call for corporate change, however, overly strict adherence to the brand heritage can turn into inertia (Blomba¨ck and Brunninge, 2009).

A related concept that seems to be gaining popularity in these economically challenging times is "retro". Whereas brand heritage is deeply rooted in the company's or product's history, and cannot be copied, "retro" is a marketing and advertising tactic that any company can apply: reviving old products or brand slogans, incorporating images of days gone by, rehashing and re-contextualising old ads and old cultural representations, and evoking any kind of nostalgia associated with the past. It is even used when a company wants to position a new brand based on consumers' pre-existing emotional touch points (Sullivan, 2009; Brown et al., 2003; Boutlis, 2000).

Dimensions of brand heritage

What is meant by brand heritage and heritage brands? Defining them is not straightforward. It should also be said that a company or product with a heritage is not necessarily a heritage brand. Having a heritage does not in itself create value but it may constitute the foundation of brand building (Urde et al., 2007). The word heritage is generally associated with inheritance: something transferred from one generation to another. As a concept, therefore, it works as a carrier of historical values from the past (Nuryanti, 1996).

Accordingly, Banerjee (2008, p. 314) describes its history, image, expectancy and equity as the four pillars of a brand's heritage. History represents its rich eventful past, and the image "an after effect of the brand communication and positioning based on the benefits to be enjoyed by the consumers". Brand expectancy refers to the physical and emotional benefits that consumers receive from the brand. Finally, equity comprises two subsets: a homogeneous and a heterogeneous set of competences that, respectively, facilitate progression and give the edge over the competition. With the exception of its history, the elements of brand heritage in Banerjee's (2008) description are difficult to measure.

Meanwhile, according to Urde et al. (2007), a heritage brand is recognisable from the following characteristics: a track record, longevity, core values, history, and the use of symbols. A track record means demonstrated proof that the company has lived up to its values and promises over time, whereas longevity reflects consistent performance among other heritage elements. Core values are an integral part of a brand's identity, and over time may constitute its heritage. History is another significant element of identity, and for the heritage brands at issue embraces three timeframes: the past, the present and the future. As Urde et al. (2007, p. 7) put it:

Heritage brands are about history and history in the making.

History can make a brand relevant to the present and, prospectively, the future.

One way of creating a brand history is to link the brand to a sense of cultural continuity and communal tradition by means of its ubiquitous presence, of which Coca Cola is a good example: the Coke name and logo are discernible virtually everywhere, and the vast majority of people alive today can recognise it (Beasley and Danesi, 2002). However, according to some authors (e.g. Winkler, 1999), a long history is not a prerequisite in that some brands develop a strong heritage over a short period of time. This applies to many products of the e-era, such as eBay and Google, as the digital age has shortened time spans. Finally, symbols and

other visual elements are used to identify the brand and express its meaning and values (Urde et al., 2007). In our opinion, of Urde et al.'s (2007) brand-heritage elements, track record overlaps with history and core values, and consequently their definition is not applicable as such. In addition, we prefer the terms consistency and continuity to longevity because they better capture the idea of the same overall look and feel in the positioning strategy and underlying theme over time (see Percy and Elliott, 2009).

As shown above, definitions vary and, in many respects, overlap, but none of them explain how to measure brand heritage per se. As mentioned, the research in this paper is on the operationalisation of both brand and cultural heritage. Consequently, brand heritage is seen here as a composite of the history as well as the consistency and continuity of a company's core values, product brands and use of symbols (see Figure 1, which shows the "visible" and "invisible" from a consumer's perspective), and a potential measurement

Figure 1 Elements of brand heritage
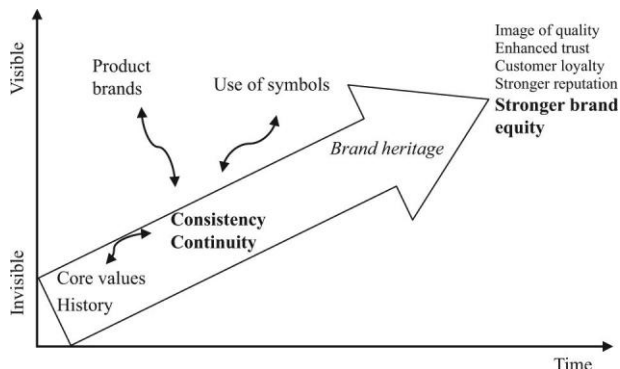
Mechanism is proposed. The elements, in turn, produce an image of quality, enhanced trust, customer loyalty and a strong reputation – eventually leading to stronger brand equity. These components are discussed in the following.

Regardless of the contradictory notions (e.g. Davis, 2010), we consider history to be a prerequisite of brand heritage. For one thing, all companies have one. History – and here we mean a time span of some decades or more – can represent a depth of experience and a sense of permanence, and as such may be an important element in image creation (Fill, 2009) as well as in maintaining brand loyalty (Dahlen et al., 2010). It also matters in terms of identity: employees know who and what they are as well as where they come from and where they are heading (Davis, 2010; Urde et al., 2007). Respecting and highlighting the history of a company or a product should not be associated with being old-fashioned: it is possible to develop a modern brand without throwing away the history that made it what it is, in other words something that customers can trust (Dinnie, 2009; Ballantyne et al., 2006).

Its history can include the "story" of the company or brand, and stories make the past relevant to contemporary life (cf. Blombåckand Brunninge, 2009). A good story can engage audiences, build long-term relationships and support organisational claims. At best, the essence of the brand resonates with the memories and emotional connections of the audience (Dahlen et al., 2010; Flory and Iglesias, 2010), thereby making the story of the company a success story that retains its attractiveness over the years.

Secondly, consistency and continuity in a company's operations and in its marketing communications enhance its brand heritage. For one thing, they concern the company's core values, and in this context help in defining the corporate strategy, and thus become part of the brand heritage. Brown et al. (2003), referring to core values, mention the brand essence or the "aura": the core values are the consistent and essential guiding principles for which the brand stands. Moreover, they do not change with current trends, or even with changing conditions in the market, and they are not to be confused with financial or short-term aims (Collins and Porras, 1996). As Urde (2003) states, they should be part of a realistic future identity. The support of the whole organization is needed in linking core values and the brand tightly together in a way that is hard to copy.

In the context of marketing communications, consistency implies a "one voice" approach, integrating the company's strategy and creative actions over the long term. Adding to this certain timelessness is an element of responsibility, which means respecting what has been done before, yet allowing change and improvement. Every new generation brings something new to the brand, but without the previous knowledge and tradition the branding would have to start all over again (Urde et al., 2007; also Percy and Elliott, 2009).

Given the visibility of a company's brand heritage in its products, it is important to take the individual product brands into account. Besides, brands with a heritage are often the oldest ones in their respective product categories (cf. Aaker, 1996). Questions such as "how has the product line changed?" and "what were the focal product brands of the company at the time of its foundation, and what are they now?" need to be asked in order to assess the consistency and continuity of the product range.

Brands with a heritage can speak to consumers through various ways: symbols, graphics, nostalgia, packaging andadvertising (Ballantyne et al., 2006). Symbols act as a means of expressing the core values, indicating what the brand stands for (Urde et al., 2007). Visual symbols have more potential than words because a symbol is more ambiguous, imbued with meanings and rich in information, and at best can create an emotional bond with consumers. (Vestergaard and Schrøder, 1985; Borja de Mozota, 2003) The little Hariboy and the Gold Bear of Haribo Candy, not to mention the contoured Coca Cola bottle, are symbols that reflect and express the organisation's meaning and heritage (Urde et al., 2007; Kessous and Roux, 2008). A consistent symbol can bring coherence and structure to the identity of a brand by associating it with the past, which makes it easy for consumers to recall and recognise it and to differentiate it from competing brands (Aaker and Joachimsthaler, 2000).

Symbols that reflect heritage can be anything that represents the brand, including logos, shapes, colours and patterns (Urde et al., 2007). They also appear in the form of taglines, such as "Snap, Crackle, Pop, Rice Krispies!" (Kellogg's, 2010), or as metaphors, gestures, musical notes, packages and even events or programmes (Aaker and Joachimsthaler, 2000). Constructing a logo is not only finding a name that creates familiarity for the brand. Successful brands develop a visual identity and a marketing-communication process that persist and are distinctive (Borja de Mozota, 2003). A colour, for example, can become so consistently linked with a specific brand and its heritage that it acquires a secondary meaning; accordingly, companies are increasingly registering colours as trademarks (Hoek and Gendall, 2010).

Operationalising brand heritage

Operationalisation is complicated because product and company brand heritage tend to be intertwined. This is even more accentuated in companies/products with a long history. In practice a company contemplating internationalisation needs to consider its brand architecture (Kapferer, 2004). With regard to fast-

moving consumer goods the main emphasis is on the product. Figure 2 depicts the proposed operationalisation. As indicated, in referring to the intangible and tangible past of a company and its products, brand heritage is not only in the past but is also a representation of it.

The cultural heritage of the target country

Even though the brand heritage is considered valuable, its significance may vary according to where the brand is

Figure 2 The proposed operationalisation of brand heritage
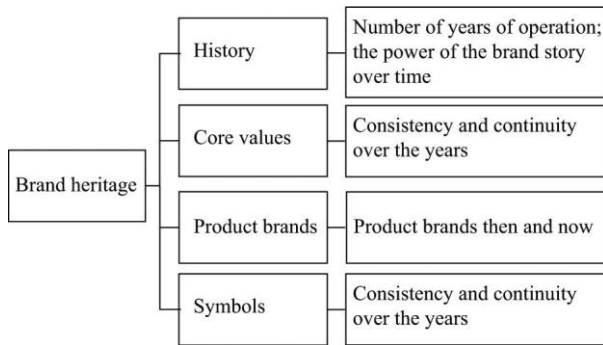
marketed: it may have a heritage in a global as well as a local sense, but the two may differ considerably (Van Gelder, 2003). Internationalising companies should therefore consider the extent to which they are able to – or should – utilise the local heritage. As Banerjee (2008) advises, the brand's heritage should be set in the context of the cultural heritage of the target country, and potential gaps in strength between them weighed up before the target country is approached.

The cultural heritage of the target country is relevant in that – in spite or perhaps because of globalisation – it has an enduring impact on the values of the individuals living in it (Inglehart and Baker, 2000). However, it is a complex phenomenon and assessing its strength is not straightforward. Culture could be defined as a collective programming of the mind that distinguishes the members of one human group from another (Hofstede, 2001). Societies develop their own distinctive cultures over time. The country is often used as the unit of analysis, and there have been various attempts to classify national cultures based on value differences (e.g. Hofstede, 2001; Trompenaars, 1993). However, to our knowledge, there are no country classifications based on differences in cultural heritage.

In line with the definition of brand heritage suggested above we thus define the cultural heritage of a country as a composite of the history and the coherence and continuity of the nation's distinguishable characteristics. Given that it is a social construction, the understanding of cultural heritage depends on the evaluator's own historical and spatial context (cf. Arantes, 2007), and in order to be able to compare countries we would need clear, more objective measurement criteria. Moreover, if they are to be of use to companies they should allow fast comparison based on the secondary information available from each country.

According to Banerjee (2008), measurement of the cultural heritage of a country should be based on homogeneity (in fact, he refers to the degree of diversity), endurance, tolerance and impediment, but he does not explain how to do it. In particular, impediment and tolerance would be hard or even impossible to measure in practice. We therefore suggest that two dimensions – homogeneity and endurance – would be sufficient for evaluating and comparing the cultural heritage in different countries.

Measures of homogeneity could be based on the dominance of a single language, ethnic background and religion within a country. For instance, the higher the proportion of speakers of the dominant language, the more homogeneous the country would seem to be (Diener and Diener, 2009; Tonta, 2009). After testing the criteria on various countries, however, we decided to leave ethnic background aside because it correlated so strongly with language and religion that excluding it made no difference in the final assessment. Furthermore, it is rather easy to find information on the dominant language and religion, whereas ethnic diversity is not always documented.

Endurance is more difficult. Should we measure the period of independence or the years the country has been populated? Both are problematic: the former focuses more on political history and the latter is vague and does not differentiate countries from each other. We therefore propose that representations of cultural heritage and its conservation could be utilised in measuring the endurance of particular cultures. The UNESCO World Heritage Lists provide comparable data on cultural heritage sites (e.g. monuments and groups of buildings), as well as on intangible aspects of heritage (e.g. traditions inherited from ancestors, rituals and festive events) covering 186 of the 192 Member States of the United Nations. UNESCO describes heritage as the legacy from the past, what people live with today, and what they pass on to future generations (UNESCO, 2010).

Even though the UNESCO World Heritage List affords fast access to comparable data, and is provided by an international neutral player, it has certain shortcomings. For example, it has been accused of promoting a European viewpoint on cultural heritage, ignoring minority groups, and applying strict nomination criteria with which less developed countries may find it impossible to comply (Labadi, 2007; Rao, 2010). However, the fact that the list seems to be the only available comparable data source on the cultural heritage of different countries justified its utilisation as a proxy for endurance. Thus the number of nominations of any particular country on the list could be considered an indicator of endurance. In sum, Figure 3 depicts the suggested operationalisation of the cultural heritage of a country.

Utilising brand heritage in different cultures

Utilising brand heritage is more complicated when a firm operates in different cultures. Banerjee (2008) proposes four different strategies from which a firm considering its use in an international setting can choose. Together they comprise a matrix, illustrated in Figure 4. The selection of strategies depends on whether the heritage of the brand is weak or strong, and on whether the cultural heritage of the target market is weak or strong.

Of the brand strategies suggested, matching seems to be the most challenging in that it may need to be tailor-made for each country. Assimilation requires country-based adaptation as well, but it tends to be easier because the brand's particular

Figure 3 The operationalisation of cultural heritage
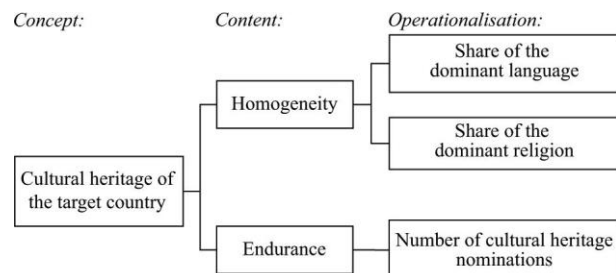
Figure 4 Brand strategies for different cultural heritages

dominant language and religion correlated (r ¼ 0:701) in the countries concerned, indicating internal consistency. Endurance was more difficult to operationalise.

Discussion and conclusions:

A company's brand heritage can be a noteworthy competitive tool as it enters international markets. However, brand managers should establish how the markets differ culturally, and construct a marketing strategy accordingly. In other words, the brand's heritage and the cultural heritage of the target country should be interlinked, thereby enabling companies to assess their relative strength in each target country. Assessment requires the objective operationalisation of both concepts, however, which was the purpose of this study. There have been studies focusing on conceptual definitions, but to our knowledge this is the first one to target operationalisation. Combining the definitions of brand heritage developed by Banerjee (2008) and Urde et al. (2007), and taking into account the measurability and the need to avoid overlapping concepts, we therefore propose that:

Brand heritage is a composite concept incorporating the history of the brand in numbers of years of operation and the power of the brand story over time, as well as the consistency and continuity of the core values, the product brands and the visual symbols.

As Banerjee (2008) suggests, the brand's heritage should be considered in the context of the cultural heritage of the target country, and potential gaps in strength between them weighed

heritage is not so deep-rooted. Both convincing and initiating emphasise communication with consumers, and thus do not seem to differ from the strategies adopted in the home market (cf. Banerjee, 2008).

Methodology

In order to pilot the operationalisations created in the previous sections we decided to concentrate on fast-moving consumer goods (FMCGs). It has been suggested that consumer-goods companies benefit from their heritage more than business-to-business organisations (Holt, 2004), and that more research is needed given that FMCGs rarely include brands that are associated with heritage (Alexander, 2009). Of the various industries represented in FMCGs we selected the food industry. Food is essential to the traditions of a culture, and a company can convey cultural elements of its country of origin along with its food brands (Tellstro¨m et al., 2006).

Empirically we investigated the phenomenon through case research. Case studies are appropriate when there is a need to understand complex phenomena that are not easily separable from their contexts (Eisenhardt, 1989; Yin, 1989). The comprehensiveness that this approach allows is highly relevant to this research because of the novelty of the topic and because of the temporal dimensions of heritage. The study incorporates four cases (four food-product brands), thereby allowing both rich description and systematic comparison (see Miles and Huberman, 1994). The cases were selected on the basis of the companies' international scope, long history (offering maximum insight into their heritage), access (Finnish cases) and cooperativeness (i.e. information provided and trust gained during previous researchprojects). The brands chosen for this study were Fazer Puikula bread and Fazer Blue milk chocolate produced the by Fazer Group, and Elovena oat flakes and Sunnuntai baking products produced by the Raisio Group. Various forms of data were gathered in order to capture the versatility of the phenomenon (Table I). The data collection took place in 2007-2010.

The first task in the within-case analysis was to organise the data according to the agreed brand-heritage criteria: history, consistency and continuity of the core values, the product brands and the visual symbols. We also analysed the international scope (international markets and brand strategies utilised). Engaging in careful conceptual contemplation, having three researchers analysing the data, and asking the informants to review the draft cases ensured the construct validity of this qualitative analysis (cf. Daymon and Holloway, 2002; Yin, 1989).

Evaluation of cultural heritage relied on homogeneity and endurance, and was based on the conceptual studies by Banerjee (2008) and Arizpe (2004). The assessment of national homogeneity relied on quantitative data obtained from public sources (see Table II in the next section). The investigation concentrated on the main target countries of the case brands, which limited the number of countries in the analysis. The operationalisation of homogeneity compared with that in previous studies (e.g. Diener and Diener, 2009), and the shares of the

up, before the country is approached. Previous literature (e.g. Hofstede, 2001; Trompenaars, 1993) has classified countries based on cultural differences, but there is a dearth of tools for measuring differences in cultural heritage. This, again, calls for operationalisation. Having taken Banerjee's (2008) conceptualisation of national cultural heritage as a starting point and converted it into measurable form that proved to be usable in practice, we propose that:

The cultural heritage of a country comprises homogeneity and endurance.

One way of assessing homogeneity is to analyse the coverage of the dominant language and religion, whereas endurance can be ranked in accordance with the number of cultural heritage nominations received.

The empirical application of the above operationalisations to Banerjee's (2008) framework, which to our knowledge is the first, leads us to our third proposition. It seems that both convincing and matching are often suitable strategies for internationalising companies with a strong brand heritage. We also found that both strategies could sometimes be adopted for one product brand simultaneously in different market areas. The timing of the market entry and the marching order of the markets also seem to matter. Hence:

The utilisation of brand heritage in international markets is influenced by the strength of the brand's own heritage and the strength of the cultural heritage of the target country, and also by other variables such as the firm's internationalisation strategy and the timing of the market entry.

Thus, although it is extremely hard to estimate the impact of a country's cultural heritage on branding decisions – as there are other influencing variables – it should be borne in mind that "there are very few instances where culture does not matter at all" (Leung et al., 2005, p. 368).

The above propositions are drawn from our theoretical discussion and case examples, and further research is needed to support their validity. We suggest that future studies should focus on specifying the circumstances in which cultural heritage matters more and when it matters less. Applicability of the brand-heritage

concept should be considered in different product categories, and account taken of the strength of the heritage in the country of origin as well as the familiarity and traditions of the product category in the target market. Overall, more empirical research is needed to test the validity of the suggested operationalisations.

Managers are under increasing pressure to utilise brand heritage more efficiently in international markets. Given that the strategies seem to differ depending on the target countries' own cultural heritages, we recommend that firms basing their competitive advantage largely on a strong brand heritage in particular carefully consider how to enter countries with a strong cultural heritage. The operationalisations created in this study are easy for practitioners and managers to apply.

Our conclusions should be considered in the light of the limitations of the study. This research is primarily conceptual and the propositions are based on relatively scarce empirical evidence. In particular, the measurement of a country's cultural heritage is problematic and deserves further consideration. We assumed that both homogeneity and endurance would play an equal role in its determination: this assumption needs to be further deliberated. Furthermorethe utilisation of the UNESCO World Heritage List as a proxy for endurance could be carefully considered in future studies. The overlap between the corporate and product brand heritage may also complicate the operationalisation of the concepts. All that said, we hope that this paper will provide the basis for future discussion, and will act as a trigger for further empirical studies.

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AN EMPIRICAL STUDY ABOUT THE RELATIONSHIP BETWEEN MOTIVATIONAL FACTORS AND EMPLOYEE RETENTION IN JINDAL STAINLESS LIMITED, KALINGANAGAR, ODISHA

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Abstract: In today's competitive business environment, the goal of employers is to decrease employee turnover, thereby decreasing training costs, recruitment costs and loss of talent and organisational knowledge. This study is aimed at identifying the key intrinsic and extrinsic motivational factors which influence employee retention of a company in one of the upcoming steel hubs of the country. It also made recommendations on how to reduce employee turnover. The study was carried out in Jindal Stainless Limited, Kalinganagar, Odisha. Primary data was collected from 60 employees of the company using reliable questionnaire. Chi-square test of Independence was used in hypothesis testing of the study. The result showed that interpersonal relationships have strong association with employee retention. However, retention proved to be independent of all the other factors taken into consideration.

Keywords: Employee retention, motivational factors, interpersonal relationships.

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Introduction: Employee retention is the ability of an organization to retain its employees. Retention policies are strategies employed by the human resource department of organizations to encourage the employees to remain within the organization for maximum period of time. A strong retention strategy is also a powerful recruitment tool.

Employee turnover is nothing but replacing an old employee with a new one. Turnover consists of retirement, termination, death, interagency transfers, and resignation. High turnover is not good for company's productivity because skilled workers will always be leaving and the worker population will contain high number of novices. Employee turnover can be due to low employee morale, poor interpersonal relationships, lack of recognition, absence of clearer path and many

other issues. Basically, a lack of satisfaction and commitment to the organization can cause an employee to withdraw and look for better opportunities.

The **two-factor theory** (also known as **Herzberg's motivation-hygiene theory**) states that there are certain factors in the workplace that cause job satisfaction, while a separate set of factors cause dissatisfaction. Two-factor theory distinguishes between:

- **Motivators** like challenging work, recognition for one's achievement, responsibility, involvement in decision making, sense of importance to an organization that give positive satisfaction, arise from intrinsic conditions of the job itself, such as recognition, achievement, or personal growth, *and*

- **Hygiene factors** do not give positive satisfaction or lead to higher motivation, though dissatisfaction results from their absence. The term "hygiene" is used to signify that these are maintenance factors. These are extrinsic to the work itself, and include aspects such as company policies, supervisory practices, or wages/salary. E.g. are status, job security, salary, fringe benefits, work conditions, good pay, paid insurance.

According to Herzberg, absence of hygiene factors is the cause of dissatisfaction among employees in a workplace. There are several ways that this dissatisfaction can be reduced. Some of the most important ways are to pay reasonable wages, ensure employees job security, and to create a positive culture in the workplace. Herzberg considered the following hygiene factors from highest to lowest importance: company policy, supervision, employee's relationship with their boss, work conditions, salary, and relationships with peers. Eliminating dissatisfaction is only one half of the task of the two factor theory. The other half would be to increase satisfaction in the workplace. This can be done by improving on motivating factors. Motivation factors are needed to motivate an employee to higher performance. Herzberg thought it was important to eliminate job dissatisfaction before going onto creating conditions for job satisfaction because it would work against each other.

Retaining talent has gained huge importance in recent years in India. This is because there is no dearth of opportunities for the best in the business especially in prominent metro cities. The 2015 Asia Pacific Benefit Trends survey by Towers Watson says that Attraction and retention of employees are the key focus areas for over half or 52% of Indian employers. Recruiting and

developing talent is a costly process. Failing to retain a key employee is a costly proposition for an organization as organizational issues such as training time and investment, lost knowledge, insecure employees and a costly candidate search are involved. Various estimates suggest that losing a middle manager in most organizations costs up to five times of his salary. When long-term employees resign, their knowledge, skills and abilities depart with them, as does the company's investment to train the workers. Tara Blythe, facilitator in the University of Florida Executive Education's Essentials of Business program, says there is a strong correlation between employee turnover and customer turnover. "Organizations with high turnover tend to have lower than average customer satisfaction and loyalty," she says. "Satisfied, long-term employees create satisfied, long-term customers." Hence, Retention of key employees and top performers is critical to long term success of any organization.

Various researches have been carried out on employee turnover and retention to understand why employees leave organizations. However, not many have focused on the reasons which make them stay. This study, therefore, determines the motivational variables which compel employees to continue in an organization for longer periods. Consequently, this will help the managers in adopting better retention strategies.

Review of literature: Bidisha Lahkar Das and Dr. Mukulesh Baruah (2013), in their research paper entitled, "Employee Retention: A Review of Literature", reveal that human resources are the life-blood of any organization. Even though most of the organizations are now a days, found to be technology driven, yet human resources are required to run the technology. The biggest challenge that organizations are facing today is not only managing the human resources but also retaining them in a highly competitive market. Securing and retaining skilled employees plays an important role for any organization, because employees' knowledge and skills are central to companies' ability to be economically competitive. Besides, continuously satisfying the employees is another challenge that the employers are facing today.

Various literature studies argue that employee retention is a complex aspect of human resource management and therefore, detailed researches need to be carried out in this field. In addition to this there are also concerns about how retention policies should be frames. According to Neha and Kundu (2014), retention strategies needs to be evidence based, grounded in the organizational, and industry specific realities and reviewed periodically.

Sunil Ramlall (2004) in his paper entitled, "A Review of Employee Motivation Theories and their Implications for Employee Retention within Organizations" described the importance of retaining critical employees and explained how employee retention practices can be more effective by identifying, analyzing, and critiquing employee motivation theories and showing the relationship between employee motivation and employee retention.

Samuel and Chipunza (2009) showed that employees in both public and private sector organisations were, to a very large extent, influenced to stay in their respective organisations by a combination of intrinsic and extrinsic motivational factors. The following motivational variables were found to have significantly influenced employee retention in both the public and private sector organisations: training and development, challenging/interesting work, freedom for innovative thinking, and job security.

Statement of Problem: Since organizations devote a significant part of their time in maintaining human capital, it raises the question of how effective the retention techniques are in reducing employee turnover. This leads the researcher to carry out this study and understand the importance of various motivational factors with respect to employee retention.

Objectives of the study

- To determine the retention strategies existing in the company from employee's perspective
- To determine the motivational factors which affect employee retention in the company, Jindal Stainless Limited

Scope of the study: The study is carried out in Jindal Stainless Steel, Kalinganagar, Odisha. The company is selected based on researcher's convenience.

Kalinganagar, situated in Jajpur District of Odisha, is neither a village nor a town. It is a name given to this geographical area by Odisha Industrial Infrastructure development Corporation (IDCO). It is becoming a major global hub in steel, power and ancillary products and is being developed as a National Investment Manufacturing Zone under the National Manufacturing Policy. Founded by O.P. Jindal, Jindal stainless is one of the largest integrated manufacturers of stainless steel in India and is ranked amongst the top 10 stainless steel manufacturers in the

world. Characterised by excellence and success, the company is innovative and versatile in its thought process.

Research methodology

Type of research

This study is analytical in nature and is a case study.

Hypothesis Statement

H_0: Employee Retention is not dependent upon the intrinsic and extrinsic motivational factors in the company.

H_1: Employee Retention is dependent upon the intrinsic and extrinsic motivational factors in the company.

Variables

Employee retention (Dependent variable)

Intrinsic and Extrinsic motivational factors (Independent variables)

Sample design

Non-Probability sampling technique (convenience sampling) is used to collect data. Data has been collected from 60 employees of the company using questionnaires.

Sources of data

Primary data is collected by survey method using a structured questionnaire and the secondary data is collected through websites and existing research works.

Statistical tools used

Chi-square test of independence is used for hypothesis testing. Percentage analysis is employed for determining the retention strategies.

Analysis and Interpretation

Table 1: Retention strategies from employee's perspectives

Retention Strategies	No of employees	Percentage (%)
1. Career growth and development programmes	57	95.00
2. Exit interview sessions	51	85.00
3. Orientation and on-boarding programmes	35	58.33
4. Women retention programmes	29	48.33
5. Executive coaching programmes	24	40.00
6. Employee retention consultants	14	23.33

Source: Primary Data

From the above table, it can be seen that 95% of employees have said that career growth and development programmes exist in the company. This is followed by exit interview sessions (85%), orientation and on boarding programmes (58.33%), women retention programmes (48.33%), executive coaching programmes (40%) and lastly, employee retention consultants (23.33%).

Table 2: Levels of significance between the retention and intrinsic motivational variables

Intrinsic Motivating Factors	Chi-square test	Associated P-value
1. Sense of Belongingness towards company	4.932	0.085
2. Freedom for Innovative thinking	3.346	0.188
3. Provision of health and wellness programmes	1.595	0.450
4. Clear and achievable performance targets	4.514	0.105
5. Job Security	1.325	0.516
6. Training and Development	2.986	0.225
7. Recognition/Reward for good performance	5.789	0.055
8. Work Autonomy	1.408	0.495
9. Mentoring	1.095	0.578
10. Challenging/Interesting work	2.315	0.678

| 11. Participation in decision making process | 0.901 | 0.637 |
| 12. Work-life Balance | 0.747 | 0.688 |

Source: Primary data

From the above table, it is seen that there is no significant association between intrinsic motivational factors and employee retention (p-value is greater than 0.05). Therefore, researcher concludes that there is not enough evidence to reject the null hypothesis.

Table 3: Levels of significance between the retention and extrinsic motivational variables

Extrinsic motivating factors	Chi-square tests	Associated p-value
1. Interpersonal Relationships	6.745	0.034
2. Salary Package	1.744	0.418
3. Retirement Benefits	0.514	0.773
4. Tools and technology provision	3.096	0.213

Source: Primary Data

From the above table, it is seen that there is evidence of strong association between interpersonal relationships and employee retention. For the remaining factors, it is inferred that there isn't strong evidence to reject null hypothesis.

Findings and Suggestion

1. Career growth and development opportunities and exit interviews are a good practice in the company. By means of exit interviews an organisation can understand the reasons that make an employee leave as well as the part of their job that they have enjoyed the most.

2. The company needs to work upon improving its executive coaching, women retention programmes, orientation and on boarding sessions, and employee retention consultants. As one of the largest integrated stainless steel manufacturing company in the country, new recruits will naturally have high expectations from the company. Orienting new employees about the region-specific issues and the cultural practices is important. Preparing them for dealing with the realities of working in a manufacturing sector is an essential task. By being transparent about the positive and negative aspects of the job, as well as the challenges and expectations, employers are positioning themselves to recruit and retain stronger candidates.

3. Executive coaching, in developing areas like Kalinganagar, is important. This is so because the region consists of population of rural and tribal background. They have different cultural practices and may have opinions which are a far cry from the general views of other regions around the country. Any decision making process should not ignore the concerns of the local workers. Ignorance and improper dealings with locals may result in tension and dreadful situations for executives. Therefore, the top level employees should be coached about the methods required to handle the workers and lower level employees. These points also hold true in case of women retention programmes and employee retention consultants.

4. It is understood that informal relations are strong in the company. The employees are motivated by their superior, subordinates and peers to work with the company. The following advantages of informal organizations to the company and its employees are noted:

   - Informal groups are helpful in supporting employees during emotional stress and in dealing with work-related frustrations.
   - It reduces workload and management pressure on persons individually.
   - In dynamic organizations like Jindal Stainless, formal plans and procedures cannot always solve the problem. Informal systems blend with formal ones to get the work done.
   - Informal relations fill in gaps in the system, for e.g., when any manager is inefficient in carrying out a task, others come forward to help him in completing his tasks.
   - Informal groups inculcate the organization culture and provide internal controls by regulating the behaviour of members inside and outside the groups.

5. Certain drawbacks have also been observed. Such as:

   - Resistance to change is a very often noticed among employees.
   - Conflicts arise when groups' interests and management's interests clash. This may lead them away from organizational objectives and cause low work productivity.
   - Rumours and half-truths infiltrate fast through informal system and cause distrust of management. This also harms the company image in the external environment.

6. Although, factors like freedom of innovative thinking and performance recognition exist in the company, they do not influence employee retention. This tells us that the company is

more focused on the work productivity and getting the required work done from employees. The other aspects of job like fringe benefits, job security, work-life balance, retirement benefits are ignored. **Without regard to this, employees are motivated to remain in the organization to achieve their personal goals.**

7. It is eye-opening to note that none of the other intrinsic and extrinsic motivational factors have any influence on retention. Previous literature studies have proven that job security, training and development programmes, compensation package have been vital in employee retention. This unconformity can be understood on the grounds that there is unavailability of better opportunities for the residents in the concerned region.

Conclusion

The results of the research establish that the only factor which has strong association with retention is interpersonal relationships. While organisations understand the importance of effective retention policies, they often neglect the consequences of improper implementation of such policies. In the face of competition in the current Indian job market, it is crucial for the company to pay particular attention to retaining the existing human resources. It's not easy to find suitable candidates for jobs in developing sectors where metro-city lifestyle cannot be facilitated. It is even more difficult to replace the cost of turnover. Henceforth, to keep up the productivity, such organisations must follow dedicated employee retention practices.

Scope for further research

Further studies can be done to understand the cause of dissociation between other motivation factors and retention.

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Critical analysis of the morphology concepts, morphemes and elements of morphology, types of morphology and different morphemes in sentences.

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According to International TEFL(Teaching of English as a Foreign) Academy, the basic definition of morphology is the study of words, their structure, and the pattern of word formation. Dr. George Kolanchery (n.d.), writes that a German linguist August Schleicher named Morphology as a sub-discipline of linguistics in 1859 for the first time. Morphology plays a substantial function in creating and structuring millions of English words. Aras Ahmed Mhamad (2013), writes that English derives a huge number of words on a daily basis from all the languages of the world and morphology gives an idea about the foundation of the words with procedures and conventions on how to form novel words. This paper critically analyzes the concepts of morphology, morphemes, elements of morphology, types of morphology and different morphemes in sentences.

Morphology is one of the systems in language. Mark Aronoff and Kirsten Fudeman (n.d.), "We also believe that morphologies are systems. This is a very old observation. Because of it, it is impossible to talk about isolated facts in a language – everything holds together." Richard Norduist (2018), "Morphology is the branch of linguistics that studies structure words, principally in relations to morphemes, which are the slightest units of language. They can be root words or gears that form new words, such as affixes." Morphemes are the minor units of words that have logic and they create words and cannot be subdivided further.

Words can be broken down into meaningful parts called morphemes. A morpheme is the negligible grammatical element in a language. A morpheme holds meaning. It cannot be separated into smaller units preserving meaning. It holds similar meaning when moved to other words. For example, a word like **'cup'** is one morpheme and it stands alone. A word like **'cups'** is two morphemes, **'cup'** and **'s'**, each holds a meaning, **'cup'** is a kitchen utensil and **'s'** is the plural. A morpheme is not same as a word, and the primary difference amid the two is that a morpheme may

or may not stand alone, whereas a word by definition can stand alone and convey meaning. Delahunty and Garvey (n.d.), "A morpheme is the smallest part of a word that has grammatical function or meaning. Morpheme is not the smallest unit of meaning." The English word **'boy'** cannot be broken up into separate sounds or sound groups. The word **'boy'** is not only a word it is also a morpheme. The single word **'unbreakable'** on the other hand consists of three morphemes. '**Un**'- meaning <u>not</u>, followed by **'break'**, a single word and the same is with **'able'**. Morphemes are usually not unique to any single word they are repeated in other words and add the same tinge of meaning each time for example: repay, reinvent, retell, rewrite, workable and reusable. This totally defies about what Aristotle said about word that a word constituted the basic unit of meaning in a language. But, as one has seen, words are not the most basic semantic units since many words can be broken down into smaller parts, each of which has a predictable meaning that reoccurs in other words.

There are two types of morphemes. They are (1) bound morpheme and (2) free morpheme. Free morpheme can stand alone and the bound morpheme must be bound or attached to another word. Hence a work like **'unbearable'** has **'un'** and **'able'** as bound morphemes because they cannot articulate their meanings individually. A bound morpheme must be attached to another morpheme in order to form a word, while **'bear'** is a free morpheme because it can position itself as an independent word and has a meaning in it. Another example can be **'unkind'** where **'un'** is a bound morpheme as it needs to be attached to another word to have its meaning whereas **'kind'** is a free morpheme as it can stand alone and has got its own meaning. According to Angela Janvosky (n.d.) each of these words (Runs, Joyous, Unsightly and Rerun) has more than one morpheme, however, some of the morphemes are bound and some are free. In the first word, the root word is '**run**', which is a free morpheme, meaning to move faster than a walk the -s, it is more than a phoneme because it contains meaning. Attached to a verb, the -s specifies the singular present tense. Even though it is just one letter, it has inherent meaning and so is a morpheme. The word **'joy'** is a free morpheme, since it can stand alone and has meaning. The suffix -ous modifies the noun into an adjective. Therefore -ous is a bound morpheme. Therefore suffix is a word part added to the end of a word and prefix is a word part added to the beginning of words. The last two words have the prefixes un- and re-, these are also bound morphemes. Therefore all prefixes and suffixes are bound morphemes, for example: prefixes and suffixes

There are two types of free morphemes, they are (1) Lexical morpheme which further includes (a) **nouns**, for example: **tree, bag** and **woman**, (b) **adjectives** for example: **sad, thin** and **pink**, (c) **adverbs**, for example: **loudly, inside** and **comfortably**, (d) **verbs** for example: **read, speak** and **dance**. One can analyze lexical morpheme in a given word, for example:

Sl. No.	word	Lexical morpheme
1.	plates	plate
2.	speaks	speak
3.	punched	punch
4.	reading	read
5.	beaten	beat

2) Functional morpheme includes (a) **articles**, for example: **a, an** and **the**, (b) **conjunctions**, for example: **and, because** and **though**, (c) **prepositions**, for example: **on, inside** and **below**, (d) **pronouns**, for example: **she, he** and **they**. One can analyze functional morpheme in a sentence, example:
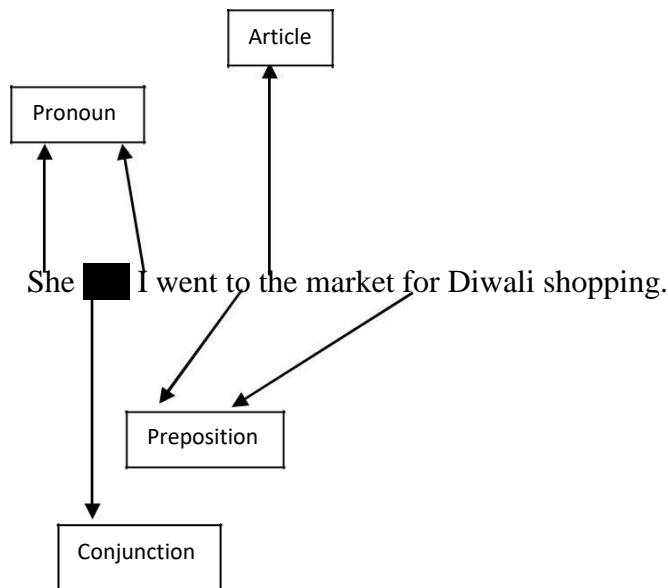
There are two types of bound morphemes, they are (1) Derivational morpheme includes affixes (a) **prefixes**, for example: co-, de-, dis-, em-, em-, anti-, circum-, epi-, ex-, hyper-, im-, inter-, micro-, non-, post-, pre-, re, semi-, sub- and tri, (b) **suffixes**, for example: -ly, -ward, -wise, -log, -

ment, -ness, -al, -ance, -cy, -dom, -ful, -hood, -fy, -ing, -ion, -ious, -ism and -ist. One can analyze the derivational morpheme in the words, for example:

1. driv**er**		1. **un**kind
2. happi**ly**		2. **anti**national
3. beauti**ful**		3.**semi**circle
4. free**dom**	**Suffixes**	4. **co**operation
5. modi**fy**		5. **re**call
6. danger**ous**	Both are derivational morpheme	6. **hyper**active
7. femin**ist**		7. **sub**way

(between Suffixes and Prefixes) **Prefixes**
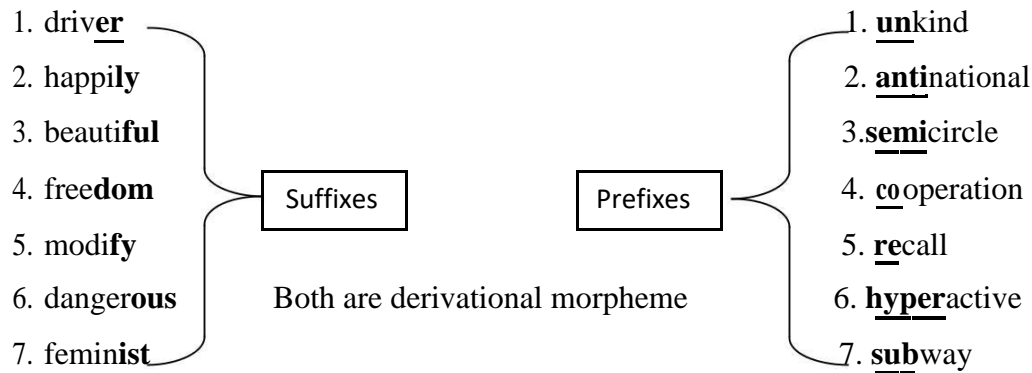
(2) Inflectional morpheme includes (a) **possession**, (b) **singular/ plural**, (c) **simple present**, (d) **present continuous**, (e) **past tense**, (f) **perfect tense**, (g) **superlative** and (h) **comparative**. One can analyze inflectional morphemes in the following example:

Sonam**'s** (**possession**) daughter Lhazin was a good child. She had dimple**s** (**plural**) and she was the cut**est** (**superlative**) child in the family. She enjoy**ed** (**past tense**) cartoons and chocolates. She was tall**er** (**comparative**) than her friends. She had always tak**en** (**perfect tense**) her studies seriously. She is right now work**ing** (**present continuous**) as a CEO in a coca cola factory.

According to Jessica Pope (n.d.), in general, inflectional morphology examines the structure and meaning of the word. Inflectional morphologists study the spelling, intonation and etymology. Derivational morphology is the study of word derivatives. Derivational morphologists study the way that one add prefixes and suffixes onto words to change their meanings. Derivational morphemes craft essential changes to the meaning of the stem whereas inflectional morphemes are used to mark grammatical information. They are used to make a new, different word. For example, -ly changes the adjective **'sad'** into the adverb **'sadly',** re- changes the meaning of the word **'pay'** that is **'repay'** and -er changes the meaning of the word **'teach'** that is **'teacher'**, there is a complete change in the meaning of the word. One should also understand that prefixes change the meaning of the word and suffixes change the part of speech. It will help one to determine the meaning of the word and how to use the words properly in a sentence.

Analysis of the morpheme can be done in a (1) word level, for example:

1. trees   **tree+N+PLU**

2. mug   **mug+N+SG**

3. reading   **read+V+PresCont**

4. kicked   **kick+V+Past**

*N: Noun, PLU: Plural; SG: Singular; V: Verb; PresCont: Present continuous; PastPart: Past Participle; Past: Past Tense

(2) In a Sentence level, for example: 'She was nearly killed by a blind tiger in the zoo', there are thirteen morphemes. From which eleven morphemes are free morphemes such as:

1. **She** (proper noun)-FM

2. **was** (past tense)-IM

3. **near** (preposition)- FM

4. **-ly** (suffix)- DM

5. **kill** (verb)- LM

6. -**ed** (suffix)- DM

7. **by** (preposition)- FM

8. **a** (article)- FM

9. **blind** (adjective)- LM

10. **tiger** (noun)-LM

11. **in** (preposition)- FM

12. **the** (article)- FM

13. **zoo** (noun)- LM

*Derivational morpheme: DM; Inflectional morpheme: IM; Lexical morpheme: LM; Verb: V; noun: N; Singular: SG; Plural: PLU; Word: W; Present Continuous: PresCont; Past Participle: PastPart; Transformer: T; Generator: G; Adjective: Aj; Superlative: SUL; Comparative: COMP; Adverb: Av

It is also very important to know about the morphological structure of the words to know how words are formed. One can further analyze the morphological structure in the words for example:

1. baker

Form- (LM dance)+(DM-er)=(w dancer)

Function- $(^V$ dance$)+(^T$-er$)=(^{N\{SG\}}$ dancer$)$

2. trees

Form-(LM tree)+(LM-s)=(wtrees)

Function-$(^N$tree$)+(^G$-s$)=(^{N\{PLU\}}$trees$)$

3. reading

Form-(LMread)+(IM-ing)=(wreading)

Function-$(^V$read$)+(^G$-ing$)=(^{PastCont}$reading$)$

4. talked

Form-(LMtalk)+(IM-ed)=(wtalked)

Function-$(^V$talk$)+(^G$-ed$)=(^{Past}$talked$)$

5. taller

Form-(LMtall)+(IM-er)=(wtaller)

Function-(^{Aj}tall)+(^{G}-er)=($^{Aj\{COMP\}}$taller)

6. unbreakable

Form-(DMun-)+(vbreak)+(DM-able)=(wunbreakable)

Function-(^{G}un-)+(^{V}break)+(^{T}-able)+(^{Aj}unbreakable)

There are different approaches to impart morphology to the students. Mary Stowe (n.d.), writes that according to Yoshimoto (2009) one can use a foldable model for the study of affixes and roots. In the example the root **'port'** can be used as the chief emphasis, and alterations can be made to the affixes. Teacher needs to write '**port**' on a paper and probe students to write appropriate prefixes and suffixes in another paper and later can slide the affixes to form a word. The words formed can be, **'trans-port-ation'** and **'im-port-ance.'**

One more approach to teach morphology is through matching games. The practice of this strategy can be found in Florida Center for Reading Research. The games include Affix Concentration, an activity that comprises matching affixes and meaning. The students can be separated into clusters of three or four. The teacher needs to make a set of header cards. Each group is going to have five header cards with a meaning of the affixes written on each card. For example, (pre-) means **before**, (-er) means **one who**, (-ness) means **state or quality**, (mis-) means **wrongly** and (-full) means **full of**. Next, the teacher needs to prepare some sentence cards. The words with affixes need to be underlined. For example, **'The children were very <u>helpful</u>'**, **'There was a <u>misunderstanding</u> about the assignment'** and **'She is a <u>dancer</u>'**. The sentence cards are to be kept face down in a stack. Every group should be given a pile of face down sentence cards. To do the activity each student will take turn drawing cards from the pile and read the sentence to the group. Then the student will identify the base that is the root word and the affix. For example **'She is a dancer'**, where **'dance'** is the root word and **'-er'** is the suffix. Then the student will place the

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sentence card under the correct header card. For example '-er' means the one who dances so the student will place the sentence card under the header card '**One who'.**

Production activity is another remarkable activity to teach morphology to students. In this activity, the students need to be divided into the cluster of three or four. Then the teacher needs to prepare a game board with various affixes on it. The teacher needs to provide one dice for each student and some game piece markers. To play the game students will take turn to roll the dice and move the places showed by the dice on the game board. Then the student will say a word and sentence that contains the affix from that place. For example, if the dice land on the affix un-, they can say the word **'unhappy'** and tell that **'Today, my friend is unhappy'**. The student will stay in new place with a correct answer or the student will move back to their earlier place with an incorrect answer.

Last of all, according to Aras Ahmed Mhamad (2013), morphology is the scientific study of the forms of the words and the study of the internal structure of words and the process of word formation. The forms of words can carry composite and exceedingly well thought-out information. Some aspects of a word's form may designate the relation of its original lexeme to others, while others specify properties of the grammatical structure within which it is found. The entire of these associations appear to be pre-eminently construed as knowledge about the relationships between words. The theme and the matter of morphology aid to master the language including spelling, vocabulary, fluency, word recognition, pronunciation, structure of complex words and text comprehension. Morphology allows the better and deeper thoughtful comprehension of words and their meaning formation.

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SOCIO-CULTURAL ASPECTS IN ROHINTON MISTRY'S SUCH A LONG JOURNEY

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Abstract

Culture is defined as the way of life of a group of people and comprises of human values, practiced in different ways in different societies. Rohinton Mistry's first novel '*Such a Long Journey*' provides a spirited account of the Parsi way of life, its identity crisis, their customs and religion. The words from Parsi life like Kusti, dustoorji, looban, gomez, are strewn in the novel, which create the atmosphere. Being a Parsi himself, Mistry is aware of the rituals and rites of his religion. His historical situation includes development of new identity in the nation to which he has migrated and a complex relationship with political and cultural history of the nation he has left behind. As a writer in a new country and in a different social and cultural milieu, he faces many challenges. He has to make sense of the various spaces he occupies as a Parsi, Indian and Canadian. In doing so, several questions arise – about where he belongs; what is his identity and ethnicity; what does it mean to belong to a nation and how to deal with multiculturalism within a framework of a nation state? Mistry's books portray diverse facets of Indian socio-cultural life, as well as Parsi Zoroastrian life, customs and religion. Many of his writings are marked as Indo-nostalgic. Mistry indulges in a nostalgic critical outlook at the community which he has left behind. He is realistic and focuses on the contradictions within the Parsi experience in the country (India), where they belong to as the community. His works propose to look at the Parsi way of life and also Parsi ethnicity with the essence of Parsi spirit. The uniqueness of Parsi culture like their costumes, festivals and other rituals like the death rites, prayers to the forces of nature and inter-clan marriage customs foster the community' unique identity different from the mainstream Indian Hindu society. Mistry's first novel, *Such a long journey* provides an authentic portrayal of the Parsis, their customs and rituals related to their community. It also captures the changing life conditions

and anguish of the Parsi community during the early sixties and seventies. This paper attempts to explore the socio-cultural aspects of the Parsi community with an intended focus on their culture, customs and religion based on Mistry's depiction.

Key words: *Parsi community, socio-cultural aspects, customs, nostalgia, identity.*

I. Introduction:

Rohinton Mistry is an Indian born Canadian author who is famous for his short stories and novels. He has created a niche for himself among the writers of the Indian diaspora. In fact, his fictional works have firmly placed him alongside leading diaspora novelists like Salman Rushdie and M.G. Vassanji. Mistry's work discerns the assertion of difference and fragmentation of identity, creating its own space within the national and diasporic context. For Mistry, the foundation of that alien quality comes not only from his status as an immigrant to Canada but also from being a member of a tiny minority in Hindu dominant India. The feeling of being left out of the cultural mainstream is vividly captured in the way Mistry's characters are displaced, consistently searching for a new identity.

Originally, if we trace Mistry's ancestral roots, he migrated from Iran to India. Shortly after his graduation from Bombay, in 1975, at the age of 23, he migrated to Canada with his wife Freny Elavia and settled in Toronto. Mistry had many reasons for migration; firstly, his wife's family members were there, secondly, the westernized education which Mistry received in India made him seek a better place in Canada and thirdly, he chose this self-exile because he

felt that there wasn't much future in India for Parsi individuals like him who felt alienated by the dominant Hindu culture. He selected Canada for his migration, dreaming that it would give him an affluent life. After reaching Toronto, he studied at the University of Toronto as a part- timer while working at the Imperial Bank of Commerce as a clerk and completed his second degree with a BA in English and Philosophy in 1982. Born in a Parsi community, his writings are heavily influenced by his religious, social and cultural views. Even though he is settled in Canada, his upbringing in Mumbai gets reflected in all his writings. The distinctness of Mumbai city, where Parsis settled in large numbers, particularly the Parsi way of life, and even the politics of India are the major themes in his novels.

Though Mistry has left India after his graduation, his understanding of Indian society is vividly found in his first novel. It may be the nostalgic factor that made him turn toward India for the subject matter of his writings. The detailed analysis of the Parsi culture, their religion, food habits, and their day- to- day life in the novel is an attempt to rediscover the forgotten past of the Parsi which is long suppressed by the dominant ideologies of the Hindu society. Mistry's nostalgia and a longing for the past are clearly echoed in Gustad's own memories of his childhood days, when there were abundance everywhere around him.

He had dreamt of his childhood the previous night, and remembered the dream in detail on waking: it was a day of great gaiety and celebration, of laughter ringing through the house, flowers filling up the rooms – in vases, in strands of *tohrun* over doorways – and music, music all day long … (Mistry 1991, p. 19) Mistry writes about how Gustad Noble constantly relives the past when his father was prosperous and economically well-established. He lives protected within the space of memory at times trying to re-live and re-enact his past by bringing home a live chicken for Roshan's birthday. Each time when he is distressed by an obstacle in life, he goes back to his past to escape the grim moment of the present. According to Mistry,

this return to the past also enables one to understand his/her past:

Some people might say it's arrogant of me not to live there (Bombay) and assume that I know everything... but I am confident that I do know. It's memory. Well, I suppose that when one says memory, its memory plus imagination, which creates a new memory. (qtd. in Roy, 151)

Albertazzi (2004) states, "he tries to show the uniqueness of the Parsi Community by focusing on their way of living and their cultural heritage. Then, he stresses the diasporic nature of Parsi social and historic experience, seeking the justification and the sense of his own story of migration in the perspective of the Parsi 'double displacement'. (p. 276 - 277). In this way, Mistry tries to show the predicament of Parsi community through his characters. In the recent years, a large number of Parsis migrated to the west. Mistry who is also a Parsi, hopes to recover a life of comfort and pride for the Parsis through his works.

Mistry's characters represent the Parsi Community, whose identity has been historically problematized. Over the centuries, the Parsis have integrated themselves into Indian society and have been retaining their own distinct customs and traditions. However, they have been subjected to marginalization at various levels. Being an ethnic minority, the Parsis experience ethnic anxiety, identity crisis; they feel insecure, threatened by the dominant Hindu culture. Being a minority, the Parsis do not have the freedom to practice their daily rituals openly. For instance, the compound wall surrounding the Khodadad Building in the novel becomes the protection for the Parsi communities to conduct their daily rituals.

With the increase in traffic and population, the black stone wall became more important than ever. It was the sole provider of privacy, especially for Jimmy and Gustad when they did their *kustis* at dawn. Over six feet high, the wall ran the length of the compound, sheltering them from non-Parsi eyes while they prayed with the glow spreading in the east. (Mistry, 1991, p.82)

The wall is not just a protection and a provider of privacy for the residents of Khodadad Building. The Parsis live in Mumbai which is a metropolis city with multi- culture. The majority of that society is dominated by the Hindus where as the Parsis were treated as subordinates. The Hindus became the centre and Parsis in the periphery. Thus, the Parsis feel threatened by the dominant Hindu society and fear that their culture would get hybridized. So, the wall serves the symbolic purpose of protecting the unique culture of the Parsis to avoid acculturation. Farquhar claims, "the whole people (Parsis) tended to stand aloof from the other communities of India, making pride in their religion and race, the reason for their exclusiveness" (p.129). The uniqueness of Parsi culture helps the community in maintaining a separate identity different from the mainstream Indian Hindu society. Moreover, Parsis live as a a close-knit community which is a sign that they believe in protecting their unique cultural identity.

In the twentieth century, the Parsis have carved a niche for themselves in almost all walks of life. They have contributed a lot in fields unluding industry, commerce, literature, and art. Parimalanayagi (2015) observes in this connection: …the Parsees made a mark upon the economic development of India. They were the first in India to produce the type of the modern entrepreneur. They pursued a policy of dynamic economic ethics. Among them, J.N. Tata advocated an early economic nationalism to a much greater degree than any other Parsee entrepreneur. In the Zoroastrianism worldview there is no room for sloth. (p. 17-18)

The Parsis' extraordinary spirit of mobilizing human resources enabled them to make notable progress in industries, commerce, and banking. In the article on *Getting to know Parsi Zoroastrians* compiled by the Zoroastrian Association of Metropolitan Washington, Jashan observes:

The foundation of the industrialization of India was laid by a Parsi, J.N. Tata, the founder of the House of Tata…. The Parsis have occupied top positions in the government, including the armed forces. They have been appointed cabinet ministers in the government,

governors of states, ambassadors, chiefs of staff of the army, navy, and air force. The Parsis are also the pioneers of the textile and shipbuilding industries in India. (qt. in *Parsi Fiction Vol. I* 33-34).

In the field of literature, the notable Parsi writers to be mentioned are D.F. Karaka, Farukh Dondy, Gieve Patel, Firdaus Kanga and Rohinton Mistry. During the colonial time, the Parsis enjoyed a privileged status as brokers between the British and other Indians. They became westernized and identified themselves with the colonial masters. This created problems in post- colonial India when their social and economic status has been downgraded. Mistry portrays this in his novel. The protagonist of the novel, Gustad Noble is a bank clerk and a family man who belongs to the Parsi Community. He is a man whose world has been haunted by flashbacks, the uncertainty of the Parsifuture and the growing political dilemmas of the independent India. He has to experience a complete upheaval in life owing to the political turbulences. When the then Prime Minister, Mrs. Indira Gandhi, nationalized the banks, the Parsis had to undergo lots of anguish such as economic losses, lowered social status and personal suffering. This is clearly stated by Dinshawji in his novel, who says:

Parsis were the kings of banking in those days. Such a respect we used to get. Now the whole atmosphere only has been spoiled. Ever since that Indira nationalized the bank. (Mistry, 1991,p.38)

The Parsis became marginalized due to the false assumption that they are traditional, conservative and religious minded, whereas, in reality, this small community has been the most urbanized, educated, libera l section, holding secular and modernist outlook without compromising the Zoroastrain religious faith and its orthodox tradition.

In his attempt to depict the lifestyles and culture of the Parsis, Mistry delineates a spirited account of the Parsi way of life, their customs and religion. For instance, the Parsis revere the sun, moon, fire, water, earth, and all creations of God. In Zoroastrian religion, fire is considered very important.

Fire is worshipped in all forms from the sun to the household fire, and no Zoroastrian worship is complete without it. In this regard, Sunitha Srinivas says in her *Functionalism and Indian Fiction* states (as cited in Wani, 2017):

The novel deals with an authentic portrayal of the Parsis, and the customs and rituals related to their community. The novelist accustoms one to another way of life, and graphically describes the Parsis' religious, customs, prayers and funeral rites. The cultural distinctiveness is asserted through the use of un-translated, specifically Parsi words. (p. 147).

There are many words from Parsi life like Kusti, dustoorji, looban, Gomez, which are spread in the novel and helps in creating the specific atmosphere peculiar to the Parsi life. As cited by Srinivas, this is clearly shown in the novel where Gustad offers his "orisons to Ahura Mazda"e at the beginning of the novel.

The first light of the morning barely illuminated the sky as Gustad Noble face eastward to offer his orisons to Ahura Mazda. The hour was approaching six and up in the compound's solitary tree the sparrows began to call. Gustad listened to their chirping every morning while reciting his Kusti prayers…(Mistry, p.1)

After finishing the prayer, as is the custom, Gustad unknots the *Kusti* from around his waist. This action is symbolic of driving away the devil. The detail of the ritual is evidently stated by Mistry in the narrative as, "When he had unwound all his feet of its slim, sacred, hand-woven length, he cracked it, whip-like: once, twice, thrice. And thus was Ahirman, the evil one, driven away…" (Mistry, 1991, p. 4). In this regard, Pardi states, "his writings are heavily influenced by his spiritual, social and cultural views. Even though he is settled in Canada, it is his upbringing in Mumbai that reflects in all writings" (2016, p.42). Religion and the day-to-day life of the occupants of Khodadad building, who were all Parsis, are merged together in his novel *Such a Long Journey* which determines the unique

culture of the Parsis. Parsi children are not allowed to make inter-caste marriages because Parsis think of themselves to be a pure race and they believe that inter-caste marriage will spoil their purity - if a Parsi marries outside the community, he/she will be excommunicated. Any Parsi man marrying outside the community will cease to be recognized as one of its members. Also, death is regarded as the ultimate impurity, and the Parsis refuse to defile the earth with burial; instead, the body is exposed within a circular, unroofed tower known as 'dokhma' or the Tower of Silence, for the vultures to devour it.

These cultural aspects are clearly depicted in the novel where Mistry describes in detail the death ritual of the Parsis which differs from the Hindu culture.

And after the prayers are said and the rituals performed, the Tower of Silence, the vultures will do the rest. When the bones are picked clean, and the clean bones gone, no proof will remain that Dinshawji ever lived and breathed. Except his memory. (Mistry, 1991, p.238)

Such descriptions of the funeral rites and the prayers offered for Dinshawji's death highlights how Mistry was influenced by his community's unique religious and cultural aspects that they continue to practice in India. However, in the 1960s and 70s, being a Parsi, he felt to be in diaspora even in India as he is now in Canada. Although he does not write about being alienated in Canada, he writes about his experience of being a minority in India and how Parsis were marginalized.

II. Conclusion:

The Parsis are in demographic decline at the end of the twentieth century. A ban on conversions, late marriages, a low birth rate, marriages outside the fold by Parsi women, whose offspring is then not accepted as Parsis, has led to a situation where only a 100,000 Parsis survive world-wide today. Being a Parsi, Mistry is keenly aware of his community's predicament. Therefore, his novels tend to focus on the customs and rituals of Parsi Community. **B**eing a Parsi himself,

Mistry finds his community at the margin of the Indian society with Hinduism as the dominant and glorifying culture. The Parsis struggle to preserve a distinct identity of their own in a multicultural metropolis society. During the pre-colonial India, the Parsis were allowed to practice their monotheistic religion. However, they had to adopt the costumes, traditions and languages of the dominant Hindu society. Their own religious festivals had to be kept at a low-key. These unequal treatments from the Hindu society developed the feeling of alienation from India, for the Parsis. Therefore, the writers like Rohinton Mistry, Bapsi Sidhwa and Firdaus Kanga writes about the social issues faced by the Parsi Community. Mistry stated in an interview that when all the Parsis have disappeared from the earth, his writings will serve as a record of how they lived.

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TUNGSTEN TRIOXIDE (WO3) BASED PHOTO ELECTRO CHEMICAL (PEC) CELL IN THE PRESENCE OF N-METHYL FORMAMIDE

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ABSTRA

TUNGSTEN TRIOXIDE (WO_3) is an n-type semiconductor which may be used as photo sensitive electrode and photo catalyst in the presence of organic substrates. WO3 photoelectrochemical (PEC) cell is constructed in the presence of N-methyl formamide (NMF). In oxygen atmosphere, WO3 electrode produces cathodic photocurrent which is attributed to the reduction of O2 and anodic photocurrent is due to oxidation of NMF in the presence of N2. A suitable mechanism is proposed for the electrode reactions.

Keywords: PEC CELL, WO3, NMF.

INTRODUCTION

Using semi conductor materials like ZnO, TiO2, WO_3 in the construction of PEC Cells received considerable attention. Any semi conductor to be effective in a PEC cell must be chemically inert and make use of solar energy in the visible region. WO_3 is an n-type semi conductor with a band gap of 2.7 eV. This corresponds to utilization of 11.8% solar energy. WO_3 is reported (1) as a stable semi conductor for electrolysis of water in the presence of light. Photo catalytic activity of WO3 is also reported (2).

In the present study WO_3 is used as a photo electrode in a PEC cell consisting of NMF Aqueous solution as electrolyte. Photo voltages and photo currents are measured. WO_3 in the powder state is used as photo catalyst and the products are identified.

EXPERIMENTAL

PEC cell is constructed using polycrystalline WO_3 paste. A thin layer of WO_3 is deposited on a platinum foil and used as photo electrode. A platinum foil is used as counter electrode. A 1500W halogen lamp is used as light source.

Electrolyte solution is a mixture of 0.1M KCl and 0.1M NMF.

WO_3,Pt/0.1 M NMF//0.1 M KCl/Pt
    0.1 M KCl

RESULTS AND DISCUSSION

The sign of the open circuit voltage is found to depend upon gaseous atmosphere present at the electrode. In the absence of light the voltages are more positive in N2 than in O2. PEC cell produces a negative photo voltage and cathodic current in the presence of visible light and O2. In the presence of N2 a positive voltage is developed and anodic current is noted (table.1). If N2 atmosphere is not maintained properly, the adsorbed O2 on **WO_3** electrode surface initially produces cathodic current and then anodic current as shown in (Fig.1 & 2).

Table 1-Effect Of Gaseoius Atmosphere On Photo
Voltage And Photo Current
Electrolyte: 0.1 M NMF in 0.1 M KCl
(40ml) Area of the electrode: 3 cm^2
Light source: 1000 watt halogen lamp

Gaseous atmosphere at		Open circuit photo-Voltage (mV)	Short circuit photo current (µA)	Nature of the photo-current
WO3 Electrode	Counter Electrode			
O2	O2	-160	4.1	Cathodic
O2	N2	-150	3.9	Cathodic
N2	O2	+55	1.5	Anodic
N2	N2	+53	1.1	Anodic

Photo voltage in O2 reaches a limiting value within 15 minutes. It takes longer times, 150 minutes in N2. When the light is switched off, the photo voltage of the cell in O2 decays fast while in N2 the decay is slow (Fig. 1).

The cathodic photocurrent in O2 increases steeply on illumination. It reaches a maximum value, then

decreases fast and attain a constant value (Fig.2) when the light is switched off, rapid decay of photo current is observed in both the atmospheres.
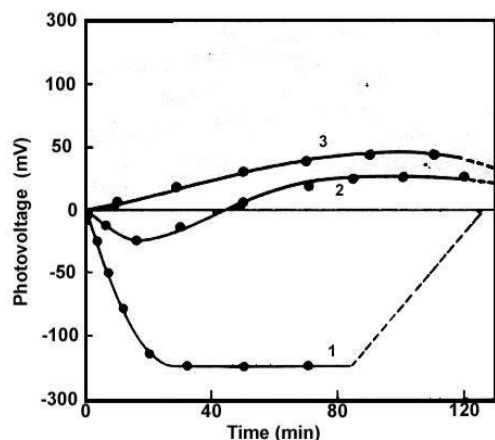
Fig.1-Variation of Photovoltage with time
1. Oxygen Atmosphere
2. Nitrogen Atmosphere (Bubbled for 60 minutes)
3. Nitrogen Atmosphere (Bubbled for 120 Minutes)
4. ....Light off
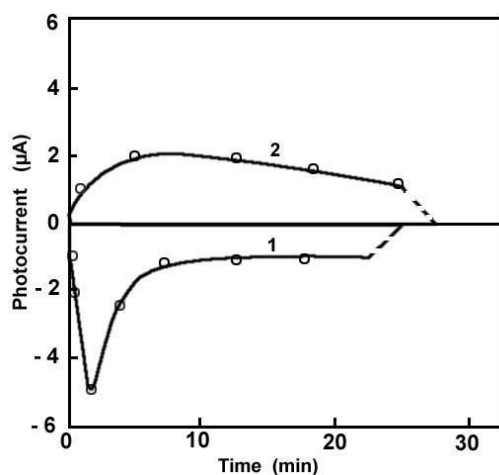
Fig2- Variation of Photocurrent with time
1. Oxygen Atmosphere
2. Nitrogen Atmosphere
3. ....Light off

Effect of intensity of light on photo voltage in O_2 atmosphere and 0.1M KCl and 0.1M N-Methyl formamide is studied. The photo voltage increases with light intensity and reaches a limiting value.

Photo voltage is maximum around 420 nm, which corresponds to the band gap of WO_3 (2.7 eV).

The plot of photovoltage verses log of light intensity is linear (Fig 3) which shows that **WO$_3$** behaves as a semiconductor (3).The generation of anodic photo current is due to oxidation reaction . In the present case cathodic photocurrent is observed only in the presence of oxygen. When O_2 is replaced by N_2 gas only anodic photo current is generated. Hence, cathodic photo current is due to reduction of O_2 to O_2^{--} Many Authors (4-7) observed similar effects on semi conductors. The super oxide Ion O_2^{-} is a good nucleophile and can react with carboxyl compounds (9). The O_2 reacts with N-methyl formamide to give CO_2 and $CH_3.NH_2$. CO_2 is identified at the electrode. However, CO_2 is not identified in the presence of N_2.
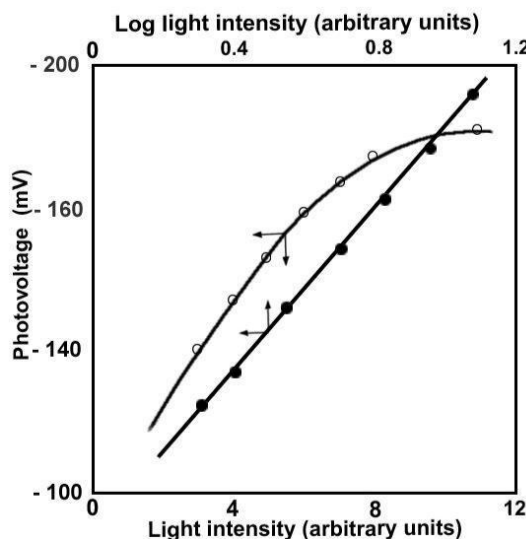
Fig3-Effect of intensity of light on photovoltage in oxygen atmosphere

Based on the experimental observations and the product analysis, a mechanism is proposed as given below. In reaction (2) the excited electrons in the conduction band flow to the surface of the electrode to react with adsorbed O_2 to give O_2^{-} and is responsible for the generation of cathodic photocurrent. The initial steep increase in photocurrent (Fig.3) is due to the availability of surface oxygen to react with the electrons as soon as illumination is started. The subsequent decrease may be due to poor electron hole separation and the oxidation of O_2^{-} radical by valence band holes (reaction 3). Detection of H_2O_2

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provides additional evidence for the formation of O_2^{--} (8).

The other products, CO_2 and $CH_3.NH_2$ are formed only in the presence of oxygen and under illumination. Hence the O_2^{--} is expected to react with DMF to give CO_2 and $CH_3.NH_2$ as shown. Protonation of NMF (reaction 6) is well known in acidic medium and this facilitates O_2^{--} attack on the carbonyl carbon of the NMF.

The anodic nature of photocurrent in nitrogen

$$WO_3 \xrightarrow{h\nu} WO_3^{(+)} + e^- \qquad \ldots(1)$$

$$e^- + O_{2\,(ads)} \rightarrow O_2^-{}_{(ads)} \qquad \ldots(2)$$

$$O_2^-{}_{(ads)} + WO_3^{(+)} \rightarrow O_2 + WO_3 \qquad \ldots(3)$$

$$O_2^-{}_{(ads)} + H^+{}_{(ads)} \rightarrow HO^{\cdot}_2 \qquad \ldots(4)$$

$$2HO_2^{\cdot}{}_{(ads)} \rightarrow H_2O_2 + O_2 \qquad \ldots(5)$$

$$\underset{\substack{\| \quad | \\ O \;\; CH_3}}{H\text{-}C\text{-}NH} \xrightarrow{\overset{OH}{\overset{|}{H^+}}} \underset{\substack{| \\ CH_3\text{-}NH}}{H\text{-}C^+} \qquad \ldots(6)$$

$$\underset{CH_3-NH}{\overset{OH}{\underset{|}{H - C^+}}} + O_2^- \rightarrow \underset{O\text{-}O^{\cdot}}{\overset{O}{\underset{\|}{H\text{-} C}}} + CH_3.NH_2 \ \ldots(7)$$

$$\underset{\substack{| \\ O\text{-}O^{\cdot}}}{\overset{\substack{O \\ \|}}{H\text{-}C}} \rightarrow CO_2 + {}^{\cdot}OH \qquad \ldots(8)$$

$$2{}^{\cdot}OH \rightarrow H_2O_2 \qquad \ldots(9)$$

$$WO_3^+ + OH^- \rightarrow WO_3 + {}^{\cdot}OH \qquad \ldots(10)$$
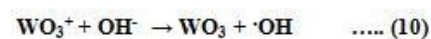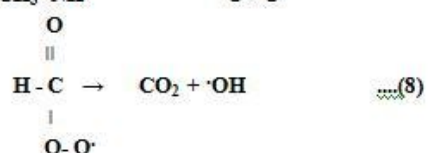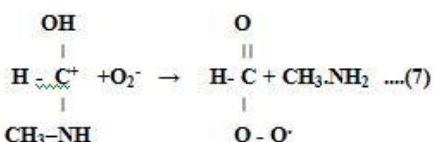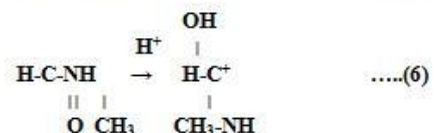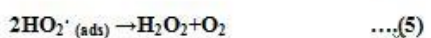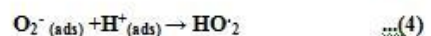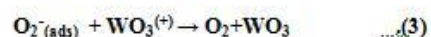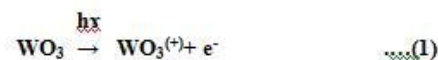
When the electrode is in nitrogen atmosphere, the electrons that are excited to the conduction band flow into the bulk of the semiconductor to produce anodic photocurrent. The photocurrent increases initially, attaining a stable value and then decreases slowly. Initially there is a greater amount of band bending which efficiently separates photoproduced holes and electrons. As the illumination progresses, the separation becomes less efficient due to decrease in band bending, resulting in recombination of electrons and holes. Hence the anodic photocurrent after reaching a maximum value starts decreasing.

It has not been possible to completely eliminate either oxidation or reduction at the electrode in a particular gaseous atmosphere. Both reations can take place simultaneously and whichever dominates decides the sign of the photovoltage. In oxygen, reduction takes place by conduction band electrons along with the oxidation of formamide by valence band holes during illumination. But the rate of reaction with holes is very slow while the reduction of oxygen is faster. Hence negative photovoltage dominates in this case. In nitrogen the presence of minute amounts of oxygen, like surface oxygen leads to an initial generation of negative photovoltage which gradually becomes positive. Only prolonged purging of the electrolyte with nitrogen completely eliminates negative photovoltage (Fig.2).

CONCLUSION

Development of photoelectrochemical cells less sensitive to air and not requiring hermetic seals will decrease the fabrication costs as well as the technological problems. One can consider the WO_3 based photoelectrochemical cell which is not sensitive to air. But the efficiency of such a cell is very low. Investigations are in progress to improve the cell efficiency and electrode stability.

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DETERMINATION OF OLMESARTAN MEDOXOMIL IN BULK AND PHARMACEUTICAL FORMULATIONS BY VALIDATED RP-HPLC METHOD

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Abstract

Analytical method was developed for the estimation of Olmesartan medoxomil drug substance by liquid chromatography. The chromatographic separation was achieved on Ascentris express C18 100*4.5um at ambient temperature. The separation was achieved by employing a mobile phase consisting of 0.1%v/v formic acid in water: Acetonitrile (50:50). The flow rate was 0.6 ml/ minute and UV detector was set at 230nm. The average retention time for Olmesartan medoxomil was found to be 1.9 min and the proposed method was validated for selectivity, precision, linearity and accuracy. All validation parameters were within the acceptable range. The assay methods were found to be linear in the range of 50-150μg/ml for Olmesartan medoxomil .

Key words: Olmesartan medoxomil, Isocratic, HPLC, Trifluoro acetic acid, and Acetonitrile

INTRODUCTION
Drug Profile

Olmesartan (4-(2-hydroxypropan-2-yl)-2-propyl-1-({4-[2-(1H-1,2,3,4-tetrazol-5-yl)phenyl] phe nyl} methyl)-1H-imidazole-5-carboxylic acid) is an antihypertensive agent, which belongs to the class of medications called angiotensin II receptor blockers (ARB[1-13]. It is indicated for the treatment of high blood pressure and is marketed under the name Olmetec®. The FDA label includes a black-box warning of injury and death to the fetus, so women of child-bearing age need to be warned and take the necessary precautions. Olmesartan is also contraindicated in diabetes mellitus patients taking aliskiren.

Olmesartan is an ARB that selectively inhibits the binding of angiotensin II to AT1, which is found in many tissues such as vascular smooth muscle and the adrenal glands. This effectively inhibits the AT1-mediated vasoconstrictive and aldosterone-secreting effects of angiotensin II and results in a decrease in vascular resistance and blood pressure. Olmesartan is selective for AT1 and has a 12,500 times greater affinity for

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AT1 than the AT2 receptor. Also unlike the well-known ARB losartan, olmesartan does not have an active metabolite or possess uricosuric effects.
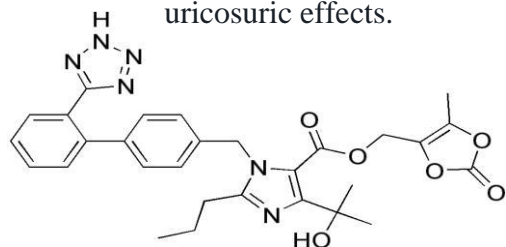
Fig 1: Olmesartan Structure

Several analytical methods[14-28] have been reported for the determination of Olmesartan medoxomil in pure drug, pharmaceutical dosage forms and in biological samples using spcetrophotometry, liquid chromatography, electro kinetic chromatography high performance thin layer chromatography either in single or in combined forms.

MATERIALS AND METHODS

Instrumentation:

Waters HPLC model 2695 with 2487detector containing LC 20AT pump and variable wavelength programmable UV-Visible detector and Rheodyne injector was employed for investigation. The chromatographic analysis was performed on a Ascentris express C18 100*4.5um. Degassing of the mobile phase was done using a Unichrome ultrasonic bath sonicator. A SCALETEC (model SAB224CL) Analytical balance was used for weighing the materials.

Chemicals and Solvents:

The reference sample of Olmesartan(API) was obtained from Sun Pharma Pvt Ltd. The Formulation Olmesartan was procured from the local market. Acetonitrile, Trifluoro acetic acid, Methanol

and formic acid used was of HPLC grade and purchased from Qualigens Limited, Mumbai, India.

The Mobile Phase:

A mixture of of 0.1%v/v formic acid in water: Acetonitrile (50:50) was prepared and used as mobile phase.**Preparation of Standard solution**

A 25mg of pure Olmesartan medoxomil was weighed and transferred to 25 ml of volumetric flask and dissolved in Diluent. The flask was shaken and volume was made up to mark with Diluents to give a primary stock solution containing 1000mg/ml. From the above solution 1ml of solution is pipette out into a 10 ml volumetric flask and volume was made up to mark with Diluent to give a solution containing 100μg/ml of Olmesartan medoxomil .

Preparation of Sample Solution

20 tablets (each tablet contains Olmesartan 40 mg) were weighed and taken into a mortar and crushed to fine powder and uniformly mixed. Tablet stock solutions of Olmesartan (μg/ml) were prepared by dissolving weight equivalent to 5 mg of Olmesartan dissolved in sufficient mobile phase. After that the solution is filtered using 0.45-micron syringe filter and sonicated for 5 min and dilute to 50ml with mobile phase. Further dilutions are prepared in 5 replicates of 100 μg/ml of Olmesartan.

METHOD DEVELOPMENT

A suitable method was developed[37-43] by carrying out systematic study of the effect of various factors by varying one parameter at a time and keeping all other conditions constant. Method development consists of selecting the appropriate wave length and choice of stationary and mobile phases. The following studies were conducted for this purpose.

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Detection wavelength:

The spectrum of Olmesartansolution was recorded separately on UV spectrophotometer. The peak maximum of absorbance wavelength was observed. The spectra of Olmesartan were showed maximum absorbance at 230nm [Fig-2].

Choice of stationary phase and Mobile Phase:

Finally the expected separation and peak shapes were obtained on Ascentris express C18 100*4.5um column. A mixture of 0.1v/v formic acid in water: Acetonitrile in the ratio of 50:50 was proved to be the most suitable for all the combinations since the chromatographic peak obtained was better defined and resolved and almost free from tailing.

Flow rate:

Flow rates of the mobile phase were changed from 0.2 – 1.0 mL/min for optimum separation. It was found from the experiments that 0.6 mL/min flow rate was ideal for the successful elution of the analyte.

Optimized chromatographic conditions

Chromatographic conditions optimized above were shown in Table 1. These optimized conditions were followed for the determination of Olmesartan in bulk samples and in its formulations. The chromatograms for Standard Drug and Placebo are identified. Among all these for the Placebo no significant peaks are detected.

VALIDATION OF PROPOSED METHOD AND REQUIREMENTS:

The proposed method was validated as per ICH guidelines[29 -42]. The parameters studied for validation were specificity,

linearity, precision, accuracy, robustness, system suitability, limit of detection, and limit of quantification.

SPECIFICITY

Blank interference

Specificity studies included application of the proposed method for blank, placebo solution, sample solution (control sample), standard solution. A study to establish the interference of blank was conducted. Diluent was injected into the chromatograph in the above defined chromatographic conditions and the blank chromatogram was recorded. Chromatogram of Blank solution (Fig. no.-4) showed no peaks at the retention time of Olmesartan peak. This indicates that the diluent solution used in sample preparation do not interfere in estimation of Olmesartan in Olsat - 40 tablets. Similarly typical representative chromatogram of standard was shown in figure -5

SYSTEM SUITABILITY

System suitability is a measure of the performance and chromatographic quality of the total analytical system – i.e. instrument and procedure. Six replicate injections of API working standard solution were injected according to the method of analysis. The percentage relative standard deviations (% RSD) for the peak responses were determined. The % RSD of the peak responses due to Olmesartan for six injections must be less than or equal to 5.0 %. The analytical system complies with the requirements specified by the system suitability. The Results are tabulated in the Table 2

Linearity and range

In the concentration range of 50.0 – 150.0 μg/ml for Olmesartan standard curve was obtained. A statistical method known as

linear regression analysis was used to evaluate the linearity of the curve. To assess the linearity of the proposed method slope, intercept and correlation coefficient [r^2] of standard curve was calculated and was given in Figure-3. The results were given in the Table- 3. From the data obtained (For Olmesartan), the method was found to be linear within the proposed range. The linearity chromatograms were given in figure- 6 -10. The LOD and LOQ results were given in Table – 7.

Accuracy

Accuracy is defined as the closeness of results obtained by that method to the true value for the sample. Accuracy is expressed in terms of percentage recovery. Recovery % is determined by the standard addition method. In the present study recovery studies were carried out at 50%, 100% and 150% spiked levels. The results of Recovery % were given in Table - 4 and the chromatograms were given in Figures 11-13.

Precision

The closeness of replicate results obtained from analysis of the same homogeneous sample is known as precision of the method. The precision of the method was assessed by six replicate injections of 100% test concentration. The precision was expressed in terms of standard deviation and %RSD. The results were given in Table- 5. The system precision was also analyzed and the results were given in the same table.

Robustness

The ability of the developed method to remain unaffected by the small changes in the parameters is known as Robustness. Robustness was assessed by varying the parameters such as percent organic content, pH of the mobile phase, buffer concentration, temperature, injection volume and flow rate. In the present investigation, a variation of ± 0.1 mL/min in the flow rate, change in

wavelength were adopted to study Robustness. The results were tabulated in Table -6.

RESULTS AND DISCUSSION

To optimize the HPLC parameters, several mobile phase compositions were tried. A satisfactory separation and good peak symmetry was found in a mixture of 0.1v/v formic acid in water : Acetonitrie in the ratio of 50:50 and 0.6 mL/min flow rate proved to be better than the other mixtures in terms of resolution and peak shape. The optimum wavelength for detection was set at 230nm at which much better detector responses for drug was obtained as shown in Fig 2. The retention time was 1.907 min for Olmesartan. Good number of theoretical plates were found, which indicates efficient performance of the column. A system suitability test was applied to representative chromatograms for various parameters. The results obtained were within acceptable limits and are represented in Table 2. Thus, the system meets suitable criteria.

The calibration curve was obtained for a series of concentration in the range of 50-150µg/ml and it was found to be linear. Five points graphs was constructed covering a concentration range 50-150 µg/ml. The standard deviation of the slope and intercept were low. The data of regression analysis of the calibration curves are shown in Table 3.

Mean percentage recovery is found to be 99.5. The proposed method has been applied for the assay of the commercial tablets containing Olmesartan. Sample was analyzed for five times after extracting the drug as mentioned in assay sample preparation of the experimental section. The results presented good agreement with the labeled content. Low values of standard deviation denoted very good repeatability of

the measurement. Thus it was showing that the equipment used for the study was correctly calibrated and hence the developed analytical method is highly repetitive. For the intermediate precision analysis was carried out by different analysts working on the same day indicated a RSD of 0.1. This indicates good method precision. The system suitability parameter like capacity factor, asymmetry factor, tailing factor and number of theoretical plates were also calculated. It was observed that all the values are within the limits. The statistical evaluation of the proposed method revealed good linearity, reproducibility and its validation for different parameters and can be concluded that it could be used for the rapid and reliable determination of Olmesartan in tablet formulation.

Table 1 Optimized chromatographic conditions for estimation Olmesartan

Column	Ascentris express C18 100*4 5 m
Buffer preparation	0.1% Formic acid
Mobile phase	Buffer : ACN (50:50 v\v)
Flow rate	0.6 ml/min
Injection volume	10ul
Run time	4min
Wavelength	230nm
Diluents	Acetonitrile: (100%)

Table :2 System Suitability results

Parameter	Olmesartan medoxomil	Acceptance criteria
Retention time	1.907	+-10
Theoretical plates	3272	>2000
Tailing factor	1.05	<1.50

% RSD	1.15	<2.00
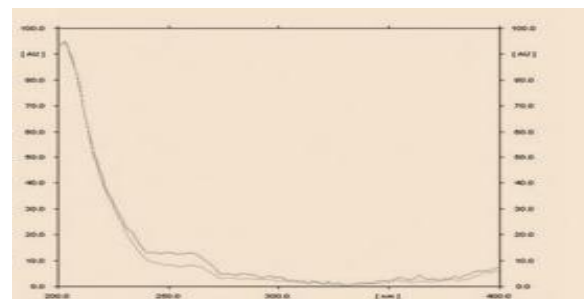
Fig 2: Olmesartan absorbance at 230nm

Table No 3: Linearity of Detector Response for Olmesartan

S.NO	level	Area
1.	50	1401971
2.	75	2217414
3.	100	2857484
4.	125	3535604
5.	150	4304193
Correlation coefficient		**0.9992**

Linearity graph of Pantoprazole:
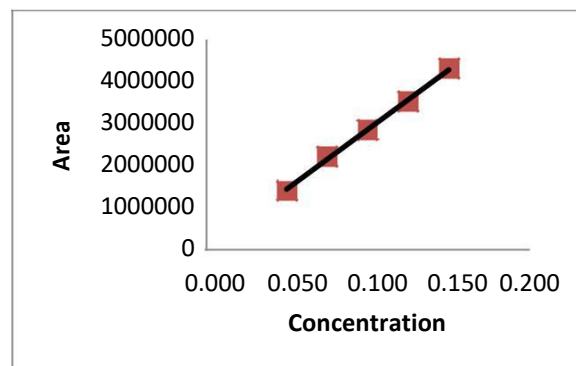
Figure No 3: linearity of detector response graphs for Olmesartan

Table- 4: Accuracy data for Olmesartan medoxomil

S.NO	Accuracy level	injection	%Recovery
1	50%	1	100.6
		2	99.9
		3	101.0
2	100%	1	99.0
		2	99.2
		3	99.1
		4	99.6
		5	98.3
		6	98.2
3	150%	1	99.3
		2	99.8
		3	99.8

Table 6: Robustness data for Olmesartan medoxomil

parameter	RT	Area
Decreased flow	1.648	2563284
Increased flow	2.277	3716403
Decreased Wave Length	1.907	2920453
Increased Wave Length	1.907	2967809

Table no.7: LOD and LOQ values Calculated from calibration curve:

	Olmesartan medoxomil in mg
LOD	0.0059*
LOQ	0.0177

Table No 5: - Method precision data for Olmesartan

S.NO	RT	Area	%Assay
Injection 1	1.912	2885532	99.0
Injection 2	1.910	2891022	99.2
Injection 3	1.910	2887943	99.1
Injection 4	1.913	2904597	99.6
Injection 5	1.913	2872538	98.3
Injection 6	1.910	2856288	98.2
Mean	1.911	2882987	98.9
Std. Dev.	0.002	16641	0.55
% RSD	0.08	0.58	0.55
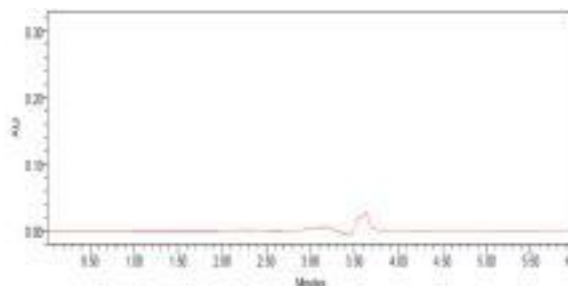
Fig 4: Blank chromatogram
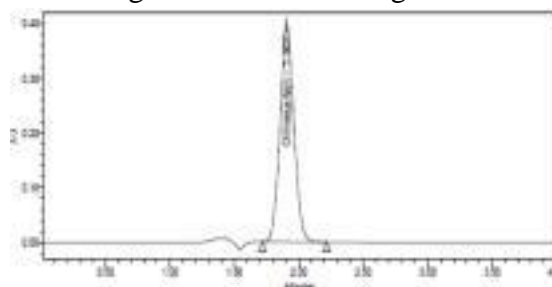
Fig 5: Chromatogram for optimized method

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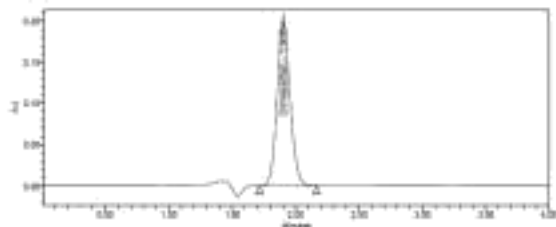
Fig-6: Chromatogram representing linearity 1
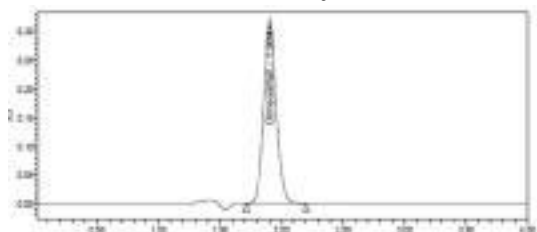
Fig-7: Chromatogram representing linearity 2
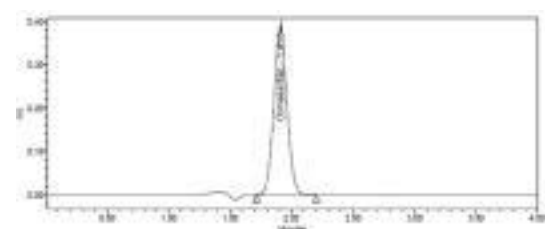
Fig-8: Chromatogram representing linearity 3
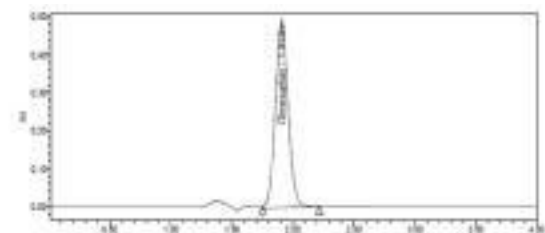
Fig-9: Chromatogram representing linearity 4
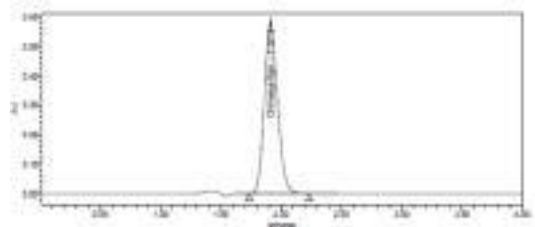
Fig-10: Chromatogram representing linearity 5
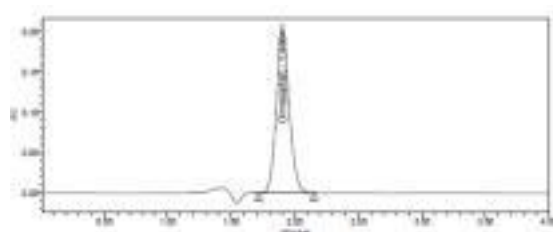
Fig-11: Typical chromatogram for Accuracy 50 %
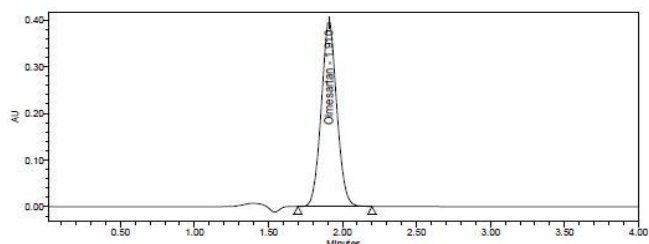
Fig-12: Typical chromatogram for Accuracy 100 %
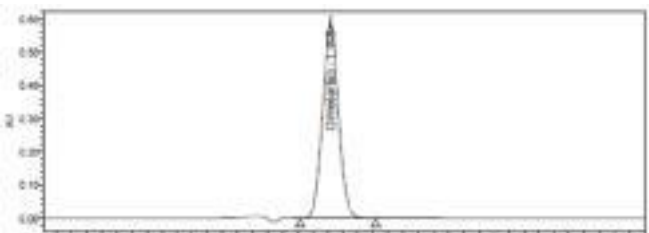
Fig-13: Typical chromatogram for Accuracy 150 %

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COLOR IMAGE RETREIVAL SYSTEM USING FUZZY SIMILARITY MEASURE

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Abstract— **Image retrieval has important practical applications in database management, medical, and computer applications etc. For the purpose of effectively retrieving more similar images from the digital image databases, this work uses the color distributions and the mean value to represent the global characteristics of the image. The comparison of image retrieval result between RGB feature vector and hue feature vector in token of image characteristics is taken. The similarity measure is calculated by hue feature vector which is not sensitive to elimination and saturation change and the size of hue vector is reduced on the premise that the retrieval result is not affected. As the experimental results indicated, the proposed technique indeed outperforms other schemes.**

Keywords— Pattern Recognition, Image Retrieval, Similarity Measure.

I. INTRODUCTION

Color image retrieval and classification are very important in the field of image processing. Image retrieval methods are mainly based on color, texture and shape of image. This chapter gives the concept of pattern recognition and its applications in color image and the need for color image retrieval using fuzzy system. Pattern recognition is concerned with the classification of objects into categories, especially by machine. Image analysis deals with the processing and analysis of images. Many pattern recognition systems are designed to classify or analyze images. Pattern recognition is concerned with the automatic detection or classification of objects or events.

A pattern is an entity, vaguely defined, that could be given a name, e.g., fingerprint image, handwritten word, human face, speech signal, DNA sequence [3]. Pattern recognition is the study of how machines can observe the environment, learn to distinguish patterns of interest, make sound and reasonable decisions about the categories of the patterns.

The measurements or properties used to classify the objects are called features and types or categories into which they are classified are called classes. Most pattern recognition tasks are first done by humans and automated later it can be defined as a process of identifying structure in data by comparisons to known structure, the known structure is developed through methods of classification [3]. Two of the main forms of pattern recognition are classification and regression. In classification problems, data are collected and given discrete class labels. In a regression problem, on the other hand, data labels are typically continuous values, not categorical.

II. IMAGE RETREIVAL

Many images on the world wide web confronts the users with new problems. Images are a fundamental part of our daily communication. The German saying "Ein Bild sagt mehr als tausend Worte" (literally: "A picture says more than a thousand words.") reflects this. The huge amount of pictures digitally available is not manageable by humans any more [2]. A person searching for a picture in a database of 100 images will probably find the search quite fast by just viewing the images or small versions of the images (thumbnails). If a thousand, ten thousand, or even more images are involved, the task becomes boring and interminable. Computers might be able to help here in the same way as they already do for searching text documents. A well-established example for text retrieval is the Internet search engine Google. Entering some keywords often helps finding related documents from the vast amount of documents available on the Internet. Google also offers a possibility to search for images, but the way the search is performed does not always lead to satisfactory results.

A broad variety of applications requires searching for images, in medical applications many images are produced and a physician might search for similar images to learn about treatments of former patients and their outcomes. Image retrieval is the task of searching for images from an image database [2]. The query to the database can be of various types,

Query-by-text: The user gives a textual description of the image he is looking for. Query-by-sketch: The user provides a sketch of the image she is looking for. Query-by-example: The user gives an example image similar to the one he is looking for.

In image retrieval the similarity between two sets of features, extracted from the database image and the query image has been used as a match measure. The match measure has been used to retrieve those regions present in a database of images, which are similar to the query image.

III. NECESSITY OF COLOR IMAGE RETREIVAL

Color image retrieval and classification are very important in the field of image processing, As a hotspot in image processing, image retrieval and classification are very important. Image retrieval methods are mainly based on color, texture, shape and semantic-image [8]. Color features are among the most important features used in image database retrieval. Due to its compact representation and low complexity, fuzzy similarity measure is the most

commonly used technique in measuring color similarity of images. These features are independent of specific domain and can be used in general systems of retrieval images. The color feature is the first and one of the most widely used visual features in image retrieval and indexing. The most important advantages of color feature are power of representing visual content of images, simple extracting color information of images and high efficiency, relatively power in separating images from each other, relatively robust to background complication and independent of image size and orientation.

For image matching, features are extracted which may be shape features, texture features, or color features. Thus, a database is formed and for each image in the database, image features are found out. Another image, called the query image, is taken as the input image whose features are also found out. Then, the features of the query image are allowed to match with the features of the images in the database [5,8]. One important criterion for testing the efficacy of search and retrieval is that the features of the query image should almost be there in the images of the database.

IV. COLOR SPACE

Color is a sensation created in response to excitation of our visual system by electromagnetic radiation known as light. Color is the perceptual result of light in the visible region having wavelength in the region of 400nm to 700nm incident upon the retina of human eye. A color can be specified by a tri-component vector. The set of all colors form a vector space called color space. RGB Color space

For representing colors several color spaces can be used. A color space is a specification of a coordinate system and a subspace within that system where each color is represented by a single point [6]. Color is perceived by humans as a combination of tristimuli i.e., R(red), G(green) and B(blue) which are usually called three primary colors. In hardware devices like monitors and digital cameras RGB color space is used. It is based on Cartesian coordinate system.
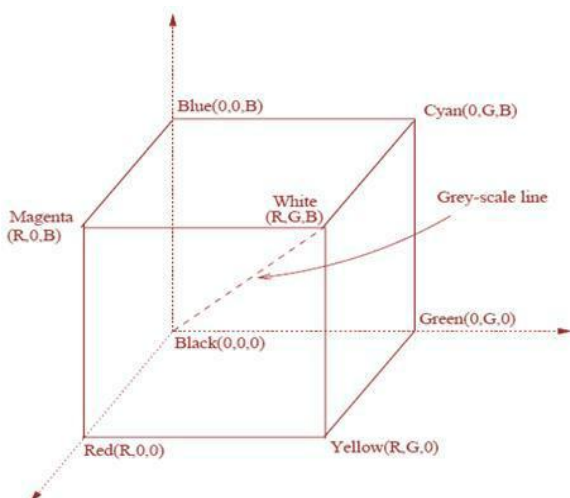
The above Fig 2.1 represents the RGB color space using the Cartesian coordinate system. HSI Color space

The HSI color model represents every color with three components Hue (H), Saturation (S), Intensity (I). The HSI color space is very important and attractive color model for image processing applications because it represents color similarly how the human eye senses colors. The Hue component describes the color itself in the form of an angle between [0,360] degrees. 0 degree mean red, 120 means green, 240 means blue, 60 degrees is yellow, 300 degrees is magenta. The Saturation component signals how much the color is polluted with white color. The range of the S component is [0,1]. The Intensity range is between [0,1] and 0 means black, 1 means white. It is a nonlinear transformation of the RGB color space.
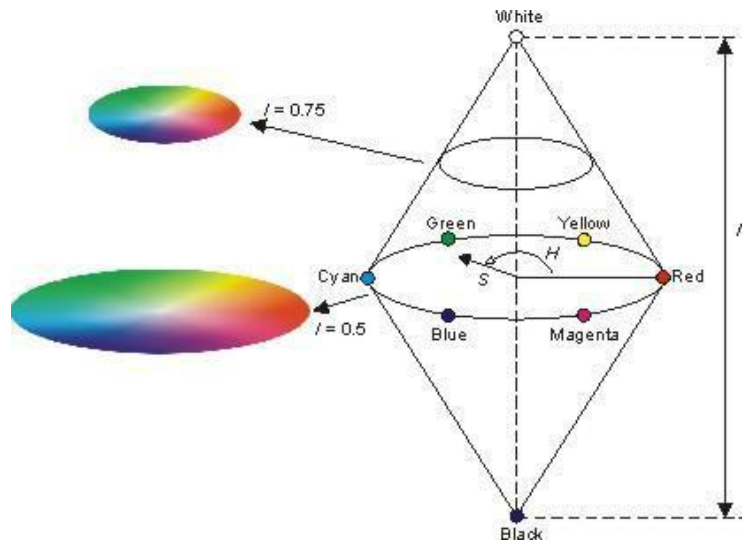
As the above Fig 2.2 shows, hue is more meaningful when saturation approaches 1 and less meaningful when saturation approaches 0 or when intensity approaches 0 or 1. Intensity also limits the saturation values.

Fuzzy logic starts with and builds on a set of user-supplied human language rules. The fuzzy systems convert these rules to their mathematical equivalents. This simplifies the job of the system designer and the computer, and results in much more accurate representations of the way systems behave in the real world. Additional benefits of fuzzy logic include its simplicity and its flexibility. Fuzzy logic can handle problems with imprecise and incomplete data, and it can model nonlinear functions of arbitrary complexity.

V.   SIMILARITY MEASURE

Similarity measure is a quantity that reflects the strength of the relation between two objects or features. This chapter mainly focuses on similarity measure and the purpose of finding similarity measure and the comparison between the existing measure and proposed measure for pattern data sets.

Similarity is quite difficult to measure. It is a quantity that reflects the strength of the relation between two objects or features [10]. The similarity between two features A and B is usually denoted as S(A,B). It has a

normalized range of 0 to 1. Measuring similarity of features endorse to

1) Distinguish one object from another

2) Group them based on their similarity

3) Grouping may also give more efficient organization and ratio of information

4) Predict the behavior of new object.

The concept of similarity is fundamentally important in almost every scientific field. For example, in mathematics, geometric methods for assessing similarity are used in studies of congruence, as well as in allied fields such as trigonometry. Topological methods are applied in fields such as semantics. Fuzzy set theory has also developed its own measures of similarity, which find application in areas such as management, medicine and meteorology. An important problem in molecular biology is to measure the sequence similarity of pairs of proteins.

Similarity is a core element in achieving an understanding of variables that motivate behavior and mediate affect. It also played a fundamentally important role in psychological experiments and theories. For example, in many experiments people are asked to make direct or indirect judgments about the similarity of pairs of objects [7]. A variety of experimental techniques are used in these studies, but the most common are to ask subjects whether the objects are the same or different, or to ask them to produce a number, between say 1 and 7, that matches their feelings about how similar the objects appear. The concept of similarity also plays a crucial but less direct role in the modeling of many other psychological tasks. This is especially true in theories of the recognition, identification, and categorization of objects, where a common assumption is that the greater the similarity between a pair of objects, the more likely one will be confused with the other. Similarity also plays a key role in the modeling of preference and liking for products or brands, as well as motivations for product consumption.

RGB index

There are three statistical histograms representing one pictures feature. The first is color attribute RED histogram, the second is color attribute GREEN histogram and the last is color attribute BLUE histogram [11]. The statistical index is,

$$U_i = \{V_{ir}, V_{ig}, V_{ib}\}$$

Where ,

$$V_{ir} = \{x_{ir1}, x_{ir2}, x_{ir3}, \dots\dots\dots\dots x_{ir128}\}$$
$$V_{ig} = \{x_{ig1}, x_{ig2}, x_{ig3}, \dots\dots\dots\dots x_{ig128}\}$$
$$V_{ib} = \{x_{ib1}, x_{ib2}, x_{ib3}, \dots\dots\dots\dots x_{ib128}\}$$

The difference between picture i and picture j under the

$$r_{ij} = \sum_{k=1}^{128} |x_{irk} - x_{jrk}|$$

RED attribute is

The difference between picture i and picture j under the GREEN attribute is

$$g_{ij} = \sum_{k=1}^{128} |x_{igk} - x_{jgk}|$$

The difference between picture i and picture j under the BLUE attribute is

$$b_{ij} = \sum_{k=1}^{128} |x_{ibk} - x_{jbk}|$$

The similarity measure of two pictures is,

$$ij = \frac{r_{ij} + g_{ij} + b_{ij}}{3}$$

The image retrieval method using fuzzy similarity measure is compared with the existing measures [11]. The images are fetched from the database and their degree of similarity is calculated with the query image.

Query image

SNO	IMAGE	Xiaojuan based similarity method	Fuzzy distance based similarity method
1		0.7093	0.72
2		0.4101	0.1699
3		0.6547	0.5428
4		0.6492	0.5673
5		0.7275	0.72
6		0.7083	0.72
7		0.5379	0.2980
8		**0.8222**	1

The plot of these images are listed below

Im 1

Im 2

Im 3

Im 4

Im 5

Im 6

Im 7
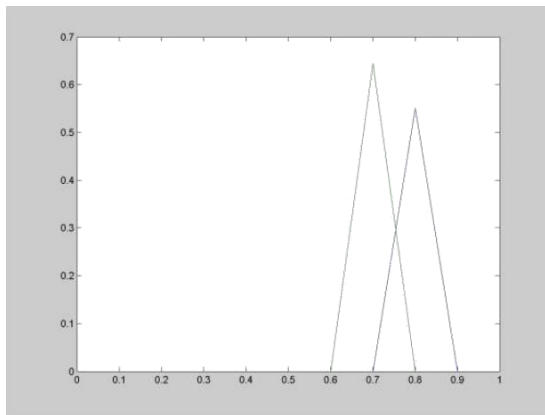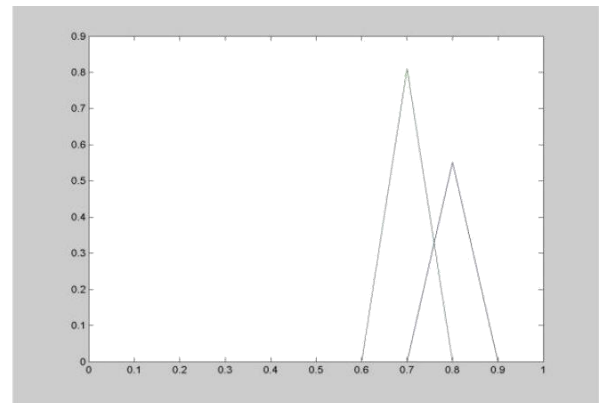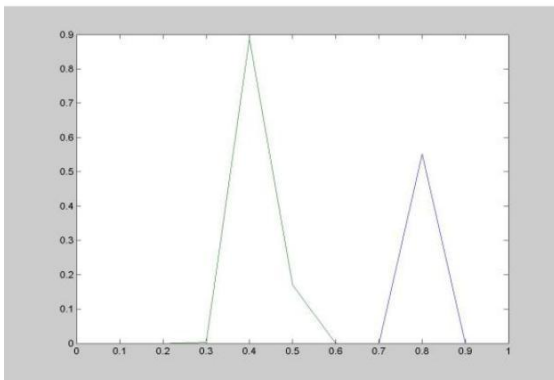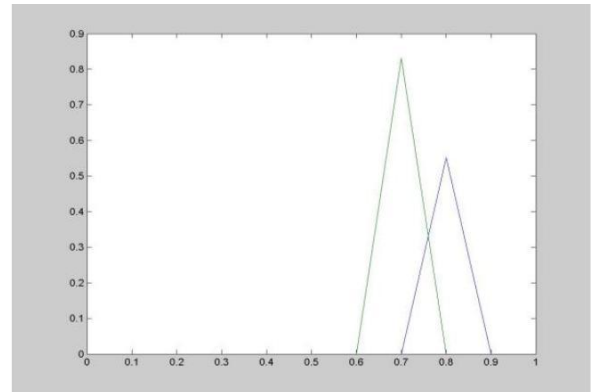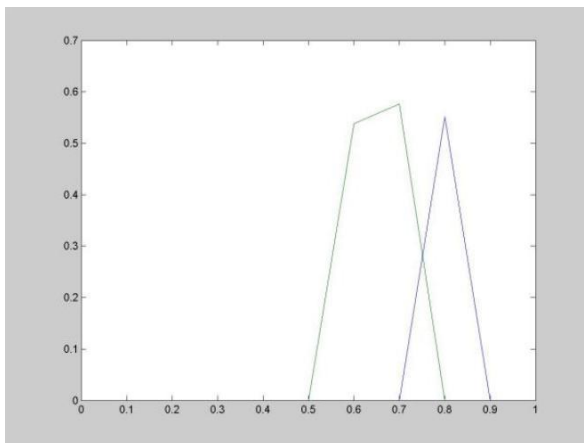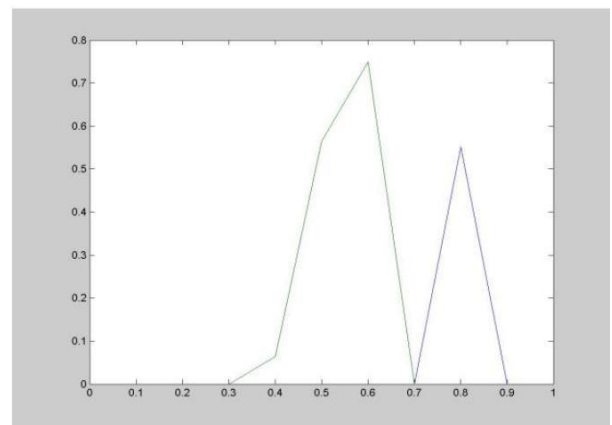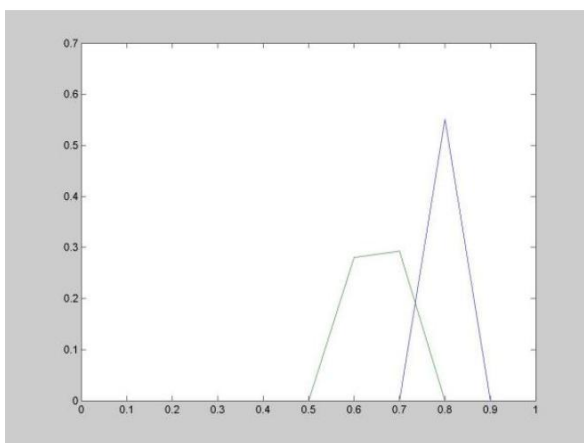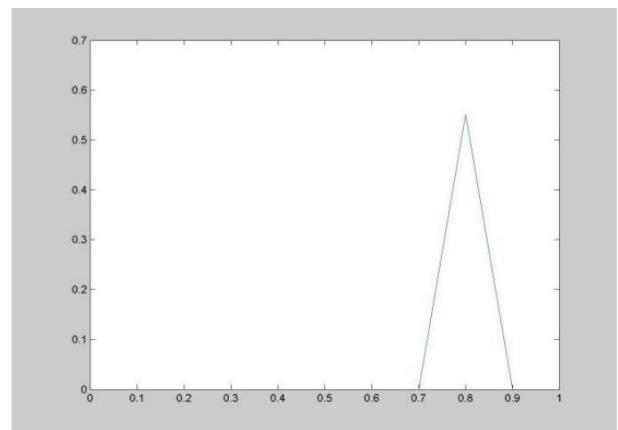
Im 8

VI. COMPARISON

From the Table 5.2, Im 8 is same as that of query image so the degree of similarity should be 1, which is true in the case of fuzzy distance based similarity method but Xiaojuan based similarity method fails to identify the 100% similarity. Also Im 2, is found to be dissimilar with the query image, the degree of similarity is found to be very low in fuzzy distance based similarity method, but the Xiaojuan based similarity method provides a high measure.

Hence it reveals that the fuzzy distance based similarity method provides better similarity when compared with the existing method [9,11]. The experimental results show that idea which takes the fuzzy similarity measure for the method of image retrieval is found to be reasonable and effective.

VII. CONCLUSION

- Based on the existing research work we have studied the color image retrieval method. This is done using fuzzy similarity measure. The similarity measure is calculated by hue feature vector. The measure greatly reduces the influence of inaccurate measure and provides a very intuitive quantification.
- The results obtained by the proposed method reflect the significance of fuzzy representation rather than the crisp definition

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Enhancing Air Compliance of loud speaker cabinet by using Activated Carbon Felts.

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ABSTRACT:-

At present Fiber glass material is used as stuffing material in sub-woofer cabinet enclosures,It increases Air Compliance and increase the apparent volume of the cabinets because it has properties of sound absorption and insulation. Air Compliance has direct impact on frequency response of the cabinet.by changing air Compliance we can optimize the response.Activated carbon felt can be used in the place of fiber glass because of large absorption coefficient at lower frequency due to adsorption property,ACF have large porosity and large surface area.It is observed Activated carbon felt of range 10 to 15 mm has large absorption coefficient at lower frequencies.the excess absorption of sound energy is due to surface reactance.

Keyword:-Adsorption,Compliance,Surface Reactance, Activated carbon felt.

I.INTRODUCTION.

Designing miniature Subwoofer enclosure has a great demand.One need to understand and should have a sound knowledge over the thiele/small parameters while designing the enclosures.the system resonance frequency and bass response depends on the volume of the enclosure.By reducing the enclosure volume it is difficult to increase bass response of the system.the best option is enhance the air compliance of the enclosure by any other means.Air compliance is the springiness associated by the Driver enclosure to that of the springiness of the Driver suspension.by stuffing the enclosure by sound absorbing material air compliance can be increased.

II.THEORY OF INFLUENCING FACTORS.

Air compliance,the quality factor of loud speaker and the stuffing material influences to obtain lower resonance of the cabinets

Air compliance of loud speaker

To bring close relation between the air compliance and resonance frequency we need to introduce the compliance ratio α , α is simply the ratio between the equivalent volume and the volume of the enclosure which the driver is mounted in.

$$\alpha = \frac{V_{as}}{V_b}$$

Resonance frequency $f_c = \sqrt{1+\alpha}\,f_s$

Air compliance based on volume of box ,density of air and velocity of sound in air [2]

$$C = \frac{V_b}{2}$$ Further

compliance can also be

$$AC = \left(\frac{f_b}{J_s}\right)^{\frac{1}{0.31}} .V$$

This equation suggest that Air compliance depends on the volume of the enclosure.more volume more air compliance.the acoustic compliance of air in the loud speaker cabinet depends on density of air and its speed.compliance can be enhanced by reducing the air density in the cabinet.

Quality factor of loud speaker

Like parallel resonant circuit that has inductance and capacitance shows the Quality factor in a graph of impedance vs frequency,like wise loudspeaker has quality factor which depends on two elements. Mass of moving components which is analogous to Inductance and restoring spring action of the spider and suspension-capacitance.for a flat frequency response the quality factor should be of order 0.7.Damping reduces the Q,Damping is essential.

If the quality factor of the enclosure with the driver is equal to the quality factor of the driver then the air inside the cabinet has no effect on the final quality factor.the resonant frequency of the cabinet will also be same as of driver.the Quality factor of the enclosure is [5]

$$Q_{tc} = \sqrt{1+\alpha}Q_{ts} \quad Q_{ts}$$ total quality factor of the

system ,it value should be less than 0.7 in order to have lower cut of frequency of the system.this suggest the volume of the enclosure should be always greater for better cut of frequency to generate good bass response.the cut off frequency at -3db is given by [5]

$$f_l = f_c \left(\left(\frac{1}{2Q_{ts}^2} - 1 \right) + \sqrt{\left(\frac{1}{2Q_{ts}^2} - 1 \right)^2 + 1} \right)^{\frac{1}{2}}$$

We cannot always create larger enclosures instead we can back the volume by stuffing the absorbing material.Fiber glass material is one of it.

III.EXPERIMENTAL DETAILS.

To study the experimentally,A sub-woofer driver is chosen,The frequency of sub-woofer is 28.6Hz,Vas=2.75 Cu.ft and its total quality factor 0.7.An enclosure is build for the Driver whose volume is 1.5 cu.ft.MDF Blocks of thickness 12mm are made with the dimensions of rare inner panel size of the enclosure.when one such block is added in the enclosure,it reduces effective volume of the enclosure to 0.06cu ft volume.for every decrease of 0.06 cu.ft volume the resonance frequency of enclosure is measured and noted for with and without activated carbon felt,the dimensions of ACF is width and height of rare panel and its thickness is 24mm (model Z-006).we observe the decrease of resonance frequency at low frequency by introducing activate carbon felt is almost 11%
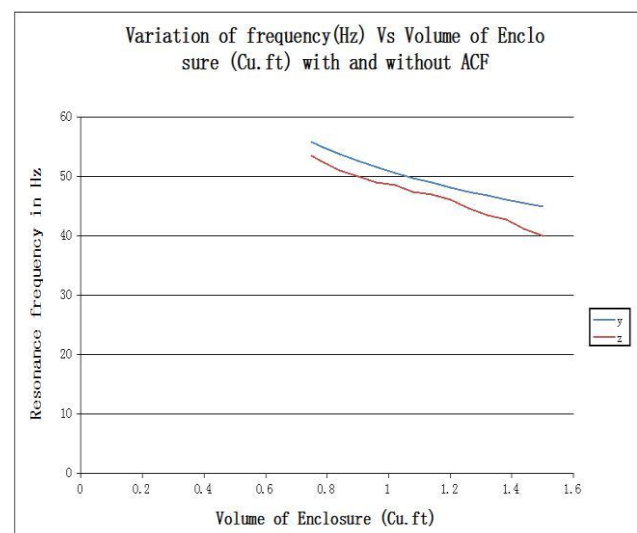
--Z line represents the frequency variation curve with respective to Volume of enclosure in presences of ACF,--Y line represents frequency variation curve with respective to Volume of enclosure without ACF. We observe resonance frequency of enclosure decreasing by addition of ACF.

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Experimental Review

Activated Carbon is made by carbonizing organic matter like coconut husks in an inert atmosphere and then oxidizing this material by exposure to carbon dioxide or steam.activated carbon has large surface area.At lower frequencies a layer of activated carbon provides strong attenuation than any other porous absorbers.This is due to reduction in surface reactance rather than surface resistance.the activated carbons contains mesoscopic pores which are the voids between grains and microscopic pores within the grains.At certain frequency the pressure in both of them mismatch and result in dissipation in sound energy[1].activated carbon can absorb air and adsorb water vapor[2] this increases compliance.adsorption increases absorption of sound.Activated Carbon granules are heavy.we can replace them by activated carbon felts.they are lightweight and can be bend easily.these sheet has shown remarkable absorption of sound at lower frequencies[3].we can use Activated carbon felt to stuff the sub-woofer enclosures to increase the compliance and volume of the enclosure.10mm to 15mm of sheets has shown large absorption of low frequency sound [3] than normal activated carbon granules.the compliance ratio decreases with increase in virtual volume of the cabinet.quality factor can be brought to optimal value and cutoff frequency can be lowered for better bass response.
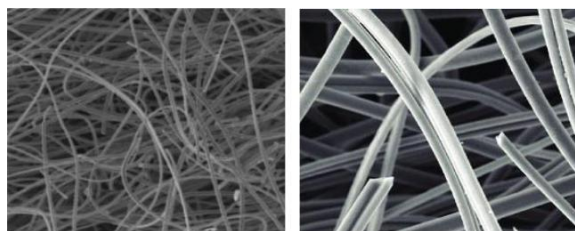
Activated Carbon felts
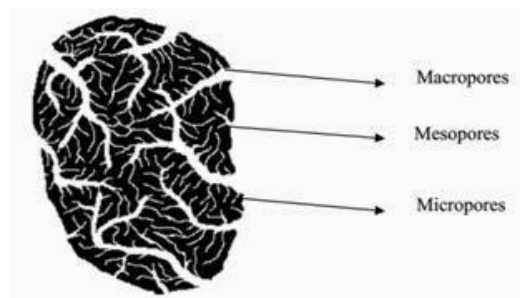
Macropores,Mesopores and Micropores of ACF

IV.CONCLUSIONS.

Activated carbon felts can enhance the air compliance of the driver enclosure due to surface reactance and adsorption.the thin layer of Activated carbon felts are light weight ,flexible then activated carbon granules they can be easily used for acoustic applications like,home theaters,small size sub-woofer enclosures.they can be used for enhancing air compliance of the driver enclosure,hence improving bass response.further research need to be carried out on ACF for improving the acoustics properties.

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Mathematical model of Business Analytics for decision making and business growth

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ABSTRACT

Business analytics is an emerging big data technology, and has become a mainstream market adopted broadly across industries, organizations, and geographic regions and among individuals to facilitate data-driven decision making for business and individual's hedonism. Big data analytics service requestors also include business information systems and e-commerce systems. Business analytics service requestors require big data analytics services including information analytics services, knowledge analytics services, and business analytics services with visualization techniques to provide knowledge patterns and Information for decision making in a form of figure or table or report
Key words: Business analytics, Variation analysis, Mathematical Model, Key parameter indicators

I.INTRODUCTION

The advancement in information technology has also made it possible for organizations to hoard large volumes of data from multiple sources through their business processes. Such data will be in the crude form. The data has to undergo lot of stages to prepare it for the analysis. The number of stages required depends on the type of sources and variation of the data. To understand the correctness of the data, most of the business analysts perform "Variation Analysis". The term Variation Analysis means the deviation of the data, both in quantity and quality of the data from the previous year/quarter data. However, most of the organizations have set a cut-off variation of the data should not deviate by 20% for better decision making and saving opportunities. If the deviation is more than the cut-off, the businesses go back to the source and identify the correct data. Further the data has to go

through the stages of consolidation of the data from various sources, enrichment of the data, assignment of the appropriate classification and select a suitable tool to analyze the data. By analyzing the data, business recommendations were drawn for business growth. Big data analytics and BI are the top priorities of chief information officers (CIOs) and comprise a $12.2 billion market [4].

Delivering the right decision support to the right people at the right time.

The term decision support, because business analytics gives you, the business user, data, information, or knowledge, which you can choose to act upon or not. Business analytics is not a new phenomenon—it's been around for the past 20 years—but with a firm anchoring in the technically oriented environment. Only recently is it making its breakthrough as the business is assuming ownership. We are seeing more and more companies, especially in the financial and the telecom sector, set up actual business analytics departments, designed to support business processes and improve performance.

Currently, BI is based on four cutting-age technology pillars of cloud, mobile, big data and social technologies [8] [6], each of these pillars corresponds to a special kind of web services, that is, cloud services, mobile services, big data services and social networking services; all these constitute modern web services [6]. Each of these services has been supported by analytics services and technologies [2].

Business analytics as information systems, consisting of three elements:

1. A characteristic of the technological element is that it can be used to collect, store, and deliver information. In the present days, talking about the electronic data, which can be collected, merged,

and stored for analysts or the so-called front-end systems who will deliver information to end-users. A front-end is the visual presentation of information and data to a user. A front-end system is entire system of optical presentations of data.

2. Human competencies form part of the information systems, too. One can retrieve data and deliver it as information in, for instance, a front-end system, and analysts must know how to generate facts targeted toward specific decision processes. Even more important, those who make the decisions, those who potentially should change their behaviour based on the decision support, are people who must be able to take hold of the decision support handed to them.

3. Finally, the information systems must contain some specific business processes that make use of the information or the new knowledge. If the organization is not utilizing the analysed information, there's no reason to invest in a data warehouse, a central storage facility that combines and optimizes the organization's data for business use.
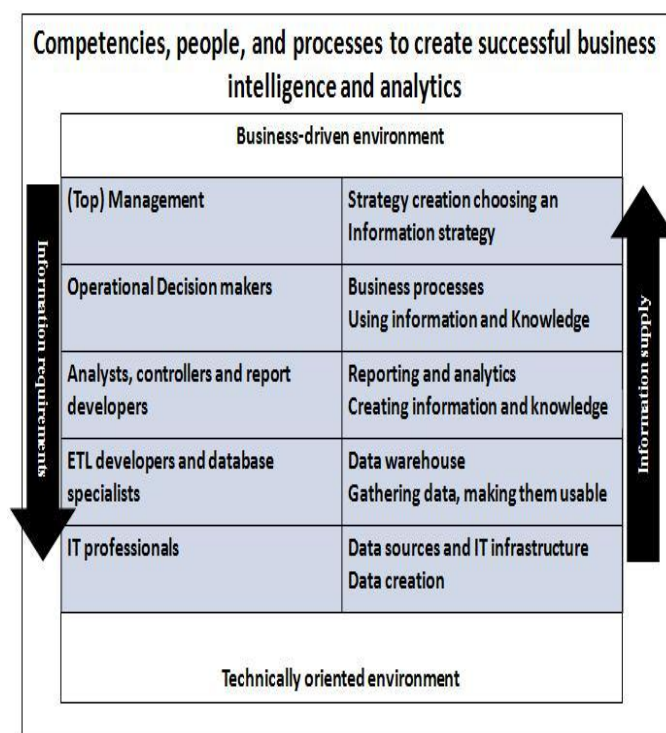
Figure 1: The Mathematical Model of Business analytics

II.DECISION MAKING AND BUSINESS GROWTH

Mathematical Model of BA can be employed in improving the viewership of a Television Network. The case study is a simplified and somewhat creative version of real events, and its objective is merely to outline a Mathematical Model of BA process. Focus is on the helicopter perspective, an improved conceptual tool, and the first important insights. The case study relates to the BA model in Figure 2.

III.OVERALL STRATEGIC TARGETS OF THE BUSINESS

The vision of the Television Network is a demand for entertainment in the shape of good music, entertaining talk, and news. Its mission is to become a leading player in the national market. The network's specified business goal is a market share of 25% and a return on equity (ROE) of 15%. The executive management dashboard of the Television Network with Key Parameter Indicators (KPIs) for monitoring business performance in relation to strategic objectives.
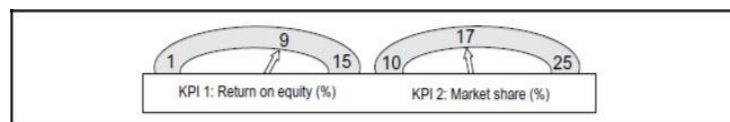
Figure 2: Executive Management Dashboard with KPIs prior to BA Initiative

The current status, which can be read from the instruments in the executive management dashboard, is an actual ROE of 9% and an actual market share of 17%. So the TV network has a way to go in order to achieve its targets of an ROE of 15% and a market share of 25%.The business strategy and objectives are thus presented by means of the following or Key Parameter Indicators (KPIs). The success and good performance are derived from the actual values of these measures in relation to the objectives.

Goal (KPI 1)   :   ROE = 15%
                       Actual =9%
Goal (KPI 2)   :   Market share = 25%
                       Actual =17%

The two KPIs are used to control and manage the TV network. Return on equity (KPI 1) is the most

important KPI, and it is affected by the market share (KPI 2). The thinking is that a bigger market share (KPI 2) will mean more concurrent viewers and increased advertising revenue, which means a bigger ROE for a given level of cost. A new BA initiative is planned and implemented in the business. The process is outlined in the following section using the BA model

IV.BUSINESS CASE

Mathematical Model of Business analytics activities must always be based on the business driven environment, with the management specifying or creating one single information strategy, which must be subject to the company's overall business strategy (vision, mission, and objectives). The Program Manager has come up with a strategic initiative to increase the business's market share from the current 17% to 25%. The TV network must hold on to its viewers longer. The Program Manager specifies this strategy as: ''From our current record of holding on to our viewers for 15 minutes, before he or she changes channel, we must in the future hold on to our average viewer for 30 minutes.'' The Program Manager introduces the performance target: average view time as a new measure or KPI for the production department and the target is that the average viewer must be kept on the broadcasting frequency for 30 minutes. The average viewing time thus takes its place as a new KPI on the management dashboard.

Target for KPI 3: Average viewing time = 30 minutes   Actual = 15 minutes

The tactical target penetrates right into the core business of the TV network. If the target is to hold an average viewer for 30 minutes—is achieved, it will mean a bigger market share, increased advertising revenue and an improved ROE. So, it is expected that an increase in KPI 3 will affect both KPI 2 and KPI 1 positively. Before launching the BA initiative, the Program Manager prepares a business case for the project. He expects a larger market share (KPI 2) of up to 25%, as a result of the increase in average viewing time (KPI 3) of 30 minutes. This is based on the mathematical analysis of historic data, which is expected to improve the pricing of advertising

slots, so that the advertising revenues of the TV network increase by $4 million per year. Based on these expectations, he calculates that return on equity (KPI 1) will increase from 9% to 13%. In addition, he expects that the BA initiative will incur a resource consumption of three employees in four months as well as necessitate of purchasing software and consultancy services for $250,000. Total costs are estimated to be $1 million. The business case speaks lined up with the carrying out the project. The reason is an expected growth in the annual cash flow of $4 million from increased advertising revenue, and that the project will cost only $1 million to implement.

The above model can be represented mathematically by
Amount of revenues generated through advertising slots of the TV network, AR = $4 million
Amount incurred in resource consumption of 3 employees + Purchasing software + Consultancy services, IA= $250,000 per month
For four months IA is 4times $250,000 = 4x$250,000 = $1 million
Expected growth in Cash flow, CF = $4 million Therefore, Project cost = CF-AR+IA
$$= \$1 \text{ million}$$

The management of the TV network now has the first elements of its information strategy in place, and it's directly related to the overall strategic objectives of the business.

Moreover, the payback period is only one quarter and the project is not considered to entail any risk. If the business case had shown a negative result (or if the project had looked risky), the BA initiative should not be implemented. Business cases are a good way of evaluating and prioritizing BA projects.

V. ACTIONS TO BE TAKEN

The business processes of the production department must now be adjusted in such a way that they actively show behaviour that secures the average viewer for longer, thereby increasing the value of KPI 3. There is an acknowledgment among the staff that they need more information and knowledge about their viewers'

characteristics and preferences at different times and in connection with the different programs.

In other words, the processes must be adapted to a viewer profile, to enable the DJs and newsreaders of the TV network to continuously deliver content that is to the current viewers' tastes. In the future, same strategies should be implemented. . This means that whatever is broadcasted must be customized to suit current viewers'

interests, and results must be measurable on an ongoing basis and readable on the management dashboard—now with the three measures or KPIs: KPI 1: return on equity, KPI 2: market share, and KPI 3: average viewing time.

VI. ANALYTICAL PROCESSES AND VIEWERS DASHBOARD

In the analytical environment, it is the task of the analyst to create information and knowledge to drive business processes in the direction of delivering content that, to a greater extent, falls into the viewers' tastes. The main questions for the analyst are:

➢ Who are our viewers (age group, sex, type of entertainment, etc,)?

➢ What do they like to view to (Movies, Music, News, Debates etc,)?

➢ Who views to what and when (time and mapping between viewers and their tastes)?

The analyst quickly realizes that he does not possess sufficient data about the viewers to be able to work out viewer profiles. If he did have this data, it could be merged with the program database of the TV network in the data warehouse, and subsequently constitute the basis of the creation of knowledge about viewer profiles at different times and for the different programs of the TV network.

VII. RAW DATA FOR ANALYSIS

The analyst needs the data from various resources with data items on the viewers' ages, genders, and tastes and preferences 24/7. The database specialist does not have this data stored,

and it cannot be obtained from an external supplier. Therefore, the database specialist asks the IT department to create a new operational data source to collect data on viewer profiles at different times of the day. In the analytical environment, the analyst now has access to data and starts to transform the collected and merged data from the various data sources into information and knowledge. The analyst also has report-developing competencies and has prepared a front-end report with the results from his BA tool, which could be Microsoft Excel. The report contains information and knowledge about viewer profiles for different times of the day and for the different programs. The report is released weekly with new numbers to the business's intranet, where it can be accessed and used by business users in the production department. The analytical environment is positioned in the border area between the technically oriented environment and the business-driven environment, and we find people with competencies in both areas. The front-end solution and the report could also be delivered by a report developer from the technically oriented environment, based on results from the analytical processes.

VIII. EVALUATION OF THE BA PROCESS

Over the next six months, the TV network succeeds in holding on to its average viewer for 9 minutes longer than before and all three KPIs are improved.
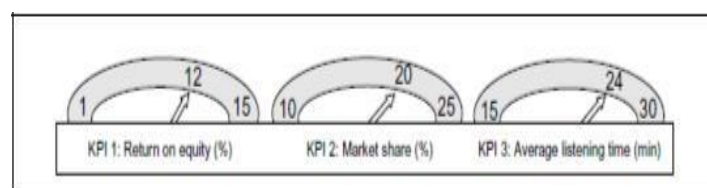
Figure 3: The TV network with KPIs after BA Initiative

Following the BA initiative, the TV network's average viewer stayed tuned in for an average of 24 minutes (KPI 3). The TV network's market share (KPI 2) went up to 20%, and return on equity (KPI 1) increased to 12%. The business is on its way to achieving its overall strategic targets, and the production department's BA initiative must be said to have been successful. It could not have been done without BA—from strategy to data sources.

IX.CONCLUSIONS

The purpose of the case study is to provide a quick overview and to show how BA can be deployed successfully to support and influence the behaviour of operational decision makers with a view to achieving overall business targets.

The following are the conclusions to draw from BA are:

The BA initiative of a business area must support and promote the businesses overall strategic targets, which equally must support and promote the overall strategic targets of the business as a whole.

The strategic targets of the BA activities of a given business area must be measurable with one or more KPIs to ensure that performance and progress can be followed on an ongoing basis. The chosen KPI, or KPIs, must be able to influence the overall KPIs of the company.

A planned BA activity must stand up to an evaluation based on business case principles. In other words, a BA initiative must create value for the company just like any other investment. Increased revenue or savings must justify the investment.

It must be specified what kind of information and knowledge are required for the effective decision makers, and how they are to act on this information. This part needs to be taken very seriously. It's important to understand that it is here and only here, in the process-changing area, that BA creates value for the company.

The analyst must be able to interpret business users correctly, and specify the requirement for relevant data and use the right methods, so that useful information and knowledge are presented for decision support. BA reports conveying knowledge must have correct functionality and insightful for business users.

The data specialist must be able to consolidate and enrich data with useful parameters. Data quality must be very high to ensure reliability from the business side. Such as variation analysis should be performed before applying the BA model.

Information technology operations and development must be able to establish an infrastructure for new data sources and secure valid retrieval of source data.

The achievement of BA in large organizations is a process that involves contributions from many functions and people. The BA model provides a helpful overview of structure, people, and their activities. So it's necessary to use it in the planning stages of BA initiatives. It may help to create an organizational function to handle BA activities across the functions of the organization to ensure the coordination among them.

Business analytics is a holistic and hierarchical discipline, stretching from business strategies to sourcing from operational data sources. The business-driven environment must assume full ownership and manage the process. The technically oriented environment must support the process with infrastructure, data delivery, and the necessary application functionality.

Business analytics is a support process. If the analyst cannot derive the right information from data, then all other activities are in vain. The same is true if incorrect data is provided to the analysts, or if the business users chooses not to act based on the new knowledge.

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Effect of pH on Adsorption of Lead(II) Using *Syzygium Jambos*

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Abstract—The industrialization and modernization all over the world causes environmental imbalances through their byproducts of heavy metals, these are becoming dangerous to the health of human beings, animals and aquatic creatures. The heavy metals can enter a water supply by industrial and consumer waste and thereby releasing heavy metals into streams, lakes, rivers, and groundwater. Lead (Pb) is one of the heavy metals, it becoming a part of our day to day life through various applications. This paper proposes *Syzygium Jambos* (SJ) as an adsorbent for the removal of Lead(II) from aqueous solutions. The metal ions mostly dependent on the pH of the aqueous solution, we investigated the effect of pH. The atomic absorption spectroscopy (AAS) is used to determine the amount of adsorption at various pH values. The optimal pH value found as 2.0 for 76.5% of maximum adsorption of Lead(II) using *Syzygium Jambos*. The detailed research review indicated that very less research happened in the utilization of *Syzygium Jambos*. Therefore the results presented in this paper are novel and are useful for the society to sidestep the toxicity of Lead(II).

Keywords— Syzygium Jambos, Adsorption, Heavy Metals, Lead (Pb), Toxicity, Effect of pH, *etc.,*

I. INTRODUCTION

The recent investigation study by pollution control board of India reveals that the heavy metals found in patients after Diwali festival celebrations, they found that high level of heavy metals, including lead, was found in the urine samples of many patients due to direct or indirect exposure to firecrackers post-Diwali. Heavy metals can pose serious health threats and their toxicity can damage central nervous, cardiovascular and gastrointestinal systems [1]. The study showed that there was evidence of increased levels of lead, barium and strontium in the urine samples of many of the subjects. These are some of the metals used in fire cracker manufacturing. Lead affects the central nervous system in humans, when heated it can emit highly toxic fumes, it causes damage to liver, kidney and reduction in hemoglobin formation, infertility and abnormalities in pregnant women and in young children can suffer mental retardation [2].

Lead is one of the common pollutants of industrial wastewater. Lead pollution exists in aqueous waste streams of many industries such as manufacture of storage batteries most of which is recycled, printing, painting, ceramics, pigments, dying, building constructions, storage tank lining, corrosive liquid containers, radiation shielding, solder, and cable sheathing , pipe work, pesticide, smoking, automobile emission, mining, burning of coal, antibacterial substances and wood preservatives [3]. These all applications indicate that in the modern living society, the people are affianced with the Lead but they are not acquainted the health hazards caused by the Lead.

Lead is non-biodegradable and accumulates in living organism therefore it must be removed from the wastewaters. Several methods of Lead removal from wastewater have been applied using chemical precipitation, membrane processes, ion-exchange and adsorption [4]. Many researchers have been using the adsorption as most effective method for the treatment of heavy metals from aqueous solution using low-cost natural adsorbents [5-7]. In regards of its simplicity and high-efficiency characteristics even for a minute amount of heavy metals, adsorption is looked upon as a better technology. Activated carbon is a well-known adsorbent and proven to be useful for the removal of heavy metals but for waste water treatment is not feasible due to its expensive cost. Adsorption is considered to be a fast physical/chemical process and its rate is controlled by the type of the process. Agricultural waste and its industrial by-products, bacteria, yeasts, fungi, and algae can be functioned as adsorbents of heavy metals [8].

The removal of metal ions from aqueous solution by adsorbent is dependent on the pH of the solution, that's why in most of adsorption experiments the popular study is the effect of pH analysis in the removal of metal ions from aqueous solutions and industrial waste waters [9]. In most of analyses the effect of pH shows a significant change in the percentage of adsorption [10]. The pH of the solution also affects the surface charge of the adsorbents and the degree of ionization of adsorbate [11].

Syzygium Jambos (L.) belongs to the family of Myrtaceae. *Carl Linne* was the first who discovered the plant. He gave the plant Latin name as Eugenia Jambos. These are native to south-east Asia. Now a day it's known as Syzygium Jambos. E [12]. It is also called as rose apple because if one cuts the fruit it smells like a rose and it can be eaten [13]. It has a long history of being used in traditional and folk medicine in various cultures. The fruit has been used as a diuretic and as a tonic for better health of the brain, liver, against fever, skin irritations and many medicinal benefits [14]. When the presence of Lead (II) is more than its permissible levels of 0.01mg/L, it causes damage to animals and aquatic creatures. This can be overcome when we treat the waste waters with the powder made from the leaves, seeds and bark of *S. Jambos*.

Many of the low cost and freely available sorbents have been investigated for the removal of lead but till now no researcher used the *Syzygium Jambos* as an adsorbent for the removal of lead. In this paper first time we have investigated

the effect of *S-Jambos* in removal of Lead (II) from aqueous solutions.

II. SYZYGIUM JAMBOS AS AN ADSORBENT

In this paper, we propose *Syzygium Jambos (S. Jambos)* as a novel adsorbent for the removal of Lead (II) from the prepared stock solutions. The *S. Jambos* plant locally called as rose apple tree, its leaves are collected from our farm garden at Kakupally, Nellore, Andhra Pradesh, India. The combination of *S. Jambos* leaves along with upcoming fruits is shown in Fig. 1, the eatable fruits are shown in Fig. 2 [15]. The *S. Jambos* leaves are washed thoroughly under tap water to remove dust over the leaves, after that washed thoroughly with distilled water and then dried for 15 days under sunlight. The dried leaves became completely crispy, after that grinded, filtered and finally obtained the fine powder as shown in Fig. 3.

Fig. 1. *Syzygium Jambos* plant with leaves and upcoming

Fig. 3. *Syzygium Jambos* leaves powder after drying process

Fig. 2. *Syzygium Jambos grownup* fruit

III. MATERIALS AND METHODS

A. Preparation of Stock solution for Lead (II) solution

Stock solution of Lead(II) is prepared by dissolving

1.598 g of $Pb(NO_3)_2$ in one liter of Milli-Q water (Distilled Water) to achieve a metal concentration of 1000 mg/l, which is equivalent to 1000 ppm. Water samples for all experiments to be prepared by diluting this stock solution to the pre-determined concentration.

B. Experimental procedure for effect of pH

The optimum pH for adsorption of Lead(II) by the *Syzygium Jambos* is determined experimentally based on the following steps and its experimental sequences is shown in the block diagram of Fig.4.

Step 1. Lead(II) solution with the concentration of 10 mg/L (10 ppm) from the stock solutions is to be added in 100 ml of distilled water. Prepare such 5 sample flasks.

Step 2. The initial pH of these samples is to be adjusted to 2, 4, 6, 8 & 10 and each sample is to be adjusted using either 0.1N H_2SO_4 or NaOH solution.

Step 3. Add 1 g of Sample A to each flask.

Step 4. Equilibrium condition for heavy metal adsorption was obtained after 2 hours of agitation at room temperature and 120 rpm.
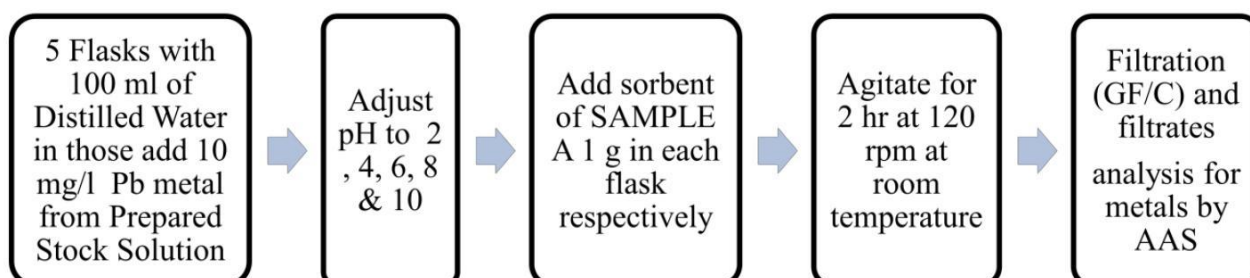
Fig. 4. Block diagram of experimental procedure to study the effect of pH

Step 5. Samples were taken after filtering the samples by Whatman TM filter

Step 6. After equilibrium was achieved and heavy metal concentrations are to be analysed using atomic adsorption spectrometer (AAS)

Step 7. The optimum pH is to be found from above steps and it is used as the FINAL pH for the next experiments.

C. Analytical Instrumentation [16]

i. Atomic Absorption Spectroscopy (AAS) [17]

The samples obtained from the procedure of section B are used in AAS. The aliquant of the mixture solution subjected for the determination of metal ions using Atomic absorption spectroscopy of model ZEEnit 700P, Germany.

The Pb (II) uptake is calculated in terms of percentage by using the Eq. 1. All experiments were conducted in duplicate.

$$\% \text{ Removal} = \dash \qquad (1)$$

Where, C_e and C_i are the final and initial concentration of heavy metal respectively. The adsorption capacity q_e (mg/g) was calculated using Eq. 2.

$$\dash \qquad (2)$$

Where, V is the volume of solution in litre (L) and W is the mass of adsorbent in gram (g).

ii. Fourier Transform Infrared (FTIR) Spectroscopy [18]

The FTIR spectra of the samples will be recorded on a PerkinElmer 1600 spectrophotometer in KBr medium. The *Syzygium Jambos* and KBr will be mixed in the ratio of 1: 5 and grind it around 30 minutes using agate motor and pestle till the mixture get homogeneously formed.

iii. Powder X-Ray Diffraction (XRD) [19]

The powder X-ray's diffraction patterns were studied by using CuK_α radiation (λ = 1.5406 Å) of Philips X-ray diffractometer at the scanning range of $2\theta = 10°-80°$ with the scanning rate of $2°$ per minute. The prepared samples were subjected for sonication in acetone media for 10 minutes in order to remove water completely from the samples and grounded before exposing to X-ray's beam.

iv. Scanning Electron Microscope (SEM) [20]

The mixed *Syzygium jambos* were pressed under hydraulic press about 1 tone to form transparent pellets. The morphology of the *Syzygium Jambos* in the form of powder deposited on glass was investigated using Philips XL 30 ESEM scanning electron microscope (SEM).

IV. RESULTS & DISSCUSSIONS

The procedures mentioned in the Section III-A&B are used to obtain the results shown in Table I. The results from Table I, Fig. 5 and Fig.6 indicates that the maximum adsorption of Lead (II) occurred at the lower values of pH than the higher values of pH. The maximum percentage removal of adsorption is found as 76.5% at the pH value of 2 using *Syzygium Jambos* as an adsorbent for initial Lead concentration of 10 mg/L , adsorbent dosage of 1g and contact time of 2 hours.

The FTIR result shown in Fig. 7 indicates the pure adsorbent of *Syzygium Jambos* without treated any heavy metal ions. The important characteristic peaks found at 3442 cm^{-1} is corresponds to N–H vibration stretching which indicates adsorbent has capacity of metal sorption and aliphatic and aromatic properties, 1633 cm^{-1} for C=C-stretching band of alkene group, 1103 cm^{-1} R-O-R aliphatic group. The XRD result shown in Fig. 8 indicates that the maximum intensity of molecules present in the *Syzygium Jambos* found as 2121 a.u at a diffraction angle 17.03^0 and minimum intensity found as 7 a.u at a diffraction angle 4.12^0. The SEM results shown in Fig. 9 indicate that there is adsorption capacity of *Syzygium Jambos*.

TABLE I. Effect of pH on Adsorption of Lead (II)

S. No	The value of pH	% Adsorption of Lead (II)
1	10	48.8
2	8	41.6
3	6	39.5
4	4	42.5
5	2	76.5
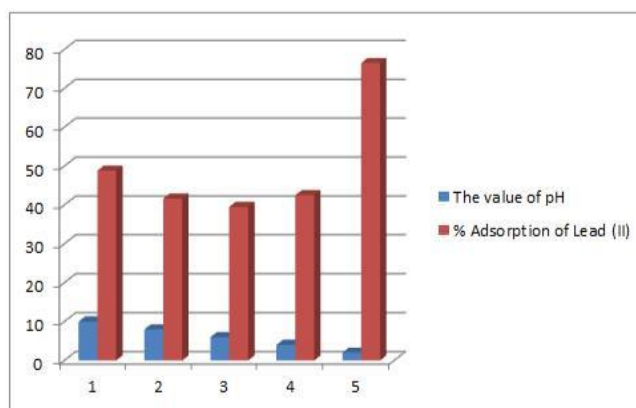
Fig. 5. Bar graph of %Adsorption Vs. value of pH
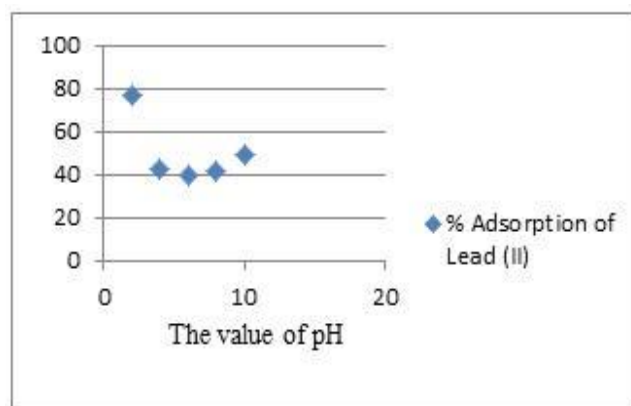
Fig. 6. Scatter plot of %Adsorption Vs. value of pH
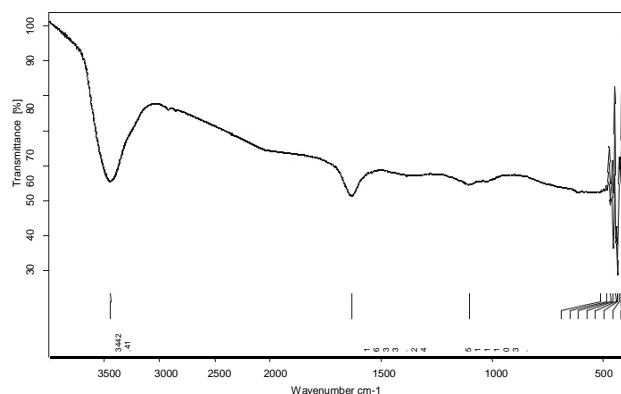
Fig. 7. FTIR result of *Syzygium Jambos* leaf powder
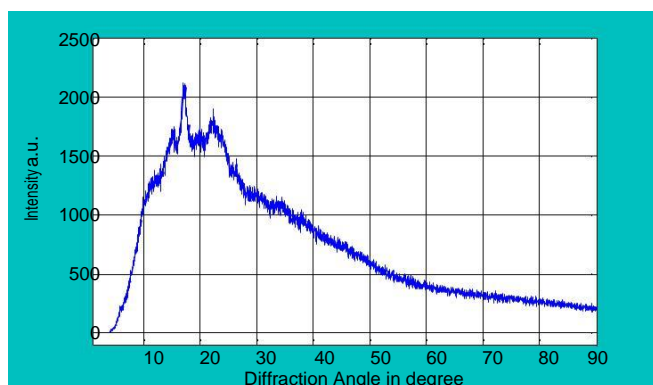
Fig. 8. XRD result of *Syzygium Jambos* leaf powder
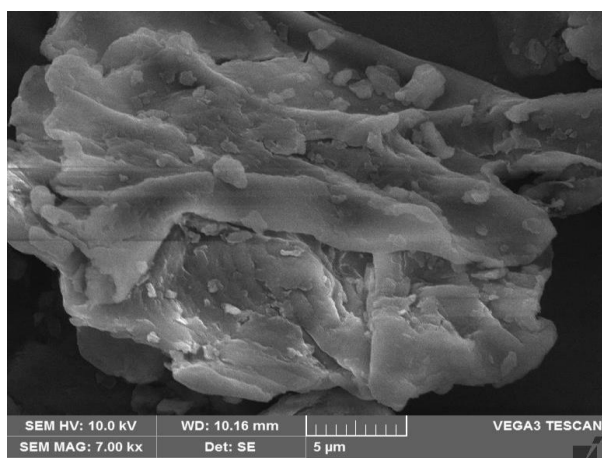
Fig. 9. SEM result of *Syzygium Jambos* leaf powder

V. CONCLUSIONS

This paper proposed *Syzygium Jambos* leaf powder as an adsorbent for the removal of Lead(II) from aqueous solutions. This paper clearly discusses the significance of removal of Lead (II) and its health hazards with respect to living creatures and environmental pollution. The results obtained through different analytical techniques such as AAS, FTIR, XRD, SEM and described the materials, methods used in the investigations to obtain the precise results. The maximum percentage removal of Lead(II) by *Syzygium Jambos* leaves powder found as 76.6% at 10 ppm of initial metal ion, 120 minutes of contact time, 1 g/L of adsorbent dosage and pH = 2. The percentage change in the maximum adsorption to minimum adsorption found as

75.98% from pH=2 to pH=6 respectively. It indicates that *Syzygium Jambos* has maximum adsorption capacity at lower pH values and there is a significant change in % adsorption capacity of Lead (II) by *Syzygium Jambos* with respect to pH value.

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Exploration of Generation Gap in Jhumpa Lahiri's The Namesake

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ABSTRACT

Any argument related to human life becomes old with time. Any generationfailing to pass its complete creed to the subsequent generation constitutes „generation gap". There is no particular factor authoritative for this generation gap. Changing social scenario, cross cultural influence and many such aspects pave way for the generation gap.

This paper aims to analyze the controversial ideologies from one generation to another with reference to the novel *The Namesake* by JhumpaLahiri.

Key Words: Immigrant experiences, generational gap, cultural influence

Most of the immigrant experiences incorporated in literary works were autobiographical. JhumpaLahiri born in London to Bengali parents is an American author of Indian origin. Hence, she expresses her personal immigrant experiences in her literary works. Her literary career began with the short story collection *Interpreter of Maladies* in 1999 for which Lahiri won the 2000 Pulitzer Prize for fiction. *The Namesake*, her first novel has been adapted for film with the same title. The title of the novel plays a significant role in the representation of the theme. Lahiri"s fiction, conceived with Indian American experiences exposes the themes like marital difficulties, self-identity and disconnection between first and second generation immigrants. As HiralMacwan says, "The Namesake convincingly illustrates the lives of both first generation and second generation Indian migrants in the USA." (49)*The Namesake*centers on the life of Ganguli family. Newly married couple AshokeGanguli and AshimaGanguliborn and brought up in Calcutta immigrate to the United States and beget two children Gogol and Sonia. These children constantly face the problems of cultural and generation gap with their parents. The name of the protagonist Gogol Ganguli and his personal contempt towards his name contributes merit to the title of the novel*TheNamesake*". The autobiographical touch in relation to „pet name" and „good name" of the character Gogol is visible as Lahiri herself has personal experience in obsession over her pet name „Jhumpa" while her good name been „NilanjanaSudeshnaLahiri" which was legally changed to JhumpaLahiri. In the novel, the generation gap begins with the name Gogol as he feels reluctant having the name of Gogol Ganguli. He has been named Gogol under the influence of Russian author Nikolai Gogol. Both Ashoke and Ashima are literature lovers and Ashima reads English poets and Ashoke reads Russian authors. Ashoke attributes his survival to the Russian author Gogol after the jarring train wreck. He considers the fluttering page of the book *The Overcoat*written by Nikolai Gogol which he was reading in the train before the wreck, attracts the rescuers attention in saving Ashoke"s life.

The novel highlights Ashoke‟s devotion towards the Russian author Nikolai Gogol and his sentimentality in naming his first child‟s pet name as Nikhil and good name as Gogol. But Gogol fails to accept a failure‟s (Nikolai Gogol) name as his name and feels that the name is neither Indian nor American. Gogol proceeds to change his name as Nikhil after his school graduation which shows a strong denial of erstwhile generation‟s ideologies. Delphine Munos rightly points out, "Through Gogol‟s predicament, Lahiri points to the paradoxes of identity construction for those among second-generation "desis" who have confused filial and affiliative bonds with their present and their past." It mayalso be due to hyphenated identity which creates serious problems in America as put forth by Alexander, "In America you have to explain yourself constantly. It is the confessional thing. Who are you? Where are you from?" At the end of the novel Gogol realizes his father‟s emotion after his death and he accidentally finds the book titled *The Short Stories of Nikolai Gogol*which was ignored by Gogol when once his father gifted the book. In the front page of the book it has been written "For Gogol Ganguli" and in the upper right hand corner of the page in scripted "The man who gave you his name, from the man who gave you your name (292)". The novel ends with Gogol reading *The Short Stories if Nikolai Gogol*and urging to connect the stories to his father‟s life which shows the redemption of former generation values.

The generation gap can also be traced between Ashoke, Ashima and their ancestors in Calcutta when they struggle to follow Bengali culture even after migration. After ten years after migration Ashoke and Ashima allow a drastic change in their lifestyle which includesAmerican food, enjoying Christian holidays, cosmetic change etc. In order to satisfy their own self, the Gangulis keep on organizing traditional events like rice ceremonies of Gogol and Sonia, celebrating Bengali festivals with American Bengali immigrant friends and neighbours. The generation gap has become substantial in the case of Sonia as she completely fails to follow rice ceremony rituals that establish the disconnection of her parent‟s homeland and their culture, tending the folk to believe Sonia as pure American born child. Lahiri focuses on Gogol‟s transformation in life as he is the protagonist of the novel in which the plot travels around Gogol‟s birth to his graduation and career. The novel exposes generation gap in various forms and the most peculiar one is Gogol‟s multiple affairs through which he tries to explore the original identities. His experiences with the three women: Ruth in college, Maxine in New York and Moushumi as wife, brings in clear understanding of life which finally makes him choose his architectural career as life soul. Maxine from different culture shows more interest in Gogol‟s culture and family traditions. She has true love towards Gogol and so her intensity in getting familiarized with Gogol‟s culture is strong but in contradiction Gogol fails to realize Maxine‟s love and deserts her mourning after the death of his father Ashoke. On the other hand MoushumiGogul‟s wife who is an American born Indian belonging to the same Bengali culture is attracted by French literature and culture. Subsequently she finds pleasure and fulfilment in her relationship with Dimitri and gets divorce from Gogol.

The narrator highlights the cultural gap between these two women characters Maxine and Moushumi. Moushumi being a childhood friend to Gogol ignores his love after marriage. She enjoys the freedom in America and her impudence towards her native culture can be stated as cultural gap. Maxine from a different culture respects Gogol‟s family traditions and their lifestyle and at one point it evokes an impression that she loves Gogol‟s culture more than him. This understanding of cultural gap induces Gogol to choose his architectural career at the end of the novel as his ancestors were the experts of

architecture in India. The cultural gap occurs due to the transformation of behaviour and social influence in the Diasporas. Sara Lamb in „*Aging and the Indian Diasporas'* rethinks the ways of generation gap and finds the most dominating cause as Modernity. She quotes from Karl Mannheim‟s classic essay *'The problem of Generations'* which speculated that cultural transformation comes about through the continuous emergence of new generations: as each generation comes into "fresh contact" with its social and cultural heritage, it remodels what it finds (14)". Maxine and Moushumicome across new cultures which lead them to modernity yields adverse effect in Gogol‟s life.

Ashoke, Ashima‟s struggle to provide a good life for their children in a critical circumstance of acculturalistic state is not validated by Gogol and Sonia as they choose their own life and companions. Gogol deserves all right to choose Maxine, Moushumi and likewise Sonia decided Ben as her husband which is impossible in a restricted world like India. Even Ashoke and Ashima were not given the freedom to choose their life partners but they accomplished their marital life.On the other hand Gogol who was given the freedom of choosing his better half failed in his marital life. The novel has the touch of realization of native culture through Gogol‟s character. The cultural transformation of Gogol proves that there is a definite change in every new generation due to various social and cultural factors but the first generation has precious values and ethics that should be incorporated in the new generation for the betterment of society and individual life.To put the problem of generation gap of immigrants in a nutshell, Adesh Pal says,

The first generation has strong attachment with the country of their origin. From the second generation onwards ties with the homeland gradually gets replaced by those with the adopted country. Food, clothes, language, religion, music, dance, myths, legends, customs of individual community etc. become the markers of identity. These are retained, discarded or adopted differently at different times and places. (Pal, 2004)

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INTEGRATED APPROACH FOR DIFFERENT METHODS OF NON LINEAR SYSTEM OF EQUATIONS

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Abstract-- **It is well known that the solution of system of non-linear equations play vital role in all the fields of science and engineering applications. In this paper we discuss the efficiency of various methods with merits and demerits for solving the non linear system of equations, and finally stopped at a landmark "Parametric method of Iteration" which accelerates the rate of convergence efficiently.**
Key words: N-R Method, Iterative Method.

I. INTRODUCTION

Many applications in science and engineering are described by a set of n-coupled, non-linear algebraic equations in n- variables $x_1, x_2, x_3 \ldots x_n$ of the form

$$F_1 (x_1, x_2, x_3 \ldots x_n) = 0$$
$$F_2(x_1, x_2, x_3 \ldots x_n) = 0$$
$$.\quad \ldots\ldots\ldots\ldots\ldots$$
$$F_n(x_1, x_2, x_3 \ldots x_n) = 0 \text{ expressed as}$$
$$F_i(x) = 0 \quad (i=1, 2, 3\ldots n) \quad \ldots\ldots\ldots (1.1)$$

Where x is an n-dimensional vector.

In Newton-Raphson method, the system (1.1) is solved by iterating the scheme

$$x^{(k+1)} = x^k - [J^k]^{-1} F(x^k) \quad (k=0, 1,2,3\ldots\ldots)$$

Where Jacobian J^k is

$$\begin{vmatrix} \dfrac{\partial F_1}{\partial x_1} & \dfrac{\partial F_1}{\partial x_2} & \cdot & \cdot & \cdot & \dfrac{\partial F_1}{\partial x_n} \\ \dfrac{\partial F_2}{\partial x_1} & \dfrac{\partial F_2}{\partial x_2} & \cdot & \cdot & \cdot & \dfrac{\partial F_2}{\partial x_n} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \dfrac{\partial F_n}{\partial x_1} & \dfrac{\partial F_n}{\partial x_2} & \cdot & \cdot & \cdot & \dfrac{\partial F_n}{\partial x_n} \end{vmatrix}$$

This method converges if the functions $F_i(x)$, all have continuous first order partial derivatives near a root x , and if the Jacobian is non-singular in the neighbourhood of this root and I $x^{(k)}$ is taken sufficiently close to the solution x*.

Now we introduce a homotopy continuation parameter 't'.

Consider the nxn system of eqn (1.1). If we assume related $G_i(x)$ with known solutions based on arbitary values $x_1 = x_1^0$, $x_2 = x_2^0$, $x_3 = x_3^0 \ldots\ldots\ldots x_n = x_n^0$

i.e.,

$G_i(x^0) = 0$ where x^0 is n x n vector such that $g_1(x_1^0, x_2^0 \ldots\ldots .. x_n^0) = 0$
$g_2(x_1^0, x_2^0 \ldots\ldots .. x_n^0) = 0$
$\ldots\ldots\ldots\ldots\ldots\ldots\ldots..$
$g_n(x_1^0, x_2^0 \ldots\ldots .. x_n^0) = 0 \ldots\ldots\ldots(1.2)$

Then we can form avector of homotopy functions
$h_1(x_1, x_2 \ldots x_n, t) = t.f_1(x_1, x_2 \ldots x_n) + (1-t)g_1(x_1, x_2 \ldots x_n)$
$h_2(x_1, x_2 \ldots x_n, t) = t.f_2(x_1, x_2 \ldots x_n) + (1-t)g_2(x_1, x_2 \ldots x_n)$
$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .$
$h_n(x_1, x_2 \ldots . x_n, t) = t.f_n(x_1, x_2 \ldots x_n) + (1-t)g_n(x_1, x_2 \ldots . x_n)$

Where t is an embedded homotopy continuation parameter.

Where $0 \le t \le 1$ always setting the homotopy functions to zero.

The essential features of this method are
- The solution is continued from the known solution
- The better chance of this procedure working is closer $G_i(x)$ are to $F_i(x)$.
- This method is not particularly sensitive to the selection of $G_i(x)$.
- A root finder is requried at each step for each value of t.
- The initial guess for the root finder is the soluion of the preceeding step.
- If this method fails, then increment in t can be reduced and the calculation repeated.
- If requried the interval for t can be extended for $0 \le t \le \infty$ as

$$h_1(x_1, x_2 \ldots .. x_n, t) = f_1(x_1 \ldots . x_n) - e^{-t} f_1(x_1^0, x_2^0 \ldots . x_n^0)$$
$$h_2(x_1, x_2 \ldots .. x_n, t) = f_2(x_1 \ldots . x_n) - e^{-t} f_2(x_1^0, x_2^0 \ldots .. x_n^0)$$
$$\ldots\ldots\ldots\ldots\ldots .. \ldots\ldots\ldots . .$$
$$h_n(x_1, x_2 \ldots .. x_n, t) = f_n(x_1 \ldots .. x_n) - e^{-t} f_n(x_1^0, x_2^0 \ldots\ldots x_n^0)$$
$$\ldots\ldots\ldots\ldots .. (1.3)$$

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with the properties

$h_1(x_1....x_n,0)=0$,

$h_2(x_1...x_n,0)=0$

………………

$h_n(x_1....x_n,0)=0$ and

$h_1(x_1....x_n,\infty)=f_1(x1, x_2....x_n)$

$h_2(x_1,x_2.....x_n)=f_2(x_1,x_2....x_n)$

………………

$h_n(x_1.x_2....x_n,\infty)=f_n(x_1, x_2....x_n)$.

Now we can analyse it by considering the differentials of the homotopy functions in(1.3) as

$dh_1= \frac{\partial f1}{\partial x1} dx_1+...\frac{\partial f1}{\partial xn} dx_n+e^{-t} f_1(x_1^0,x_2^0...x_n^0)dt=0$

$dh_2= dx_1+... \frac{\partial f2}{\partial xn} dx_n+e^{-t} f_2(x_1^0,x_2^0....x_n^0)dt=0$

………………

$dh_n= \frac{\partial fn}{\partial x1} dx_1+...\frac{\partial fn}{\partial xn} dx_n+e^{-t} f_n(x_1^0,x_2^0....x_n^0)dt=0$

…………... (1.4)

The equation (1.4) is the Devidenko's differential equations can be written in matrix form for the nxn problem as

$J \frac{dx}{dt}= -f$………………….. (1.5)

Where 'J' and 'f' are the Jacobian matrix and function vector of the non-linear system

respectively and $\frac{dy}{dt}$ is the derivative of the solution vector with respect to the continuation parameter 't'.

Eq (1.5) defines an initial value of problem , requiring an initial condition vector assumed as starting solution

$x(0)=x_0$ …...…………..(1.6)

For the solution of non linear system (1.5) is to be integrated until $J\frac{dx}{dt}\approx 0$

$f\approx 0$………..(1.7)

For the scalar case we can analyze the convergence of solutions to Dendenko's ODE eq(1.5) becomes

$\frac{df}{dx}\frac{dx}{dt}=-f$

$\frac{dt}{f}=-dt$

Integrating and applying initial conditions f (t_0)=f_0

gives $\log(f/f_0)=-(t-t_0)$ or

$f=f_0 e^{-(t-t_0)}$…………………..(1.9)

Which indicates the convergence of Devidenko's method is exponential in t. Note that the form of ODES in eqn (1.5) is linearly implicit ODES.

For explicit ODES compute a solution of (1.5) which can be written in the form

$\frac{dx}{dt}=-J^{-1}f$ ……………(1.8)

This method works well for relatively low order systems.

The convergence of this method is more reliable (i.e,) Dendenko's method may work when Newton method fails.

A major difficulty with Newton's method (1.1)and Dendenko's method (1.5) is failure caused by singular or near matrix(as both methods require the inverse Jacobian matrix).To circumvent this problem , we consider the discrete and differential Levenberg Marquardt methods.

$\{(1-\alpha)J^T J+\alpha I \} \Delta x =J^T f$……………..(1.10)

$\{(1-\alpha)J^T J+\alpha I\} \frac{dx}{dt}=-J^T f$………………..(1.11)

When $\alpha=0$, eq (1.10) and (1.11) reduce to

$J^T J\Delta x=-J^T f$ or $J\Delta x=-f$………..(1.12)

$J^T J\frac{dx}{dt}=-J^T f$ or $J\frac{dx}{dt}=-f$…………(1.13)

Eq(1.12) and (1.13) are just Newton's method and Devidenko's method respectively (both will fail if 'J' is singular)

When $\alpha=1$ eq (1.10) and (1.11) reduce to

$\Delta x = -J^T f$………(1.14)

$\frac{dx}{dt} = -J^T f$………(1.15)

Eqn (1.14) and (1.15) express the discrete and differential steepest descent. They do not require Inverse Jacobian.

However these equations reflect the conditions for maximum or minimum in

$SS=\sum_{i=1}^{N} f_i^2$………..(1.16)

Therefore, the approach to avoiding a singular system and still approach the solution $f_1=f_2......f_n=0$ is to use $0< \alpha <1$,and to possibly vary α as the solution proceeds by monitoring the condition of J. When it approaches the solution, relatively slow when compared to Newton's method.

II. PARAMETRIC METHOD OF ITERATION:

To solve the system (1.1), we rewrite the equation (1.1) by introducing a set of parameter $\alpha_1,\alpha_2.......\alpha_n$ all of them are positive, are expressed as

$x_1^{(k+1)}=(1-\alpha_1^k)x_1^{(k)}+\alpha_1^{(k)}f_1^{(k)}$

$x_2^{(k+1)}=(1-\alpha_2^k)x_2^{(k)}+\alpha_2^{(k)}f_2^{(k)}$

$$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$$
$$x_n^{(k+1)}=(1-\alpha_n^k)x_n^{(k)}+\alpha_n^{(k)}f_n^{(k)}$$
$$k=(0,1,2\ldots\ldots)\ldots\ldots\ldots\ldots.(2.1)$$

As the parameters $\alpha_i^{(k)}$ in (2.1) accelerates to convergence of (1.1), this method (2.1) may be called as parametric method of iteration .

As given in [3] and [1], are can easily show that the method (2.1) converges when the conditions

$$\left|\alpha_2\frac{\partial f_2}{\partial x_1}+\alpha_3\frac{\partial f_3}{\partial x_1}+\ldots+\alpha_n\frac{\partial f_n}{\partial x_1}\right|<1$$

$$\left|\alpha_1\frac{\partial f_1}{\partial x_2}\right|+\left|\alpha_3\frac{\partial f_3}{\partial x_2}\right|+\ldots+\left|\alpha_n\frac{\partial f_n}{\partial x_2}\right|<1$$

$$\cdots\cdots\cdots\cdots\cdots\cdots$$

$$\left|\alpha_1\frac{\partial f_1}{\partial x_n}\right|+\left|\alpha_2\frac{\partial f_2}{\partial x_n}\right|+\ldots+\left|\alpha_{n-1}\frac{\partial f_{n-1}}{\partial x_n}\right|<1$$

$$\cdots\cdots\cdots\cdots\cdots (2.2)$$

hold true for all $x=x^k$ and $\alpha=\alpha^k$ for each k.

If we choose $\alpha_i^k=[1-\frac{\partial f_i}{\partial x_i}/x=x^k]^{-1}$, (i=1,2……n) for each 'k'………………(2.3)

Now the parametric method of iteration can be defined from (2.1),(2.2),(2.3) as

$$x^{(k=1)}=(1-\alpha^k)x^k+\alpha^kf(x^k)\ldots\ldots\ldots..(2.4)$$

It is to be observed that the system given in [4] can be taken by writing

$$x_1^{k+1}=(\cos x_2^k\, x_3^k+0.5+x_1^k)/4$$
$$x_2^{k+1}=Ix_1^{(k+1)}/25$$
$$x_3^{k+1}=(x_3^k-9-e^{-x1x2})/21\ldots\ldots\ldots\ldots(2.5)$$

(* here + or – sign should be taken in accordance with the initial guess). has converged in 3 iterations for $(x_1^0,x_2^0,x_3^0)=(0,0,0),(1,1,0)$ and (5,5,5) where as the Newton Raphson method has failed to converge , 10 Iterations and 12 Iterations respectively.

III. Conclusion:

A major difficulty with the Newton's method (1.1) and Devidenko's method (1.5) is failure caused by singular or near singular matrix(as both methods require the Inverse Jacobian matrix). To circumvent this problem, we consider the discrete and differential Levenberg Marqusrdt methods as they do not require Inverse Jacobian. But it approachs the solution relatively slow when compared with Newton's Method. Then a homotopy continuation parameter is introduced for solving system(1.1) with the choice of $0<t<\alpha$. Essentially this method requires the known solution and a root finder at each other step for each value of t. For improving the rate of convergence Parametric method of Iteration introduced with the choice of a parameter α, where $\alpha^{(k)}=[1-f'(x)|x=x^k]^{-1}$ for each k, and observedthat it is more efficient to converge.

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Importance of Reading & Comprehension for Engineering Students

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Abstract:

In today"s competitive life everyone has to have the command over the English language and communication. In the period of learning the subject knowledge engineering students stopped focusing on the communication and English Language. This lack of communication activities leads them for struggle in job search. In this paper we are trying to put a light on certain type of skill which can guide and motivate them to learn the English accurately that is "The Reading Skill". Its helps them to develop vocabulary as well as the "Business Communication".

Keywords:

English Language, Reading Skills, Types of Reading and its Techniques, Methodology, Example Reading Test.

Introduction:

Reading Skills is an ability to recognize and comprehend the printing words. According to Michael West "Reading is the shortest way to learn a language". Reading skill is also known as receptive skill. Reading is a mediator between sounds and prints.

Students need to understand types and techniques of reading for better comprehension and they must have an idea which type of reading they should use in their learning process as well as in their practical/professional life. On the basis of test result we can understand the level of student"s in reading skills.

Types of Reading:

Reading is a method of communication that enables a person to turn writing into meaning. It allows the reader to convert a written text into a meaningful language with independence, comprehension, and fluency, and to interact with the message. (7 Reading Techniques for Increasing Learning & Knowledge)

Generally there are five types of reading.
1. Silent Reading
2. Loud Reading
3. Intensive

4. Extensive
5. Critical reading
   (Konda Nageshwar Rao)
1- Silent Reading:
   It is a process of learning through reading silently, where reader will not create a sound but he will focus to understand the central theme of the text. According to Reborn and Dollman it"s a major part of academic learning, it is **sense orientated** and it comes under intensive and extensive reading. They have given the idea that a person can read 400-500 words per minute therefore reading skills develop the speed of understanding the written text. Eye span will be high. Example: competitive exams and academic exams.

2- Loud Reading:

The reader will read loudly thus he will create the sound and pronunciate the words. But in this type of reading reader will not able to get a central theme of the text.

This type of reading is suitable for beginners or young learners. Reader will get command on pronunciation and get clarity of the spoken language.

It is a part of only intensive reading. It is **sound orientated.** Eye span is low and reading speed will 200-250 words per minute**.**

Examples: young learners,

3- Intensive Reading:

It is a process of reading a text in order to receive the detail information. Here reader will active and understand the text effectively and essentially. Reader reads a text in both way silently and loudly. It deals with **study skills** (note taking/note making).

Example: business letter, reports, reading, text book, course books, circular,

4- Extensive Reading:

It is a process of reading where reads to get the central idea of a text. It deals with silent reading. It gives overall view of the printed words. It deals with **reference skills.** It is for non-academic purpose, and for pleasure.

Examples: novels, poems, magazines, news paper,

5- Critical Reading:

This process deals with critical examination of the text, and understands the written and hidden message from it. Examples: English Literature Ph.D Students does a critical evaluation of the selected texts. SQ3R(Survey, Question, Read, Recall, Review) (Critical Reading & Reading Strategies/skills you need)

Techniques of Reading:

Different linguistics has given various techniques of reading but most of the language trainer will take skimming, scanning, intensive and extensive reading as tool to give a reading skills training.

1- Skimming
2- Scanning
3- Skipping
4- Reading the lines
5- Reading between the lines
6- Reading beyond the lines.

Example for utilizing reading techniques:

A. **STEP ONE: Orientation (Orientierung).**

Goal: Pre-reading preparation.

Look carefully at anything that can give you information on the reading: table of contents, the introduction to the story, the title, subheadings within the story, glosses, vocabulary. Try to find some of this type of information:

- what kind of text it is (fairy tale, report?);

- whether it is mainly action or dialogue;

- whether it is mainly internal (thinking) or external (interaction among characters);

- whether it is in chronological order; etc.

Next: Think about what you might associate with any of the results of your orientation. For example, if you have decided the text is a drama, think about what you expect from a drama. If there is a certain word that occurs often or in a central location, think about what one normally associates with that word. An example is das Gesetz in the story Vor dem Gesetz: what does one normally associate with "the law?" What might that mean for this story?

B. **STEP TWO: Skimming.**

Goal: To get the general meaning (gist) of the story without trying to decode exactly what each word means. Read the whole text through silently **twice** as outlined below. Do not use a dictionary! (To help you resist the

temptation to decode the reading word-for-word, you should time yourself, allowing **no more than two minutes per paragraph**.)

1. Your **first** reading will help orient you further to the content and make you comfortable with what you don't understand in it. Focus on what does make sense (cognates, compound words, logical relationships between words and whole phrases), and skip what you don't understand, trying to go with the flow.

2. Your **second** reading will give you a much better feeling for the content. You will notice that some passages that were unclear during your first reading are starting to clear up, since what comes at the end often helps you to understand the beginning.

After completing these two readings, stop and make a **mental summary** of what you have understood. Now invent a sentence (**Schlüsselsatz**) summarizing what you think the story is (or might be) about. Write in German if you can, English if you must. You might write something like: This story deals with X (love, for instance), and Y happens. . . .

C. **STEP THREE: Scanning.**

Goal: To extract specific pieces of information.

In "real life" you might scan a train schedule for one kind of information, a travel brochure for different information, and a theater program for a third type. From the literary texts in this course, you will extract certain basic facts by **scanning** it:

Read through the text again **very quickly**, scanning for the things listed below. To focus your attention more clearly, underline (preferably in different color ink/pencil), and list on your Übungsblattthese items:

- **WER** (both names and descriptive nouns, like der Mann, always trying to include articles);

- **WANN** (both dates and others, like später, am nächsten Tag, etc.);

- **WO** (both place names and others like zu Hause, etc.)

Now pull things together:

1. Locate and write down a few words more about what you have written for 3. For example, if you have found a name Georg, write a short description of Georg using words you find in the text about him.

2. Now write a loose chronology of what happens. Write in German as much as you can; use English to fill in the gaps. Don't look up words in the dictionary; complete sentences are not necessary. Write just enough to indicate the progress of the literary text.

D. **STEP FOUR: Decoding.**

Goal: Thorough comprehension. After you have skimmed and scanned, there will still be stretches of text that offer vocabulary or grammatical difficulties you can't overcome easily. In those cases, intensive reading (detailed, word-by-word decoding) is necessary. So, now read the text again, this time slowing down and decoding these sections, i.e. carefully analyzing each word unit. Remember to think about structure as well as vocabulary when you are working. For example:

- establish logical relationships by finding connectors (for ex. although, if, in addition, etc.)

- identify to what or whom a word or group of words refers

- Locate important words in the phrase or sentence, like the

subject, main verb (and the parts of the main verb), important pronouns, etc.

Now you should be able to paraphrase the author, but not necessarily evaluate the ideas or tell the "why" about the text. When you are finished reading, try to retell events in the text in your mind; in German this is called a Nacherzählung. Make yourself notes on your Übungsblatt (in German if possible) so that you could retell it in class.

E. **STEP FIVE: Global Understanding.**

Goal: To understand and critically evaluate the "why" of the text. Some examples of questions you should ask yourself after all your readings:

- Why did the author put this remark or description in this place and not in another?

- What is the meaning of a fact alone? in relation to other facts in the text?

Usually we will discuss these and similar questions in class, but you should try to figure some of them out by yourself and make some notes to contribute to the discussion. (Reading 2)

Methodologies:

We have taken two methodologies which can prove that reading skills is helpful to learn English language.
1st procedure is identify the level of understanding of the students.2nd procedure is guide them to improve vocabulary.
Levels of Understanding the Text:

In this process trainer/teacher will conduct some testes based on reading for the students, and on the basis of the result she/he will divide students in two groups, Lower Order Thinking Skills and Higher Level Thinking Skills. Below table can help the trainer/teacher to evaluate the students" level of understanding.

Lower Level Thinker Skills	Higher Level Thinking Skills
1-Knowledge	4- Analysis

What is…..? How is…..? Where is…..? When did....happened? How did...happened? How would you explain..?	What are the parts of features of …? How is ____ related to …? What do you think…? What is the theme…? What motivate is there…? What conclusions can you draw…?
2-Comprehension How would you classify the type of…? How would you compare..? Contrast…? How would you rephrase the meaning…? What facts or ideas show…? What is the main idea of…? Which statements support…?	**5-Evaluation** Why do you agree with the actions? The outcomes? What is your opinion of…? How would you prove…? Disprove…? How can you assess the value or importance of …? What would you recommend…? How would you rate or evaluate the…?
3- Application How would you use…? What examples can you find to…? How would you solve---- using what you have learned…? How would you show your understanding of…? What approach would you use to…? How would you apply what you learned to develop…?	**6– Synthesis** What changes would you make to solve…? How would you improve…? What would happen if …? How can you elaborate on the reason…? What alternative can you propose...? How can you invent How would you adapt___ to create a different…?

Vocabulary Building:

Teacher/Trainer will give list of new words/ difficult words to the student, students need to

use dictionary and find out the synonyms and make meaningful sentences by using this words.

1	Heinous	Evil	Certain
		Undesirable	Talented
2	Proficient	Productive	Skilled
		Sleepy	speedy
3	Noxious	Spiritual	Near
		Unhealthy	Similar
4	Heterogeneous	Lush	Mixed
		Rough	Excellent
5	Profound	Complete	Long-term
		Deep	Absurd
6	Obtuse	Threatening	Valuable
		Insensitive	Determined
7	Gormandize	Allow	Sleep
		Deep	Overeat
8	Privilege	Declaration	Truth
		Task	Honor
9	Nuance	Variation	Publicity
		Option	Statement
10	Homogenous	Uniform	Guilty
		Afraid	Political

Answer Key:
- 1- Evil
- 2- Skilled
- 3- Unhealthy
- 4- Mixed
- 5- Deep
- 6- Insensitive
- 7- Overeat
- 8- Honor
- 9- Variation
- 10- Uniform

Certain test will help students to identify and understand meaning of new words and they will be able to utilize these words in their day-to-day life.

Conclusion:

For every individual has to work on the English Language, as it is an ocean ,people have to lean it continuously, therefore Reading can be best tool to learn new words and utilize in their personal and professional life.
By taking self test or test by other also online tested people can learn new vocabulary and also evaluate them. Teacher/trainer of English language can use certain reading test as a tool to make reading as a active learning process and motivate them to develop their vocabulary.

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Appendices:

Nacherzählung:
a mental representation of the **meaning** or **significance** of something.
Synonyms: reading, version Types: reinterpretation. a new or different **meaning**. (especially of Scripture)

Übungsblatt
Exercise or practice

Example Reading Test with Answer key:
Directions: Read the passage. Then answer the questions below.

In this lawsuit, the lawyer who represents three different insurance companies against one plaintiff is seeking a settlement agreement, wherein the plaintiff agrees to drop the lawsuit in exchange for a certain amount of money. The plaintiff has agreed to accept $10,000. Now the lawyer must convince the companies, none of which wants to pay more than $3,000, that it is in their interest to pay enough so that the total reaches $10,000. The lawyer claims that this lawsuit is like a giant jigsaw puzzle.

Questions

1) The lawyer claims that "this lawsuit is like a giant jigsaw puzzle" mostly because it

A. cannot be solved
B. is a source of frustration and anxiety for the lawyer
C. has pieces that must fit together in a certain way
D. is too difficult for the lawyer to handle
E. is a confusing jumble of information

2) Based on information in the passage, it can be inferred that the settlement agreement can be reached if

I. each of the three companies agrees to pay a little more money
II. one of the companies is willing to pay an extra $1,000 III. the plaintiff reduces the amount of money he or she is willing to accept

A. I only
B. I and II only
C. II and III only
D. I, II, and III

Answers and Explanations 1) E

In this passage, the author describes a lawsuit. The author writes, "In this lawsuit, the lawyer who represents three different insurance companies against one plaintiff is seeking a settlement agreement, wherein the plaintiff agrees to drop the lawsuit in exchange for a certain amount of money." This means that there are four different parties involved in this lawsuit: the three companies and the plaintiff. Then the author explains that for the settlement agreement to work, "the lawyer must convince the companies, none of which wants to pay more than $3,000, that it is in their interest to pay enough so that the total reaches $10,000," which is the amount the plaintiff is willing to accept. If none of the companies pays more than $3,000, then the total will only be $9,000, and the settlement agreement will not work. If each of the three companies agrees to pay a little more money, or if one of the companies is willing to pay an extra $1,000, or if the plaintiff reduces the acceptable amount, then the pieces will fit together in such a way that the settlement

agreement will work. If the pieces do not fit together in a certain way, though, the settlement agreement will not be reached. In the same way, a giant jigsaw puzzle has pieces that must fit together in a certain way to make the puzzle work. This means that the lawyer claims that "this lawsuit is like a giant jigsaw puzzle" mostly because it has pieces that must fit together in a certain way. Therefore (C) is correct. Although the lawsuit has not yet been solved, the passage does not suggest that it cannot ever be solved (see above). Furthermore, a jigsaw puzzle can be solved, so if the lawsuit could not be solved, this would be unlike a giant jigsaw puzzle. This makes (A) incorrect. While some people may find a giant jigsaw puzzle to be a source of frustration and anxiety, the passage does not provide information to suggest that the lawyer finds the lawsuit to be this way. Therefore (B) is incorrect. While some people may find a giant jigsaw puzzle to be difficult, the passage does not provide information to suggest that the lawsuit is too difficult for the lawyer to handle. This means (D) is incorrect. Although the lawsuit contains particular information, the information is not a confusing jumble. It is presented in an organized way that, albeit complicated, is readily understandable. This makes (E) incorrect.

2) D

In the passage, the author explains how the settlement agreement will work: "The plaintiff has agreed to accept $10,000. Now the lawyer must convince the companies, none of which wants to pay more than $3,000, that it is in their interest to pay enough so that the total reaches $10,000." If each of the companies pays $3,000, then the total will only be $9,000 and the settlement agreement will not be reached. If, however, each of the three companies agrees to pay a little more money, they could have a total of $10,000. This means that the settlement agreement can be reached if each of the three companies agrees to pay a little more money. This supports option (I). In the passage, the author explains how the settlement agreement will work: "The plaintiff has agreed to accept $10,000. Now the lawyer must convince the companies, none of which wants to pay more than $3,000, that it is in their interest to pay

enough so that the total reaches $10,000." If two of the companies only pay $3,000, but one of the companies is willing to pay an extra $1,000 for a contribution of $4,000, then the total will be $10,000. This means that the settlement agreement can be reached if one of the companies agrees to pay an extra $1,000. This supports option (II). In the passage, the author explains how the settlement agreement will work: "The plaintiff has agreed to accept $10,000. Now the lawyer must convince the companies, none of which wants to pay more than $3,000, that it is in their interest to pay enough so that the total reaches $10,000." If each of the companies pays $3,000, then the total will only be $9,000. But if the plaintiff reduces the amount of money he or she is willing to accept, then the settlement agreement can be reached. This supports option (III). Therefore (D) is correct.

WRITING SKILLS A USEFUL TOOL FOR SUCCESSFUL PROFESSIONALS

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Abstract:We all know that in today's scenario getting a job is just not enough, but also we need to keep it in our hands as well as get career development in the same field or the other.To maintain the graph of success people have to constantly work on LSRW skills. Being a professional they must have to focus on Speaking and Writing. Writing is tool which can give a boost to their professional life. In this paper we will discuss how one can get command over Writing Skills, prepare and present impressive business documents.

Keywords:

Writing skills, types of writing, business documents, Strategies of business writing. Example test

I.Introduction

Writing skills are specific abilities which help writers put their thoughts into words in a meaningful form and to mentally interact with the message. (slideshare)
Writing is process of formation of acceptable words into sentences. It is also known as productive/active skills. Few linguistic gave a Psycho motor and graphic motor terms to writing skills

Writing Skills:

Writing is depending on spelling, hand writing, punctuation marks, grammar and tenses. One has to have command on these things he/she can prepare a good document.

Types of writing:

There are four main types of writing: expository, persuasive, narrative, and descriptive.Expository – Writing in which author's purpose is to inform or explain the subject to the reader.

Examples: research Oriented Articles, reviews,

1. Persuasive – Writing to influence or inspire the people and make them to know more about something.
   Examples: Brochures Articles in news papers.

2. Narrative – this type of writing deals with a form of writing that may be factual or fictional(imaginary)
   Examples: Novels, Plays, Short Stories, Imaginative essays
   .

3. Descriptive_ It is a writing which is written to describe a person or a thing or an incident or an event, this is most common of writing in the academics. Examples: Lessons in text book.

Business Writing (BW)

The Business Writing Skills is the ability to prepare impressive, meaningful, effective, clear and precise document such as e-mail, memos, letters, proposal and reports.
Successful professionals will always prepare precise but meaningful all types of business documents.
All type of writing should have atleast 3 paragraphs.
Introduction
Main body
Conclusion

In introduction part of letters or emails writer should give clear information and reason for writing.
In main body explanations and justifications should be given in details. This part can have more than 1 paragraph, depending upon the topic. In conclusion writer must have to give the gist of the main body, and expectation for actions/reply.

Purpose of Business Writing:

Business writing has specific goals. There are clear and fixed reasons for business writing.

Reasons for Business writing:
Convey Information:
Business Writing is very useful to distribute knowledge.
Example: Research Reports, Policy Memorandums.

Deliver News:
It is often used to share the news/events, planning for future activities inside and outside of organization.
Examples: Circulars, Quick memo, business events pamphlets.

Direct Action:
BW is used by seniors or authorized person to inform about the action, to give the order and provide guideline to implement the ideas.
Examples: CEO's, Team Leader's letter or memo for command/order.

Explain/Justify:

Business writing is suitable and useful to give justification and explanation for past failure of any activity or task or duty. Usually it is useful in complicated situations.
(Nordquist, 2018)

Types of Business Writing:

There are five major type of business writing. 1- Business Letters
2- Memorandums
3- Reports
4- Proposals
5- Case Studies
6- Emails

While preparing any type of business documents one must be precise, clear, and should write to the point. Business document does not allow the writer to waste reader's time by adding unnecessary and non-related things.

Business Letters, E-mail:

Subject in the letter must be clear and specific in not more than 1 line; message should convey to the reader what it is about, the reason and expectation for the action should be clear.

Reports, Case studies:

For preparing report or case study, writer should use direct speech, should provide evidence for the points, questions, blame etc to make it effective and reasonable/acceptable.

Proposals:

While making proposal writer should give details of his organization in an impressive way, should portrait his/company's strength in a way that leads to acceptance of the proposals.
He/she should put a light on achievements of the company in similar work, about the budget, and what company has to offer.

Memorandums:

Writer has to keep the agenda in mind while preparing the memorandum. It should precise and have only related information.

Strategies to Prepare Impressive and Effective Business Documents:

☐ Understand the audience:
While preparing business documents writer must keep his audience in mind, their level of understanding. As in corporate world/working environment we need people communicate with all group of people, who has good command over language, average command on language and below average.
Writer need to keep in about the designation of reader, educational background, and his area of specialization etc.

☐ Avoid Jargon:
While preparing business documents writer must avoid using jargon, as it's not necessary that every individual have awareness of the meaning of it.

☐ Use Active voice:
Writer should use active voice, instead of using passive voice. As it may make confusion, or it may not convey the exact message to the reader.

☐ Be Precise:
Writer should select words very carefully and precisely. Instead of making long sentence one must use short but meaningful sentence.

☐ Use 'We', not 'I':
When a document is representing the company and the individual, writer should use 'we' or 'organization'.

☐ Be Careful for Font and Style:
Avoid using complex style/cursive style, avoid using big font side. Avoid using so many colors in one document.

☐ Don't Depend on Spellchecker:
Writer should rely on spell checker as it does not correct the tenses and grammar.

☐ Review the Document:
After preparing the document check it twice, before sending it to the receiver. Use printed material to check the readability of the text and mistakes, if find so correct it in the draft and prepare the final copy.

☐ Give Full Form of the Abbreviations: When using abbreviation in the document full form must be provided at first time then second time only abbreviation can be use.

☐ Use table/graph/charts etc appropriately. And use title for each of it, to make it clear for reader that why he/she is having it in the document.

☐ Use grammar and vocabulary wisely.

☐ Check the document on other system also before sending to others, to check whether the attachment etc is showing in the same he/she is wanted to.

II.Conclusion:

By having the command over writing skills, using proper techniques for business writing one can achieve his/her professional goal as per the plan.

Hence it is necessary for the professional to work on business writing skills continuously and get fast progress in their respective field by using writing strategies as a powerful tool.

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Example: Business Writing Test: Following is the test to analyze one's basic knowledge for business communication.

A-Why should you be careful when using a computer spellchecker?

1- They only check certain words in the text.
2- You can't tell if they're correcting spelling or grammar.
3- They do not check for meaning or context of words.
4- They aren't always activated

B-When filling in an email subject field, what should you avoid?
1- Using parentheses
2- Excessive punctuation
3- Capital letters
4- Short concise phrases

C-what information should be included in the final paragraph of a letter or email?

1- Your contact details
2- The subject of the letter or email
3- More information on the topic
4- A proposal or call for action

D-If you don't know the name of someone when writing a formal letter, how should you begin the letter?

1- 'Hi there'
2- 'Dear Sir/Madam'
3- 'to whoever'
4- An address is not needed

E-Which abbreviation used before your signature means that you're signing something on behalf of someone else?

1- PP
2- CC
3- PTO
4- RSVP

(business writing skills quiz /high speed trainng)

Answers key:

A-3, B-2, C-4, D-2, E-1

INSILICO ANALYSIS OF ANTIFUNGAL EFFICACY OF CURCUMIN

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Abstract

Curcumin is one of the medicinally important phyto-ingredient present in turmeric and belongs to a class of polyphenols. Curcumin is a well known antifungal compound. In the present study, insilico analysis of antifungal efficacy of curcumin has been done by molecular docking method. Geometry of curcumin has been optimised using Gaussian 09 program, utilizing the B3LYP method and the 6-31g(d) basis set and are characterised by frequency analysis. The optimised structure of curcumin is docked with the most potential antifungal target - Glucosamine-6-phosphate synthase using Autodock tools. The binding energy is found to be -8.74 kcal/mol. The binding efficacy of curcumin with the target protein is determined by comparing the calculated binding energy (-8.74 kcal/mol) with that of an antifungal drug - Fluconazole (Diflucan) (-5.84 kcal/mol). The binding efficacy is found to be remarkable and are greater than the Fluconazole drug.

Key words: Glucosamine-6-phosphate synthase, Curcumin, antifungal, docking, binding energy.

Introduction

Medicinal plants are widely used as preventive and curative solutions against different common as well as lethal diseases in our ancient culture. Ayurveda, an ancient Indian medicinal system has therapies based on complex herbal compounds, mineral and metal substances. Among many plants, Ayurveda's golden botanical is *Curcuma longa* (Zingiberaceae family), the rhizome of which yields a golden yellow powder - turmeric, an imperative household spice of Asia (Figure 1). Curcumin (diferuloylmethane) is one of the medicinally important phyto-ingredient present in turmeric and belongs to a class of polyphenols (Figure 2).

Figure 1. *Curcuma longa*

Figure 2. The structure of curcumin.

Curcumin possesses many therapeutic properties such as anti-inflammatory, antioxidant, anticancer, antibacterial, antifungal, antimalarial and wound healing properties [1]. As a folk remedy of ancient medicinal system to current clinical trials, curcumin has though been exhausively studied and reviewed, still research on its

hidden restorative properties such as, chemopreventive, chemotherapeutic, chemosensitizing, radio sensitizing and radioprotection, are in progress at diverse angles [1]. Among the biological applications of curcumin, the antifungal properties plays a pivotal role and gains importance in current research. Several experimental studies are available to prove the antifungal efficacy of curcumin, but the theoretical studies about it are meagre [1].

In structure based virtual analysis, docking studies help us to calculate the binding efficiency and the nature of the interactions between a particular compound and the fungal target. Thus, in order to determine the binding potential of curcumin with the fungi, the current work focus on docking of curcumin with a fungal protein Glucosamine-6-phosphate synthase (GlmS), which is potential target in antimicrobial chemotherapy [2]. This enzyme catalyzes the first step in hexosamine biosynthesis, converting D-fructose-6-phosphate into D-glucosamine-6-phosphate using glutamine as the ammonia source and leads to the formation

of uridine-5-diphospho-N-acetyl-D-glucosamine, the important step of metabolic control in the biosynthesis of amino sugar containing macromolecules which is necessary for the cell wall assembly in bacteria and fungi. The inactivation of GlmS even for a short time is lethal for the fungi. In the present work, the molecular docking studies for curcumin with the GlmS was carried out to find the binding orientation of it and the number of hydrogen bonding interactions that stabilise the binding affinity.

Computational details

Ligand and Protein Preparation

Geometry of curcumin and the antifungal drug - fluconazole (Diflucan) has been optimised using Gaussian 09 program utilizing the B3LYP method and the 6-31g(d) basis set and are characterised by frequency analysis [3-5]. The crystal structure of the protein - Glucosamine-6-phosphate synthase (GlmS) was retrieved from the protein data bank (PDB ID: 2vf5). All the bound substances (ligands and co-factors) and solvent molecules were removed from the protein molecule. Docking experiments were performed for the natural products against PKnB protein using Autodock tools [6]. The Lamarckian Genetic Algorithm was used during the docking process to explore the best conformational space for the ligand. Other parameters were set as default. The ligand binding domain of target protein PKnB was predicted using the Site Finder module of Molecular Operating Environment. UCSF Chimera software [7] is used to visualize the best docked conformations and hydrogen bonding interactions.

Results and discussion

The optimized geometry of curcumin, antifungal drug - fluconazole (diflucan) and the three dimensional structure of the receptor is represented in Figure 3, 4 & 5 respectively. Curcumin which is a lead compound is found to obey the Lipinski's "Rule of Five" [8] and the details are presented in Table 1.
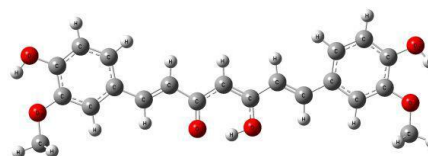
Figure 3. Optimized structure of curcumin.
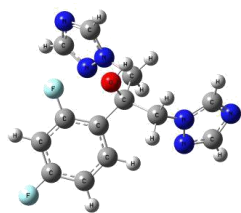
Figure 4. Optimized structure of diflucan.
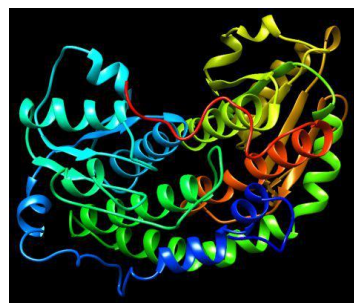
Figure 5. Optimized three dimensional structure of the target protein GlmS.

Table1. Drug-like properties of curcumin.

	Molecular Wt (g/mol)	H bond donor	H bond acceptor	Rotatable bonds
Curcumin	368.385	2	6	8

Docking calculation

Curcumin was docked with the fungal target protein (GlmS), to predict its binding energies and possible binding modes using Autodock tools. The best docked conformations were selected, visualized, and analyzed using Autodock tools and Chimera software. The interaction of the ligand with the active site residues of the target GlmS was analysed in terms of the binding energy, number of hydrogen bonds established by the ligand with residues of the active site. Autodock uses the following empirical formula to calculate the Free energy of binding,

Binding energy (ΔG) = Intermolecular energy + Vanderwaal's hydrogen bond desolvation energy + Electrostatic energy + Total internal energy + Torsional

indicates the highest ligand/protein affinity. The calculated binding energy of curcumin and the antifungal drug - diflucan were found to be -8.74 & -5.84 kcal/mol respectively. Curcumin displayed the best binding affinity with the target protein when compared to the drug - diflucan. For curcumin, the bond conformation was stabilized by strong interactions with polar and non-polar side chains of the amino acids in the binding pockets owing to the presence of hydrogen bond donors in it. It is anchored by six hydrogen bonds involving various amino acid residues of GlmS protein (Table 2). The ligand binding data of both curcumin and the antifungal drug - diflucan was given in the Table 2.

The hydrogen bonding interactions between the ligand curcumin and the protein (GlmS) was illustrated in the

The dock score of Autodock is reported in kcal/mol. The conventional anti-fungal drug Fluconazole (Diflucan) was also docked with the same target protein to deliberate the anti-fungal ability of the curcumin. The best docking score (free energy with more negative value)

Figures 6A & 6B. Similarly, the interaction between the antifungal drug - diflucan and the protein was illustrated in the Figures 7A & 7B. Thus, the greater number of stabilizing H-bonding interactions of curcumin with the target (Figure 6B), makes the molecule to possess greater binding affinity.

Table 2. Binding data of curcumin and diflucan

PARAMETER	PREDICTED VALUES	
	Curcumin	Diflucan
Binding Energy (kcal/mol)	-8.74	-5.84
Inhibitory Constant	+389.61 (nM)	+52.49 (uM)
Intermolecular Energy (kcal/mol)	-9.65	-7.26
Total Internal Energy (kcal/mol)	-2.88	-1.26
Torsional Energy (kcal/mol)	+2.98	+1.79
Electrostatic Energy (kcal/mol)	-0.18	-0.23
Unbound System Energy (kcal/mol)	-0.80	-0.90
Vanderwaal's Hydrogen Bond Desolvation Energy (kcal/mol)	-9.47	-7.03
Total number of hydrogen bonds	6	3
Interacting amino acid residues of target protein and their corresponding bond length (Å)	Ser 303, Ser 349, Ser 347, Ala 602, Gly 348, Ser 349	Cys 300, Thr 302, Ser 303
	2.705, 2.649, 2.503, 2.160, 3.416, 2.700	1.815, 3.099, 3.212

Curcumin interacted with Ser 303, Ser 349, Ser 347, Ala 602, Gly 348 of the active site of GlmS, by forming hydrogen bonds. Desolvation energy is a prime parameter that decides a molecular interaction with its pharmacodynamic target. In the biological environment, all the drug binding pockets of a target protein remain solvated and hence a ligand cannot as such occupy the active site unless it dislodges the water molecules. The

desolvation energy of curcumin is found to be greater (-9.47 kcal/mol).
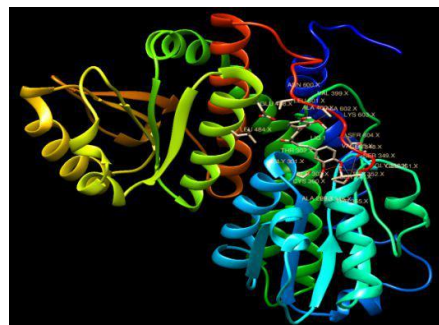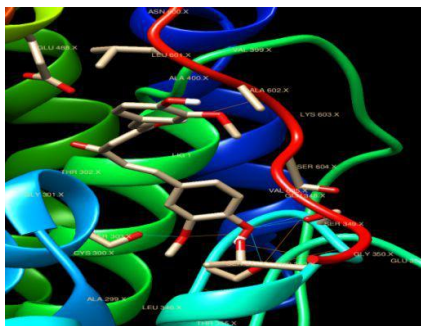
Figure 6A. Curcumin with its most likely binding conformation is docked into the binding cavity of the receptor GlmS

Figure 6B. Curcumin with its most likely binding conformation is docked into the binding cavity of the receptor GlmS and the intermolecular interactions (H-bonds) are identified.
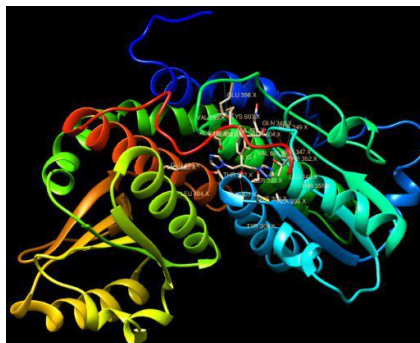
Figure 7A. Diflucan with its most likely binding conformation is docked into the binding cavity of the receptor GlmS.
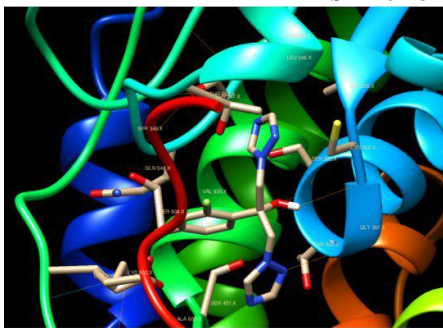
Figure 7B. Diflucan with its most likely binding conformation is docked into the binding cavity of the receptor GlmS and the intermolecular interactions (H-bonds) are identified.

Conclusion

The current insilico study explains the binding affinity of the antifungal natural compound curcumin with the fungal protein - GlmS. The binding affinity was found to be greater when compared to the antifungal drug fluconazole. The hydrogen bonding interactions are responsible the greater binding affinity of curcumin with the target protein. Thus, the present work adds a proof to the fact that, the greater antifungal activity of curcumin is due to its greater binding affinity towards the fungal protein.

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Copolymerization of N-tert-butylacrylamide with 9-Vinylcarbazol

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ABSTRACT

Copolymer of N-tert-butylacrylamide and 9-vinyl carbazole was prepared by free radical polymerization in methanol at 60°C using BPO as initiator. The copolymer was characterized by ^{1}H-NMR and ^{13}C-NMR spectroscopy. The copolymers compositions were determined by ^{1}H-NMR analysis and the reactivity ratios of the monomers were determined by Fineman-Ross and Kelen-Tudos methods. The reactivity ratios indicate the formation of random copolymer. Mean sequence lengths of copolymers are estimated from r1and r2 values. It shows that the NTB unit increases in a linear fashion in the polymer chain as the concentration of NTB increases in the monomer feed. Antimicrobial activity of NTB copolymers showed that the copolymers have high antibacterial and antifungal activity than the control for the both bacteria and fungi.

Keywords: N-tert-butylacrylamide, 9-vinylcarbazole, Copolymers Composition, Mean Sequence Length, Reactivity ratio, Antibacterial activity.

I. INTRODUCTION

The N-substituted acrylamides are used to prepare thermosensitive polymers which have great potential in applications as drug delivery system, human gene vector and biocatalysts. Antimicrobials gained interest in both academic research and industry due to their potential to provide quality and safety benefits to many materials. Contamination by microorganism is of great concern in several areas such as medical devices, health care products, water purification systems, hospital and dental equipment etc. One possible way to avoid the microbial contamination is to develop antimicrobial agents.

II. EXPERIMENTAL METHODS

^{13}C-NMR spectrum of poly (NTB-co-9-Vinyl carbazole)
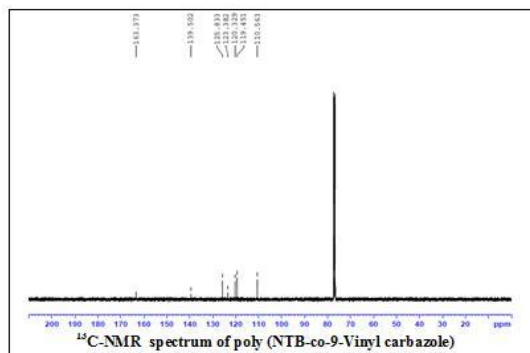
2.1. Copolymerization of N-tert-butylacrylamide (NTB) and 9-Vinyl carbazole

A total feed of 3g of monomers N-tert-butylacrylamide, 9-Vinyl carbazole and 30mg of BPO initiator were dissolved in 20ml of methanol in a standard reaction tube to obtain a homogeneous solution. The mixture was flushed with nitrogen gas. The inlet and outlet of the reaction tube was closed by means of rubber tubing's. The reaction vessel is then immersed in a thermostatic water bath maintained at 60ºC. The copolymerization reaction was allowed to proceed for an appropriate duration that would give a conversion below 10% (7hrs). After the reaction vessel was removed from the thermostat and cooled under the tap. The solution poured in ice cold double distilled water to precipitate the copolymer.

2.2. Characterization of copolymers
Copolymer of NTB with 9-Vinyl carbazole were characterized by ^{1}H-NMR & ^{13}C-NMR Spectroscopy, Thermogravimetric analysis and AntimicrobialStudies**III. RESULTS AND DISCUSSION**

3.1. Copolymerization of N-tert-butylacrylamide with 9-Vinylcarbazole

A series of poly (NTB-co-9-Vinylcarbazole) were prepared by free radical polymerization. About 3 g of total monomers were dissolved in methanol and 30mg of BPO initiator was added, and the polymerization was carried at 60°C.The prepared copolymer was washed with methanol to remove the unreacted monomer.

Schematic representation of the copolymer (NTB-co-9-Vinylcarbazole)

3.2. ^{1}H-NMR & ^{13}C-NMR Spectroscopy

^{1}H-NMR spectrum of poly (NTB-co-9-Vinylcarbazole)
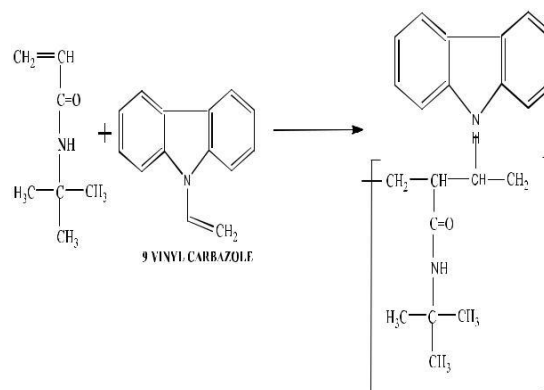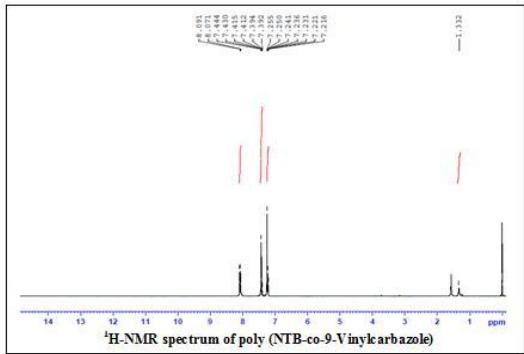
δ 132.08 (CH2 =C(H)-CO-NH…); δ 125.07 (CH2=C(H)-CO-NH..) ; δ 51.11 (-CO-NH-C(CH3)-CH2); δ 28.65 (-CO-NH-C(CH3)3-CH2-CH3); δ 126.27 (aryl 3,3^{1}carbon);
δ 120.00 (aryl 2,2 ^{1} carbon); δ 110.02 (aryl 1,1^1 carbon).

^{13}C-NMR (DMSO), δ(ppm)
3.3.Determinationofcopolymer composition of poly (NTB-co-9-Vinylcarbazole)

The copolymer composition of copolymers was determined from the intensity of aromatic proton with respect to the total intensity of all aliphatic protons. Therefore the m1 (mole fraction of 9-Vinylcarbazole in copolymer) is determined from the following equation

Fineman-Ross (FR) Plot

Kelen-Tudos plot
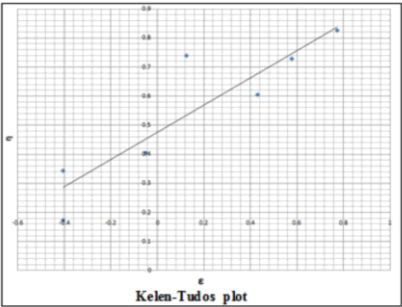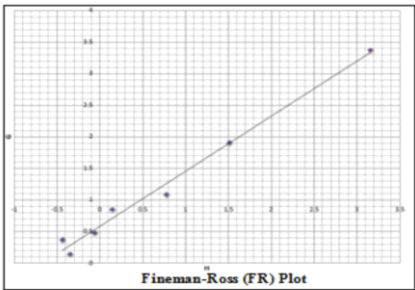
1.2 to 2.4ppm for tert-butyl protons and 7.4 to 8.0 ppm for NH protons.+ c is the ratio of the intensity of aromatic proton and   the intensity of all aliphatic protons.

Determination of reactivity ratios of poly (NTB-co-9-Vinylcarbazole)

The reactivity of the copolymers were determined by both Fineman-Ross and Kelen-Tudos Method.

Reactivity Ratios

Methods	r_1	r_2	r1:r2
Fineman-Ross(FR)	1.64	0.52	0.85
Kelen-Tudos(KT)	1.64	0.49	0.80

3.4. Thermal studies

Copolymer exhibit triple stage decomposition at 230^0C (1st), 330^0C (2nd) and 370 (3rd). The maximum weight loss occurring in stage 1 may be due to scission in amide linkage, stage 2 due to carbazole linkage and stage 3 due to ring scission. The stability of the copolymer is between 380-620^0C. The residual weight % is about 0.8.

TGDTA curves

370
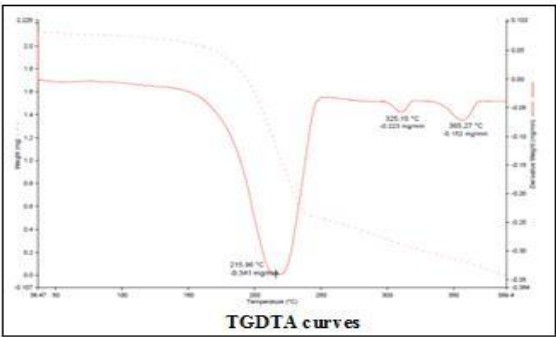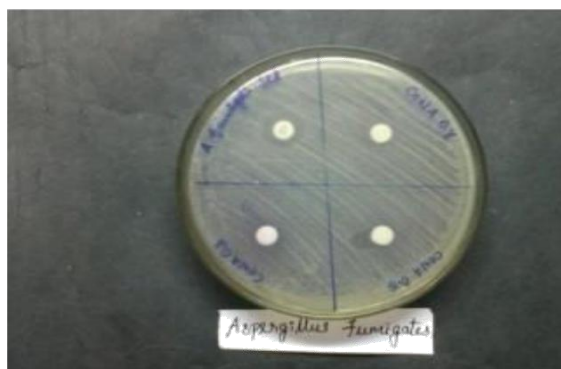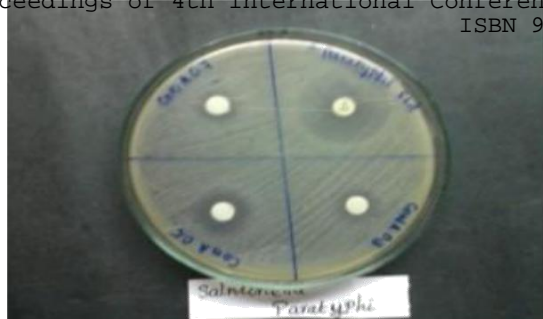
3.5. Antimicrobial Activity

The zone of inhibition reveals that the copolymer is specific to the microorganism examined. The observation on the biological assay indicates that the antimicrobial action due to N, O, groups which is of considerable chemotherapeutic interest. Copolymer has the maximum inhibition at the lowest concentration level between (62.5 - 125 μg/ml) against the microorganism *Staphylococcus aureus*, (15.625 - 31.25 μg/ml) against the microorganism *Aspergillus niger.*

polymerization in methanol at 60°C using BPO as initiator. By using the ^{1}H-NMR, ^{13}C-NMR spectroscopy, the composition reactivity ratio and mean sequence length of copolymer were determined. The formation of copolymers was studied by using Thermal Analysis. The reactivity ratio values reveal N-substituted acrylamide is more reactive than 9-Vinyl carbazole. The product of the r1 and r2 indicates the formation of random copolymerization. The determination of mean sequence lengths showed that the NTB unit increases in a linear fashion in the polymer chain as the concentration of NTB increases in the monomer feed. The thermal studies of NTB showed triple stage decomposition. Antimicrobial activity of poly (NTB-co-9-Vinyl carbazole) was carried out using fresh nutrient method. Antimicrobial activity of NTB copolymers results showed that the copolymers have high antifungal activity than the antibacterial activity. The MIC shows more active nature of copolymers

Antibacterial and Antifungal Activity of poly (NTB-co-9-Vinylcarbazole)

IV. CONCLUSIONS

Copolymer of N-tert-butylacrylamide and 9-Vinyl carbazole was prepared by free radical

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STRUCTURE AND FTIR STUDIES OF Na_2O-Bi_2O_3-B_2O_3 GLASSES DOPED WITH V_2O_5

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Abstract— Alkali oxy borate glasses are well known due to their variety of applications in phosphors, solar energy converters and in a number of electronic devices. These glasses have high mechanical strength when compared with the pure borate glasses. On the other hand heavy metal oxide (Bi_2O_3) glasses going to high refractive index such glasses exhibit non-linear effects V_2O_5 is known to have a structure composed of VO_5 pyramids. Several vanadate glasses show a semi conducting behavior with the electrical conductivity of 10^{-3} to 10^{-5} (ohm-cm) which is known to be electron transfer between V^{4+} and V^{5+} ions, existing in the structure of the glass. Further the conductivity in these glasses can be explained by a small polaron hopping theory. Further vanadium glasses are identified as n-type semiconductors for the low value of V^{4+}/V^{5+} ratio. Vanadyl ions are expected to dissolve easily in borate network virtually no devoted studies on spectroscopic studies such as FTIR on alkali bismuth borate glasses doped with V_2O_5 transition metal are available. Understanding over the influence of V_2O_5 on the structural aspects of Na_2O- Bi_2O_3- B_2O_3 a systematic study of XRD, FTIR spectra. The following composition is chosen for the present study:
10   Na_2O- (20-x)Bi_2O_3-70 B_2O_3:x V_2O_5 with x ranging from 0 to 2.0 wt%

Keywords—FTIR,XRD,Borate Glass,Vanadium,Polaron radius

Introduction

The physical properties of the glasses is of considerable importance because of the insight it gives into the fundamental process-taking place in them. Such a study paved the way for the application of some of these glasses in technology. In fact, the physical properties of the glasses are to a large extent controlled by the structure, composition, and the nature of the bonds of the glasses. The investigation of the changes in the physical properties of glasses with controlled variation of chemical composition, doping etc., is of considerable interest in the application point of view.

Materials prepared from a melt quenching are often referred to as glasses. Unlike crystals, these materials do not possess the long-range periodicity of the arrangement of the atoms. However the building block, $(AO_3^{-3}$ triangle, where A stands for metal) which is known as short-range order, is retained in the glass. These materials possess ionic as well as covalent bonding interaction.

When a liquid is cooled from high temperature, crystallization may take place at the melting point T_m. If the crystallization takes place, there will be abrupt change in the volume at T_m and if the glass formation takes place, there will be a gradual break in slope. The region over which the change of slope occurs is known as glass optical absorption transition temperature T_g. This process of changes in volume with temperature as a super cooled liquid is cooled through the glass transition temperature T_g is illustrated Fig. 1.1.

Why do certain materials readily form glasses on cooling a melt and why do only certain chemical compositions of materials have a greater glass-forming tendency? To the present day, the perfect knowledge on the answers of these questions is lacking. However, there are several factors which play a significant role in determining the ease of glass formation, for example, chemical or structural properties of the glass system, thermodynamic or free volume aspects of the materials, the average atomic coordination number etc.

The credit of first successful attempt to categorize the materials into glass formers and non-glass formers goes to Zachariasen[1]. He prepared the glasses with five oxide materials

which were the only known glass formers by themselves: SiO_2, GeO_2, B_2O_3, As_2O_3 and P_2O_5. In addition, these oxides can also form glasses when mixed up with other oxides (upto certain percentage), which were not by themselves glass formers. Basing proposed certain rules, which an oxide should obey if it has to form a glass. The latest rules afterCooper [2] objections to original rules are

    i)   A high proportion of glass network forming cations is surrounded by oxygen tetrahedra or triangles.

    ii)   The oxygen polyhedra share only corners with each other.

    iii)   Some oxygen atoms are linked to only two cations, and do not form additional bonds with any other cations.

Basing on these rules, a continuous random network for a glass can be constructed as shown in Fig. 1.2.As per these rules, the oxides of the type AO, A_2O should not form glasses, and the rules are satisfied only for oxides of the type A_2O_3, AO_2 and A_2O_5.Presence of oxides such as A^+ (example Li^+, Na^+, K^+ etc.,) A^{2+} (example Ca^{2+}, Pb^{2+}, Cd^{2+} etc.,) other than A^{3+} and A^{4+} are known as network modifiers. Li_2O, Na_2O, K_2O, PbO, CaO, ZnO, CdO etc., are some of the basic examples of modifiers in glass network. These modifiers break up the continuous network by introducing non-bridging oxygens (Fig.1.3).A third group of oxides known as intermediate class of oxides also exist which by themselves not readily form glasses but do so when mixed with other oxides; such oxides are known as intermediates. The examples of this group are TeO_2, WO_3, MoO_3, Al_2O_3, Ga_2O_3 and V_2O_5. Excellent reviews and articles on the topology of the glass by Vanvotert [3], Elliott [4], Polk [5], Ingram [6],give the useful information.

During the last few decades a large variety of inorganic glasses have been developed with an attempt to achieve suitable electrical, mechanical and optical characteristics. These characteristics are associated with the improved physical properties such as electrical resistance, mechanical strength, glass transparency, IR transmission performance and their ability to accept more transition metal/rare-earth ions as luminescent centers for their use in glass laser technology. Work along these lines was carried out on a number of glasses giving valuable information [7-11]. Investigations on the spectroscopic properties such as optical absorption, IR spectra and electron spin resonance are used as probes to throw some light on the structural aspects of the glasses.

Importance of the work

- Bismuth borate glasses are competitive alternatives as base material for 3D laser writing of colored structures

- Under a variety of excitation conditions, such glasses exhibit NIR emission in the range of 1000–1700 nm with bandwidths varying between 200 and 500 nm

- Fluorescence occurs with lifetimes of up to several hundred microseconds.

- All these glasses have been proposed as gain medium for broad band fiber amplifiers.

- In subsequent experiments, optical amplification, laser output, tunable laser operation, and all-fiber lasers were demonstrated based on Bi-doped glasses.

- More recently, Bi-doped glasses were further considered for the usage of spectral converters and planar luminescent concentrators for photovoltaic energy conversion using low-band gap semiconductors

- $75B_2O_3$-25 Bi_2O_3 glass is a good candidate for broad band optical amplification and laser material covering the wavelength from 1100 to 1300 nm Y. Q. Qiu, et.al Laser Physics 20 (2010) 2

- Na_2O-Bi_2O_3- B_2O_3 :V_2O_5 glasses have potential applications in solid state ionic devices, such as solid state batteries, fuel cells, gas sensors, electrochemical capacitors, electro chromic displays,

analog memory devices in the far infrared region.

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- Addition of V_2O_5 to Na_2O-Bi_2O_3- B_2O_3 glass matrix makes the glasses more moisture resistant and improves the physical properties of the glasses.

Physical parameters-

A digital balance of VIBRA HT direct reading balance (capacity 220gm, readability 0.0001g) was used for weighing.

Composition of the present glasses
$10Na_2O$-$(20-x)Bi_2O_3$-70 B_2O_3 –xV_2O_5 with $0 \square x \square$ 2.0 wt%.
V_0:$10Na_2O$-$20Bi_2O_3$-70 B_2O_3
V_1:$10Na_2O$-$19.5Bi_2O_3$-70 B_2O_3 –$0.5V_2O_5$
V_2:$10Na_2O$-$19.0Bi_2O_3$-70 B_2O_3 –$1.0V_2O_5$
V_3:$10Na_2O$-$18.5Bi_2O_3$-70 B_2O_3 –$1.5V_2O_5$
V_4:$10Na_2O$-$18.0Bi_2O_3$-70 B_2O_3 –$2.0V_2O_5$

EXPERMENTAL PROCEDURE

- The glasses for the present study are prepared by melt quenching technique.

- Materials used for the preparation of the present glasses were Analytical grade reagents (99.9 % pure) of *Na_2O,Bi_2O_3, B_2O_3 and V_2O_5*

- The compounds of required compositions were thoroughly mixed in an agate mortar and melted in a platinum crucible. The furnace used was a PID temperature controlled furnace .

- The glasses were melted at about 950 ^{o}C for 20 minutes till a bubble free liquid was formed.

- The resultant melt was poured on a rectangular brass mould (containing smooth polished inner surface) held at room temperature.

- The samples were subsequently annealed at 300 ^{o}C in another furnace.

- The glasses were then ground and optically polished. The approximate final dimensions of the glasses used for studying the optical properties are 1mm thickness

Physical Parameters

Sample	x (wt%)	ρ (g/cm^3) (± 0.0001)	Vm (cm^3/mole) (± 0.001)	N_i X 10^{21} (joins/cm^3) (± 0.001)	R_i (Å) (± 0.001)
V0	0	4.3442	34.096	--	--
V1	0.5	4.4040	33.323	9.037	4.8009
V2	1.0	4.3431	33.451	18.005	3.8153
V3	1.5	4.2180	34.106	26.488	3.3546
V4	2.0	4.1332	34.462	34.953	3.0584

X-Ray Diffraction-
The obtained samples are characterized by means of powder X-ray diffraction recorded with Philips Xpert system using the step-scan method with Cu-Kα radiation. A step size of 0.04^0 and a collection time of 2s per point 2θ range.
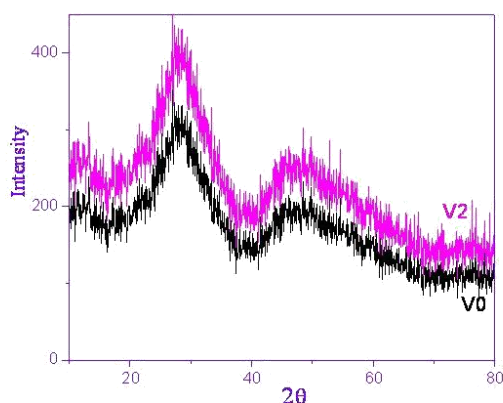
FTIR STUDIES

- The short wavelength absorption edge observed at 356.5 nm for pure (V_0) glass is shifted gradually towards higher wavelength 462.5 nm with an increase of the concentration of V_2O_5 upto 2.0 wt%.

- Interestingly, a strong absorption peak is observed at 445.5 nm for pure sample and the spectrum of 0.5 mol% of V_2O_5 doped glass is exhibited two broad absorption bands at 590.5 ($2B_2 \rightarrow 2B_1$) and 855 nm ($2B_2 \rightarrow 2E$); with increase in the concentration of V_2O_5, the peak height of these bands is observed to decrease.

- Besides such bands are red shifted to 611 and 926.5 nm respectively.

- The study of short wave length absorption edge is a useful method for the investigation of optically induced electronic transitions and provides the information about the band structure and energy gap in both crystalline and non crystalline materials

- The absorption band of vanadyl free sample and its brownish colour clearly emphasis the existence of some thermal reduced of Bi^{3+} ions into lower valence states in the glass network.

- The decrease in characteristic optical band intensities with increase in concentration of V_2O_5 is suggesting that the oxidation of V^{4+} state into V^{5+} state.

- The decrease in optical band gap and Urbach energy with increase in V_2O_5 concentration indicates the decrease in the insulating strength due to increase of modifying nature of vanadium ions. The above said result supported by the increase

in Λth which decreases the covalent nature of the network with increase in V_2O_5 concentration
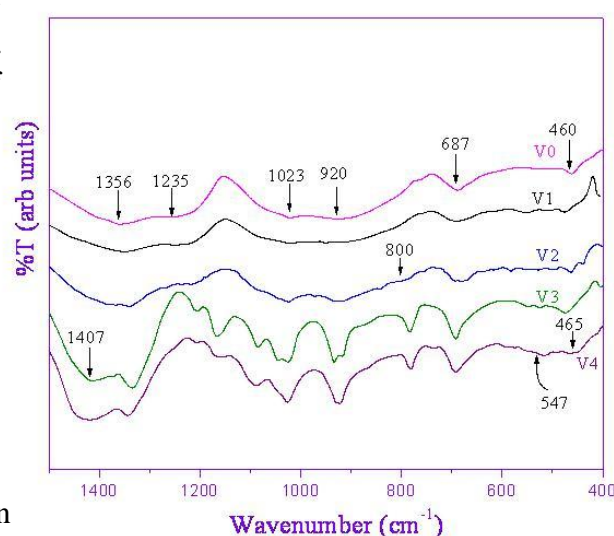
- The spectra exhibited three conventional broad bands originated from borate groups at about 1356 cm^{-1} (due to BO_3 units), 1023 cm^{-1} due to BO_4 units and at 687 cm^{-1} due to bending vibrations of B–O–B linkages.

- These broad bands are the result of convolution of individual bands with each other. In the spectrum of pure (V_2O_5 free, V_0) sample a feeble band is appeared at 460 Cm^{-1}.
- With the doping of V_2O_5 a small new band at 553 cm^{-1} is appeared and is broadened with increase in concentration of V_2O_5.
- With increasing in the concentration of V_2O_5, the intensity of the bands at around 1356 cm^{-1} is increased and red shifted as the expense of BO_4 vibrational units and at higher concentrations new bands around 1385 and 800 cm^{-1} are formed.
- With increase in V_2O_5concentrationBO_4 units are converted into BO_3 units and also the signal intensity of BiO_6 units is increased.
- At higher concentrations of V_2O_5 a clear band corresponds to V-O-V bending and V=O stretching vibrations are resolved along with a new band around 1400 cm^{-1} due to the formation of non bridging oxygens.
- The increase inV_2O_5content in the present glass system enhances the octahedral structural units of $[BiO_6]$ and $[VO_6]$ groups. It clearly indicates that the bismuth as well as vanadyl ions act as modifiers in the present glass network at higher concentrations.

CONCLUSIONS

Summing up the results on the spectroscopic studies of Na_2O-Bi_2O_3-B_2O_3: V_2O_5glasses concludes that the rigidity/insulating strength of glass network is decreasing due to increase of VO_6,BiO_6 octahedral structural units and non bridging oxygens in the network.

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I.

A.

A REVIEW ON APPLICATIONS OF GRAPH ISOMORPHISM AND DOMINATING SET

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ABSTRACT

The paper concentrates on the domination in graphs with application during a graph G = (V, E), S ⊆ V could be a dominating set of G if each vertex is either in S or joined by a grip to some vertex in S. many various kindsof domination are researched extensively this paper explores applications of dominating sets.

Graphs are thought of as a superb modeling tool that is employed to model several sort of relations amongst any physical scenario. This Paper explores totally different ideas concerned in graph theory and their applications in engineering, chemical science etc to demonstrate the utility of graph theory

Key words: Graph isomorphism, Dominating set,Isomers

I.INTRODUCTION

Graph theory may be a branch of distinct arithmetic.
In arithmetic and technology graph theory is that the study of graphs that are mathematical structures wont to model try wise relations between objects. There's wide use of graphs in providing drawback finding techniques in1977 Cockayne and Hedetniemi created a noteworthy and in depth survey of the results apprehend at that point regarding dominating sets in graphs. Graph theory is one in every of the foremost

flourishing branches of recent arithmetic and pc applications. It's a awfully big selection of applications to several fields like engineering,physical,social and chemical sciences etc.

Graph Theory – Isomorphism: A graph can exist in different forms having the same number of vertices, edges, and also the same edge connectivity. Such graphs are called isomorphic graphs.

In graph theory , a dominating set for a graph = (,) is a subset D of V such that every vertex not in D is adjacent to at least one member of D

2.APPLICATION IN CHEMICAL SCIENCE

Organic chemistry is one of the sources of graph theory. By using graph isomorphism[5] we can identify

FIGURE-1

$$CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - CH_3$$
Hexane

$$CH_3 - CH - CH_2 - CH_2 - CH_3$$
$$CH_3$$
2-Methyl pentane

$$CH_3 - CH_2 - CH - CH_2 - CH_3$$
$$CH_3$$
3- Methyl pentane

$$CH_3$$
$$CH_3 - C - CH_2 - CH_3$$
$$CH_3$$
2,2 - Dimethylbutane

$$CH_3 - CH - CH - CH_3$$
$$CH_3 \quad CH_3$$
2,3- Dimethyl butane

Isomers of organic compounds like Hexane ($_6$ $_{14}$), Heptane ($_7$ $_{16}$) [4]

These can be identified by graph isomorphism

Hexane consists of five isomers, since these are the only five possible non-isomorphic structures which shows in figure-1
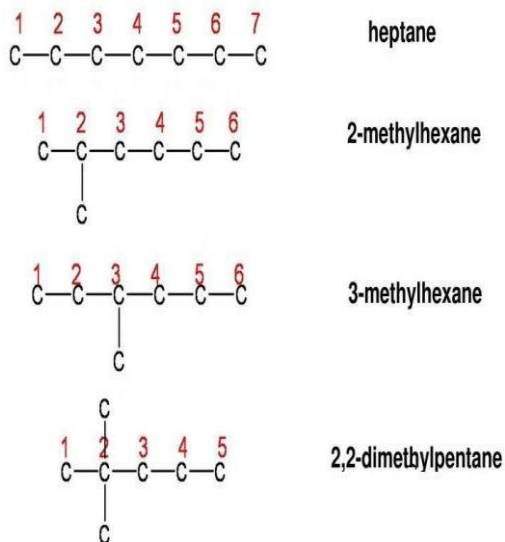
FIGURE-2

Heptane consists of five isomers, since these are the only five possible non-isomorphic structures shown in figure-2 and figure-3
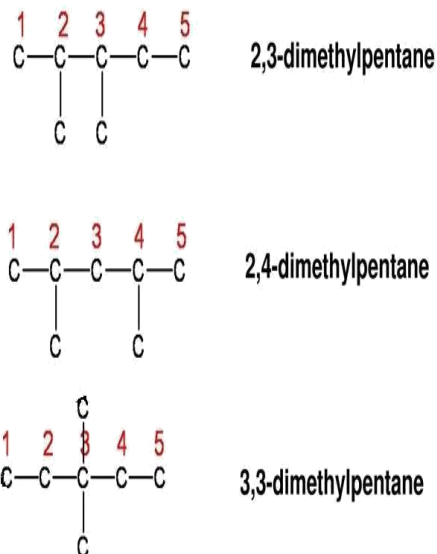
FIGURE-3

3.Applications of Domination in Graph

FIGURE-4

380
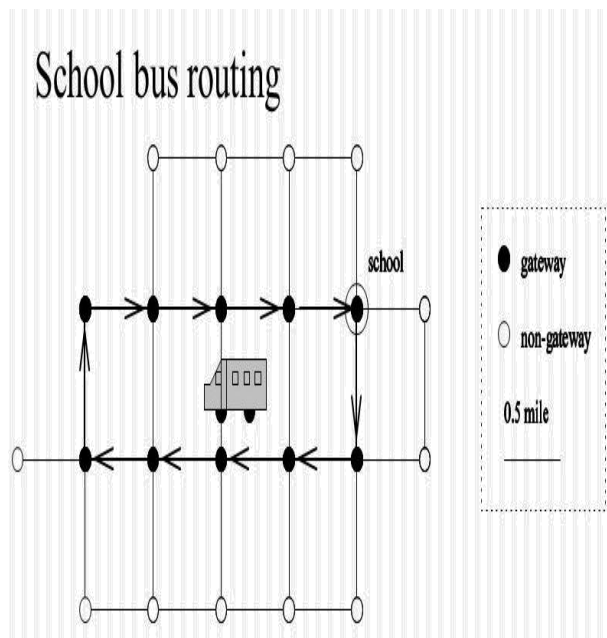
Domination in graphs has applications to many fields. Domination arises in facility location issues, wherever the quantity of facilities (e.g., hospitals, fireplace stations) is fastened and one makes an attempt to attenuate the gap that someone has to jaunt get to the nearest facility. An analogous drawback happens once the utmost distance to a fality is fastened and one makes an attempt to attenuate the quantity of facilities necessary so everyone low set of processors that are near that we are going to tolerate at the most a 2 unit delay betweenthe time a processor sends its info and also the time it arrives at a close-by collector. During this case we tend to obtain a distance-2 dominating set among the set of all processors seems to be serviceable [2].

3.1 School Bus Routing:

Most faculty within the country give faculty operate belowbound rulesOne in all that sometimes states that no kid shall leave, No bus ride will take over some nominal range of minutes and limits on the quantity of kids that a bus will carry at any one time.[1]Let us assume that the varsity has determined that no kid shall must walk over 0.5 mile so as to be picked up by a faculty bus. Construct a route for a faculty bus that leaves the varsity, gets at intervals 0.5 mile of each kid and returns to the varsity.[1].We consider an example of bus routing which shown in the figure-4

3.2 Computer Communication Networks:

Consider a electronic network sculptural by a graph G = (V, E), that vertices represents computers and edges represent direct links between pairs of computers. Let the vertices in following figure represent associate degree array, or network, of sixteen computers, or processors. Every processor to that it's directly connected. Assume that

from time to time we want to gather info from all processors. We tend to try this by having every processor route its info to 1 of atiny low set of grouping processors (a dominating set). Since this should be done comparatively quickly, we tend to cannot route this info over too long a path. Therefore we tend to determine atiny

III. Conclusion

The main aim of this paper is to review the importance of graph theoretical ideas in numerous areas of Science & engineering for analysises that they will use Domination and isomorphism in graph theoretical ideas for the research. Once reviewing this paper, we have a tendency to project particularly on the thought of applications in graph theory. Therefore, the graph theory section of every paper is given importance to universe application. This analysis is utilized within the revered fields of graph theory and Researches could get some data associated with graph theory and its applications in numerous fields.

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THE EFFECT OF RADIALLY VARYING MHD AND MASS TRANSFER ON PERISTALTIC FLOW OF WILLIAMSON FLUID IN A VERTICAL ANNULUS

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Abstract

In the present paper, we have investigated the influence of the effects of radially varying MHD and mass transfer on peristaltic flow of Williamson fluid model in a vertical annulus. The governing equations of Williamson fluid model are simplified using the assumptions of long wavelength and low Reynold's number. An approximated analytical solution has been derived for velocity field using Perturbation method. The expressions for pressure rise are calculated using numerical integration. The graphical results are presented to interpret various physical parameters.

Keywords
Peristaltic flow, Williamson fluid, Annulus, Perturbation solution, MHD.

I. INTRODUCTION

The study of peristaltic transport has enjoyed increased interest from investigators in several engineering disciplines. From a mechanical point of view, peristalsis offers the opportunity of constructing pumps in which the transported medium does not come in direct contact with any moving parts such as valves, plungers, and rotors. This could be of great benefit in cases where the medium is either highly abrasive or decomposable under stress. This has led to the development of fingers and roller pumps which work according to the principle of peristalsis. Applications include dialysis machines, open-heart bypass pump machines, and infusion pumps. After the first investigation reported by Latham [1], several theoretical and experimental investigations [2–6] about the peristaltic flow of Newtonian and non-Newtonian fluids have been made under different conditions with reference to physiological and mechanical situations.

The peristaltic transport of magnetohydrodynamic (MHD) flow of a fluid in a channel is of interest in connection with certain problems of the movement of conductive physiological fluids, e.g., the blood, blood pump machines and with the need for experimental as well as theoretical research on the operation of a peristaltic MHD compressor. Effect of a moving magnetic field on blood flow was investigated by Sud et al. [7], and they observed that the effect of suitable moving magnetic field accelerates the speed of blood. Agrawal and Anwaruddin[8] developed a mathematical model of MHD flow of blood through an equally branched channel with flexible walls executing peristaltic waves using long wave length approximation method and observed, for the flow blood in arteries with arterial disease like arterial stenosis or arteriosclerosis, that the influence of magnetic field may be utilized as a blood pump in carrying out cardiac operations. The principle of magnetic field is successfully applied to Magnetic Resonance Imaging (MRI) when a patient under goes in a height static magnetic field. Abbasi et al.[9] developed a mathematical model on peristaltic transport of MHD fluid by considering variable viscosity. Moreover, the influence of magnetic field on peristaltic flow of a Casson fluid in an asymmetric channel was studied by Akbar[10] who has also investigated the characteristics of fluid flow in tabular harmonizes by considering long wave length and low Reynolds number approximations [11]. Mahmoud [12] et al. have also examined Effect of porous media and magnetic field on peristaltic transport of a Jeffrey fluid in an asymmetric channel..

The peristalsis in the presence of heat transfer is imperative in many processes as oxygenation and

hemodialysis. Heat transfer is also significant in the treatment of diseased tissues in cancer. Furthermore, the human lungs, bile duct and gall bladder have stones that behave like natural porous media. Also, keeping in mind the pathological situations, the distribution of fatty cholesterol and artery clogging blood clots in the coronary artery may be considered as the domains of porous medium. The magnetohydrodynamic peristaltic flow in a channel has a pivotal role in the motion of physiological fluids including blood and blood pump machines. Mass transfer in peristaltic flow occurs during the chemical breakdown of food, amalgamation of gastric juices with food and in other digestion processes. Motivated by these facts, Akbar[13] has carried out the influence of magnetic field on flow and heat transfer of a carbon nanotube induced by peristaltic waves and observed that with the increase of solid volume fraction of the nanoparticles and heat absorption parameter, the temperature profile increases significantly and also different authors have investigated the influence of heat transfer and magnetic field on the peristaltic transport of Newtonian fluid and Non-Newtonian fluids with different geometries from[14-20].Recently, few attempts have been made in the peristaltic literature to study the combined effects of heat and mass transfer. Eldabe et al. [21] analyzed the mixed convective heat and mass transfer in a non-Newtonian fluid at a peristaltic surface with temperature-dependent viscosity. The influence of heat and mass transfer on MHD peristaltic flow through a porous space with compliant walls was studied by Srinivas and Kothandapani [22]. The effects of elasticity of the flexible walls on the peristaltic transport of viscous fluid with heat transfer in a two-dimensional uniform channel have been investigated by Srinivas and Kothandapani [23]. Ogulu [24] examined heat and mass transfer of blood under the influence of a uniform magnetic field.

Very recently, S.Nadeem and Noreen Akbar[25] have investigated the effects of heat and mass transfer peristaltic flow of Williamson model in a vertical annulus. The main aim of the present study is to provide an analytical solution for the peristaltic flow of a non-Newtonian fluid under long wavelength and low Reynold's number considerations. The governing equations are constituted for Williamson fluid with radially varying. Exact solutions have been calculated for energy and equation of concentration and also analytical solution has been presented for velocity profile. At the end of the article graphical results have been presented for various parameter of interest.

II. MATHEMATICAL FORMULATION
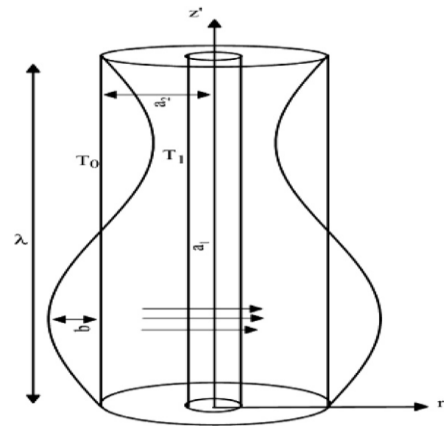
FIG.1. GEOMETRY OF THE PROBLEM.

For an incompressible fluid the balance of mass and momentum are given by

$$div\, V = 0 \qquad (1)$$

$$\rho \frac{dV}{dt} = div\, S + \rho f \qquad (2)$$

where ρ is the density, V is the velocity vector, S is the Cauchy stress tensor, f represents the specific body force and $\frac{d}{dt}$ represents the material time derivative. The constitutive equation is given by

$$S = -PI + \tau \qquad (3)$$

$$\tau = -\left[\eta_\infty + (\eta_o + \eta_\infty)(1 - \Gamma\bar{\dot\gamma})^{-1}\right]\bar{\dot\gamma} \qquad (4)$$

in which $-PI$ is the spherical part of the stress due to constraint of incompressibility , τ is the extra stress tensor, η_∞ is the infinite shear rate viscosity, η_0 is the zero rate viscosity, Γ is the time constant ,and $\bar{\dot\gamma}$ is defined as

$$\bar{\dot\gamma} = \sqrt{\frac{1}{2}\sum_i\sum_j \bar{\dot\gamma}_{ij}\bar{\dot\gamma}_{ji}} = \sqrt{\frac{1}{2}\pi} \qquad (5)$$

$$\tau = -\eta_o\left|(1 - \Gamma\bar{\dot\gamma})^{-1}\right|\bar{\dot\gamma} = -\eta_o\left|(1 - \Gamma\bar{\dot\gamma})\right|\bar{\dot\gamma} \qquad (6)$$

The peristaltic transport of an incompressible Williamson fluid with radially varying MHD in a vertical annulus is considered. The inner tube is rigid and maintained at temperature $\bar{T}_1$, the outer tube has a sinusoidal wave travelling down its walls and maintained at temperature $\bar{T}_o$.

The geometry of the wall surface is defined as

$$\bar{R}_1 = a_1 \qquad (7)$$

$$\bar{R}_2 = a_2 + b\sin\frac{2\pi}{\lambda}(\bar{Z} - c\bar{t}) \qquad (8)$$

where a_1 is the radius of the inner tube, a_2 is the radius of the outer tube at inlet, b is the wave amplitude , λ is the wavelength, c the wave speed and $\bar{t}$ the time.

The governing equations in the fixed frame for an incompressible Williamson fluid model are given as

$$\frac{\partial \overline{U}}{\partial \overline{R}} + \frac{\overline{U}}{\overline{R}} + \frac{\partial \overline{W}}{\partial \overline{Z}} = 0 \quad (9)$$

$$\rho \left(\frac{\partial}{\partial \overline{t}} + \overline{U}\frac{\partial}{\partial \overline{R}} + \overline{W}\frac{\partial}{\partial \overline{Z}} \right)\overline{U} = -\frac{\partial \overline{P}}{\partial \overline{R}} - \frac{1}{\overline{R}}\frac{\partial}{\partial \overline{R}}\left(\overline{R}\overline{S}_{\overline{R}\overline{R}} \right)$$

$$- \frac{\partial}{\partial \overline{Z}}\left(\overline{S}_{\overline{R}\overline{Z}} \right) - \frac{\overline{S}_{\overline{\theta}\overline{\theta}}}{\overline{R}}$$

(10)

$$\rho \left(\frac{\partial}{\partial \overline{t}} + \overline{U}\frac{\partial}{\partial \overline{R}} + \overline{W}\frac{\partial}{\partial \overline{Z}} \right)\overline{W} = -\frac{\partial \overline{P}}{\partial \overline{Z}} - \frac{1}{\overline{R}}\frac{\partial}{\partial \overline{R}}\left(\overline{R}\overline{S}_{\overline{R}\overline{Z}} \right)$$

$$- \frac{\partial}{\partial \overline{Z}}\left(\overline{S}_{\overline{Z}\overline{Z}} \right) + \rho g \alpha \left(\overline{T} - \overline{T}_o \right) + \rho g \alpha \left(\overline{C} - \overline{C}_o \right)$$

$$- \overline{B}_o^2 \overline{r}\left(J + c \right)$$

(11)

the energy equation in absence of dissipation terms and the concentration equation are defined as

$$\rho c_p \left(\frac{\partial}{\partial \overline{t}} + \overline{U}\frac{\partial}{\partial \overline{R}} + \overline{W}\frac{\partial}{\partial \overline{Z}} \right)\overline{T}$$

$$= k \left(\frac{\partial^2 \overline{T}}{\partial \overline{R}^2} + \frac{1}{\overline{R}}\frac{\partial \overline{T}}{\partial \overline{R}} + \frac{\partial^2 \overline{T}}{\partial \overline{Z}^2} \right)$$

(12)

$$\left(\frac{\partial}{\partial \overline{t}} + \overline{U}\frac{\partial}{\partial \overline{R}} + \overline{W}\frac{\partial}{\partial \overline{Z}} \right)\overline{C} = D \left(\frac{\partial^2 \overline{C}}{\partial \overline{R}^2} + \frac{1}{\overline{R}}\frac{\partial \overline{C}}{\partial \overline{R}} + \frac{\partial^2 \overline{C}}{\partial \overline{Z}^2} \right)$$

$$+ \frac{DK_T}{T_m} \left(\frac{\partial^2 \overline{T}}{\partial \overline{R}^2} + \frac{1}{\overline{R}}\frac{\partial \overline{T}}{\partial \overline{R}} + \frac{\partial^2 \overline{T}}{\partial \overline{Z}^2} \right)$$

(13)

In In the above equations, $\overline{P}$ is the pressure, $\overline{U}, \overline{W}$ are the respective velocity components in the radial and axial directions respectively, $\overline{T}$ is the temperature, $\overline{C}$ is the concentration of fluid , ρ is the density , k denotes the thermal conductivity, c_p is the specific heat at constant pressure T_m is the temperature of the medium, D is the coefficient of mass diffusivity, K_T is the thermal diffusion ratio.

In the fixed coordinates $(\overline{R}, \overline{Z})$, the flow between the two tubes is unsteady .It becomes steady in a wave frame $(\overline{r}, \overline{z})$ moving with the same speed as the wave moves in the $\overline{Z}-$ direction. The transformations between the two frames are

$$\overline{r} = \overline{R}, \quad \overline{z} = \overline{Z} - c\overline{t},$$
$$\overline{u} = \overline{U}, \quad \overline{w} = \overline{W} - c,$$

(14)

where $\overline{u}$ and $\overline{w}$ are the velocities in the wave frame. The appropriate boundary conditions in the wave frame are of the following form $\overline{w} = -1$ at $\overline{r} = \overline{r}_1$

$$\overline{w} = -1 \qquad \text{at } \overline{r} = \overline{r}_2$$
$$\overline{T} = \overline{T}_o \qquad \text{at} \qquad \overline{r} = \overline{r}_1$$
$$\overline{T} = \overline{T}_1 \qquad \text{at} \qquad \overline{r} = \overline{r}_2$$
$$\overline{C} = \overline{C}_0 \qquad \text{at} \qquad \overline{r} = \overline{r}_1$$
$$\overline{C} = \overline{C}_1 \quad \text{at } \overline{r} = \overline{r}_2$$

(15)

we introduce the non-dimensional variables

$$R = \frac{\overline{R}}{a_2}, \quad r = \frac{\overline{r}}{a_2}, \quad Z = \frac{\overline{Z}}{\lambda}, \quad z = \frac{\overline{z}}{\lambda},$$

$$W = \frac{\overline{W}}{c}, \quad w = \frac{\overline{w}}{c}, \dot{\gamma} = \frac{a_2}{c}\overline{\dot{\gamma}},$$

$$U = \frac{\lambda \overline{U}}{a_2 c}, \quad u = \frac{\lambda \overline{u}}{a_2 c}, P = \frac{a_2^2 \overline{P}}{c\lambda \mu},$$

$$\theta = \frac{\left(\overline{T} - \overline{T}_1 \right)}{\left(\overline{T}_o - \overline{T}_1 \right)}, t = \frac{c\overline{t}}{\lambda}, \delta = \frac{a_2}{\lambda},$$

$$\text{Re} = \frac{\rho c a_2}{\mu}, S = \frac{a_2 \overline{S}}{c\mu}, r_1 = \frac{\overline{r}_1}{a_2} = \varepsilon,$$

$$r_2 = \frac{\overline{r}_2}{a_2} = 1 + \varphi \sin(2\pi z),$$

$$\beta = \frac{Q_o a_2^2}{k\left(\overline{T}_1 - \overline{T}_o \right)}, Gr = \frac{g\alpha a_2^3 \left(\overline{T}_1 - \overline{T}_o \right)}{\upsilon^2},$$

$$Br = \frac{\alpha g a^3 \left(\overline{C}_1 - \overline{C}_o \right)}{\upsilon^2},$$

$$Sr = \frac{\rho DK_T \left(\overline{T}_o - \overline{T}_1 \right)}{\mu T_m \left(\overline{C}_o - \overline{C}_1 \right)}, Sc = \frac{\mu}{D\rho},$$

$$\sigma = \frac{\left(\overline{C} - \overline{C}_1 \right)}{\left(\overline{C}_o - \overline{C}_1 \right)}, \varphi = \frac{b}{a_2}, M(r) = B_o(r)\sqrt{\frac{\sigma}{\mu}}a_2$$

(16)

Making use of (14) and (16),(9) to (13) take the form

$$\frac{\partial u}{\partial r} + \frac{u}{r} + \frac{\partial w}{\partial z} = 0 \qquad (17)$$

$$\text{Re } \delta^3\left(u\frac{\partial}{\partial r}+w\frac{\partial}{\partial z}\right)u = -\frac{\partial P}{\partial r}-\frac{\delta}{r}\frac{\partial}{\partial r}(r\tau_{rr})-\delta^2\frac{\partial}{\partial z}(\tau_{rz})$$

(18)

$$\text{Re } \delta\left(u\frac{\partial}{\partial r}+w\frac{\partial}{\partial z}\right)w = -\frac{\partial P}{\partial z}-\frac{1}{r}\frac{\partial}{\partial r}(r\tau_{rz})-\delta\frac{\partial}{\partial z}(\tau_{zz})+G_r\theta+B_r\sigma-(M(r))^2(w+1)$$

(19)

$$\text{Re } \delta\Pr\left(u\frac{\partial}{\partial r}+w\frac{\partial}{\partial z}\right)\theta = \frac{\partial^2\theta}{\partial r^2}+\frac{1}{r}\frac{\partial\theta}{\partial r}+\delta^2\frac{\partial^2\theta}{\partial z^2}+\beta$$

(20)

$$\text{Re } \delta\left(u\frac{\partial}{\partial r}+w\frac{\partial}{\partial z}\right)\sigma = \frac{1}{S_c}\left(\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial\sigma}{\partial r}\right)+\delta^2\frac{\partial^2\sigma}{\partial z^2}\right)+S_r\left(\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial\theta}{\partial r}\right)+\delta^2\frac{\partial^2\theta}{\partial z^2}\right)$$

(21)

where

$$\tau_{rr} = -2\delta[1+We\dot\gamma]\frac{\partial u}{\partial r}$$

$$\tau_{rz} = -[1+We\dot\gamma]\left(\frac{\partial u}{\partial r}\delta^2+\frac{\partial w}{\partial r}\right)$$

$$\tau_{zz} = -2\delta[1+We\dot\gamma]\delta\frac{\partial w}{\partial z}$$

$$\dot\gamma = \left[2\delta^2\left(\frac{\partial u}{\partial r}\right)^2+\left(\frac{\partial u}{\partial z}\delta^2+\frac{\partial w}{\partial r}\right)^2+2\delta^2\left(\frac{\partial w}{\partial z}\right)^2\right]^{\frac{1}{2}}$$

in which δ, Re, We represent the wave, Reynolds and Weissenberg numbers, respectively. Under the assumptions of long wavelength $\delta<<1$ and low Reynolds number, neglecting the terms of order δ and higher ,(18)-(21) and boundary condition (15) take the form

$$\frac{\partial P}{\partial r}=0 \quad (22)$$

$$\frac{\partial P}{\partial z} = \frac{1}{r}\frac{\partial}{\partial r}\left[r\left(1+We\frac{\partial w}{\partial r}\right)\frac{\partial w}{\partial r}\right]+G_r\theta+$$
$$B_r\sigma-(M(r))^2(w+1)$$

(23)

$$0 = \frac{\partial^2\theta}{\partial r^2}+\frac{1}{r}\frac{\partial\theta}{\partial r}+\beta$$

(24)

$$0 = \frac{1}{Sc}\left(\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial\sigma}{\partial r}\right)\right)+Sc\left(\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial\theta}{\partial r}\right)\right)(25)$$

$$w=-1 \text{ at } r=r_1=\varepsilon$$

$$w=-1 \text{ at } r=r_2=1+\phi\sin(2\pi z)$$

$\theta=1$ at $r=r_1$

$\theta=0$ at $r=r_2$

$\sigma=1$ at $r=r_1$

$\sigma=0$ at $r=r_2$

(26)

In the forthcoming analysis variable set $M(r)=\dfrac{M}{r}$

where is the M is the Hartmann number, Sr is the Soret number, Sc Schmidt number, Br is the local concentration Grashof number , μ is the viscosity of the fluid , r_2 dimensionless form of radius of outer tube , ϕ amplitude ratio and Gr is the local temperature Grashof number.

III. PERTURBATION SOLUTION

Solving (24) and (25) subject to the boundary conditions (26), we obtain the expression for temperature and concentration field as follows

$$\theta(r,z)=\frac{1}{a_{11}}\left(a_{12}\ln(r)+a_{13}r^2+a_{14}\right)$$

(27)

$$\sigma(r,z)=-\frac{S_rS_c}{a_{11}}\left(a_{12}\ln(r)+a_{13}r^2+a_{14}\right)+a_{17}\ln r+a_{18}$$

(28)

To get the solution of (23) we employ the regular perturbation to find the solution. For perturbation solution, we expand w, F and P as

$$w = w_0+We\,w_1+O(We^2)$$

(29)

$$F = F_0+We\,F_1+O(We^2)$$

(30)

$$P = P_0+We\,P_1+O(We^2)$$

(31)

The perturbation results for small parameter We, satisfying the conditions (26) for velocity and pressure gradient can be written as

$$w(r,z)=c_1r^M+c_2r^{-M}+\frac{dp_o}{dz}a_{39}r^2+a_{35}r^2\ln(r)+a_{36}r^2+a_{37}r^4-1+$$
$$c_3r^M+c_4r^{-M}+\frac{dp_1}{dz}a_{39}r^2-(y_{P_{13}})_r-(y_{P_{14}})_r$$

$$\frac{dp}{dz}=r_2^2\left(\frac{-1}{L_2}\right)F+L_{13}$$

where

$$a_{11}=4(\ln(r_1)-\ln(r_2)), a_{12}=4+\beta(r_1^2-r_2^2) ,$$

$$a_{13}=\beta(\ln(r_2)-\ln(r_1)),$$

$$a_{14}=\beta(r_2^2\ln(r_1)-r_1^2\ln(r_2))-4\ln(r_2),$$

$$a_{15}=-\frac{SrSc}{a_{11}}(a_{12}\ln(r_1)+a_{13}r_1^2+a_{14}),$$

$$a_{16} = -\frac{SrSc}{a_{11}}\left(a_{12}\ln(r_2) + a_{13}r_2^2 + a_{14}\right),$$

$$a_{17} = \frac{1 - a_{15} - a_{16}}{\ln(r_1) - \ln(r_2)}, a_{18} = 1 - a_{15} - a_{17}\ln(r_1)$$

$$a_{19} = \frac{(Gr a_{13})}{a_{11}(16 - M^2)}, \quad a_{20} = \frac{(Gr a_{14})}{a_{11}(4 - M^2)},$$

$$a_{21} = \frac{-4a_{18}}{4 - M^2}, a_{22} = a_{21} + a_{20},$$

$$a_{23} = \frac{-BrSrSc}{a_{11}}, a_{24} = \frac{a_{12}}{(4 - M^2)}, a_{25} = \frac{-4a_{12}}{(4 - M^2)^2},$$

$$a_{26} = \frac{a_{13}}{16 - M^2}, a_{27} = \frac{a_{14}}{4 - M^2},$$

$$a_{28} = \frac{Br a_{17}}{4 - M^2}, a_{29} = \frac{-4 Br a_{17}}{(4 - M^2)^2}, a_{30} = \frac{Br a_{18}}{4 - M^2},$$

$$a_{31} = a_{23} + a_{24}, a_{32} = a_{31} + a_{28},$$

$$a_{33} = a_{23}(a_{25} + a_{27}) + (a_{29} + a_{30}), a_{34} = a_{23}a_{26},$$

$$a_{35} = -(a_{18} + a_{32}), a_{36} = -(a_{19} + a_{34}),$$

$$a_{37} = -(a_{19} + a_{34}), a_{38} = a_{35} + 2a_{36}, a_{39} = \frac{1}{4 - M^2},$$

$$a_{40} = M(M - 1)c_1, a_{41} = M(M + 1)c_2,$$

$$a_{42} = \frac{a_{12}}{a_{11}}, a_{43} = \frac{5a_{13}}{a_{11}}, \quad a_{44} = 3a_{14} + a_{12},$$

$$a_{45} = a_{41} + 2a_{12}, a_{46} = a_{39}a_{12}a_{63}, \quad a_{47} = a_{40}a_{12}a_{63},$$

$$a_{48} = 2a_{38}a_{12}a_{63}, \quad\quad a_{49} = a_{35}a_{12}a_{63},$$

$$a_{50} = 2a_{36}a_{12}a_{63}, a_{51} = 12a_{37}a_{12}a_{63}, a_{52} = a_{13}a_{39}a_{63},$$

$$a_{53} = a_{40}a_{13}a_{63}, a_{54} = 2a_{13}a_{38}a_{63}, a_{55} = a_{13}a_{35}a_{63},$$

$$a_{56} = 2a_{36}a_{13}a_{63}, a_{57} = 12a_{37}a_{13}a_{63}, a_{58} = a_{14}a_{39}a_{63},$$

$$a_{59} = a_{14}a_{40}a_{63}, a_{60} = a_{14}a_{38}, a_{61} = a_{14}a_{35},$$

$$a_{62} = 2a_{36}a_{14}, \quad a_{63} = \frac{1}{a_{11}}, \quad a_{64} = 12a_{37}a_{14}$$

$$w_o = c_1 r^M + c_2 r^{-M} + \frac{dp_o}{dz}a_{39}r^2 + a_{35}r^2\log(r) + a_{36}r^2$$

$$+ a_{37}r^4 - 1$$

$$c_{21} = r_2^{-M}r_1^M - r_1^{-M}r_2^M, c_{22} = (r_1^2 r_2^M - r_2^2 r_1^M)a_{39},$$

$$c_{23} = a_{35}(r_1^2 r_2^M \log(r_1) - r_2^2 r_1^M \log(r_2)) + a_{36}(r_1^2 r_2^M - r_2^2 r_1^M) + a_{37}(r_1^4 r_2^M - r_2^4 r_1^M),$$

$$c_2 = \frac{1}{c_{21}}\left(\frac{dp_o}{dz}c_{22} + c_{23}\right),$$

$$c_1 = -r_1^{(-M)}\left(c_2 r_1^{-M} + \frac{dp_o}{dz}a_{39}r_1^2 + a_{35}r_1^2\log(r_1)\right) + a_{36}r_1^2 + a_{37}r_1^4$$

$$c_{41} = r_2^{-M}r_1^M - r_1^{-M}r_2^M, c_{42} = (r_1^2 r_2^M - r_2^2 r_1^M),$$

$$c_4 = \frac{1}{c_{41}}\begin{pmatrix} c_{42}\dfrac{dp_1}{dz}a_{39} - r_2^M y_{p_{13}r_1} - r_1^M y_{p_{13}r_2} \\ -r_2^M y_{p_{14}r_1} - r_1^M y_{p_{14}r_2} \end{pmatrix}$$

$$c_3 = r_1^{-M}\left(c_4 r_1^{-M}\frac{dp_1}{dz}a_{39}r_1^2 - y_{p_{13}r_1} - y_{p_{14}r_2}\right)$$

$$y_{p_{13}r} = r^2\frac{\partial}{\partial r}\left(\frac{\partial w_o}{\partial r}\right)^2, \quad y_{p_{14}r} = r\left(\frac{\partial w_o}{\partial r}\right)^2,$$

$$w_1 = c_3 r^M + c_4 r^{-M} + \frac{dp_1}{dz}a_{39}r^2 - y_{p_{13}r} - y_{p_{14}r}$$

$$L_1 = \frac{c_1}{2 + M}\left(r_2^{2+M} - r_1^{2+M}\right) + \frac{c_2}{2 - M}\left(r_2^{2-M} - r_1^{2-M}\right),$$

$$L_2 = \frac{a_{38}}{4}\left(r_2^4 - r_1^4\right),$$

$$L_3 = \frac{a_{35}}{16}\left(r_2^4\left(4\log(r_2) - 1\right) - r_1^4\left(4\log(r_1) - 1\right)\right) + \frac{a_{36}}{20}\left(r_2^5 - r_1^5\right) + \frac{a_{37}}{42}\left(r_2^7 - r_1^7\right) - \frac{1}{6}\left(r_2^3 - r_1^3\right),$$

$$L_4 = -(L_1 + L_3)$$

IV. RESULTS AND DISCUSSION

Fig.2. shows that the velocity field using perturbation solution. In this section we have presented the solution of the Williamson fluid model graphically. The expression for pressure rise ΔP is calculated numerically using Mathmatica software. The effects of various parameters on the pressure rise ΔP are shown from Fig.3. to Fig.7. for different values of Weissenberg number (We), amplitude ratio (ϕ),Thermal ratio (β),Radius value (ε) and Hartmann number (M) . It is observed that the pressure rise ΔP decreases with the increase in $We, \phi, \beta, \varepsilon$ and M .It is noticed that best peristaltic pumping region with the Hartmann number M from Fig.7. Otherwise there is augmented pumping.

The frictional force on inner tube $(F^{(o)})$ are observed from the Fig.8. to Fig.12. for various parameter values of Weissenberg number (We), amplitude ratio (ϕ),Thermal ratio (β),Radius value (ε) and Hartmann number (M). As the values of We, ε and β are increasing. We observed that the plots for $F^{(o)}$ is decreasing from Fig. 8, Fig. 10 and Fig.

12. while the figures Fig.9. and Fig.13. are depicted that increasing as the values of ϕ and M are increasing.

The frictional force on outer tube $\left(F^{(i)}\right)$ are observed from the Fig.13. to Fig.17. for various parameter values of Weissenberg number (We), amplitude ratio (ϕ),Thermal ratio (β),Radius value (ε) and Hartmann number (M).It is found that, the $F^{(i)}$ is decreasing as the various values of We and β from Fig.13.and Fig.16.while it is increasing for the different values of ϕ, ε and M .

The Temperature of the field is increasing with the different values of β whereas the concentration of the field decreasing for the various values of β, Sr and Sc .

The fixed constant values for Pressure Rise ΔP , frictional force on inner tube $F^{(o)}$ and frictional force on outer tube $F^{(i)}$ are given by

$$Gr = 2, We = 0.1, M = 0.3, Sr = 5, Sc = 0.2, Br = 0.01, \varepsilon = 0.1, z = 0.1, \frac{dp}{dz} = 0.3, \beta = 0.04$$
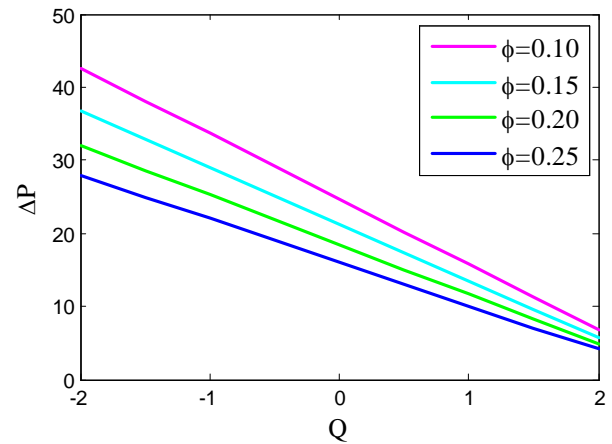
Fig.4. Pressure rise versus flow rate for different values for ϕ .
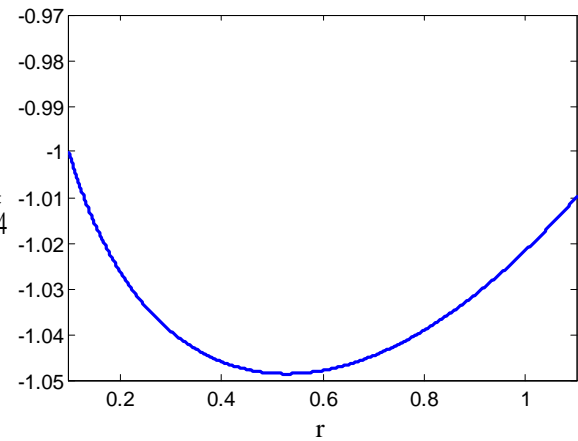
Fig.2. Velocity for

$$G_r = 0.01, We = 0.001, M = 0.01, Sr = 0.5,$$

$$Sc = 0.3, Br = 0.01, \varepsilon = 0.1, z = 0.1, \frac{dp_o}{dz} = 0.3,$$

$$\frac{dp_1}{dz} = 0.3, \frac{dp}{dz} = 0.3, \varphi = 0.3, \beta = 0.08$$

Fig.3. Pressure rise versus flow rate for different values for *We*
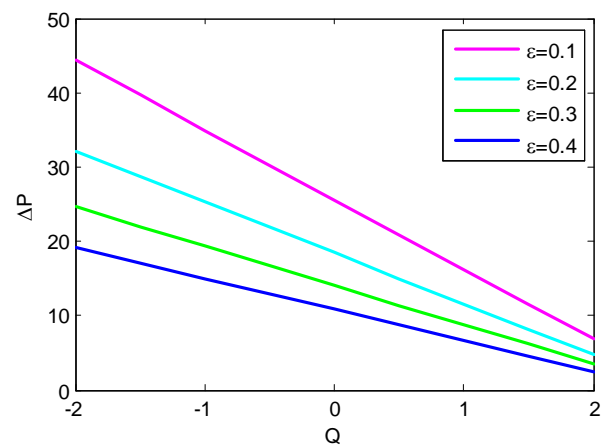
Fig.5. Pressure rise versus flow rate for different values for ε .
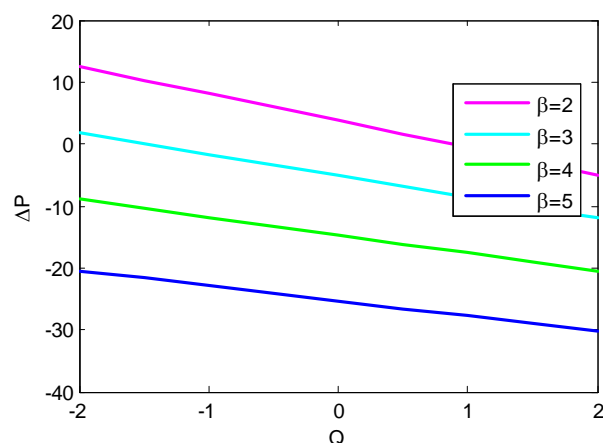
Fig.6. Pressure rise versus flow rate for different values for β.
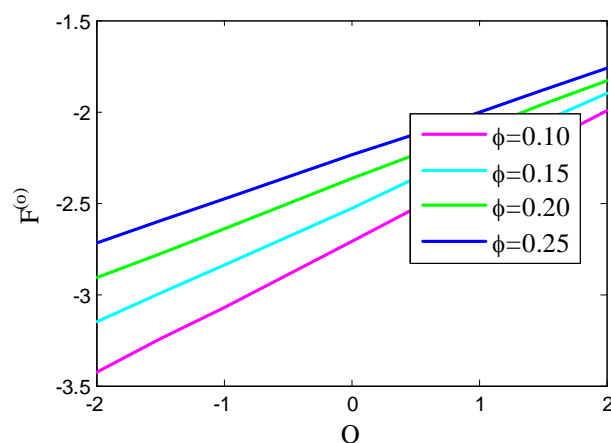
Fig.7. Pressure rise versus flow rate for different values for M.
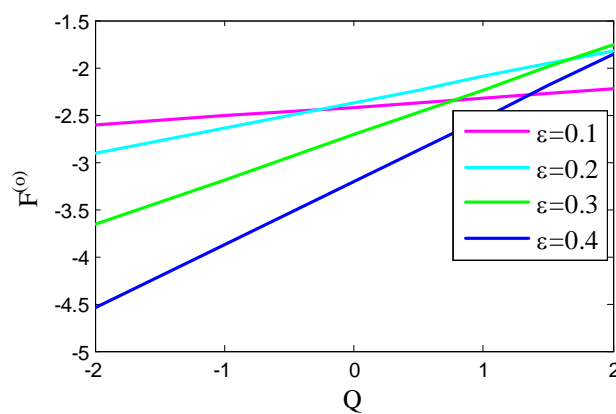
Fig.8. Frictional force on inner tube versus flow rate for different values for We.

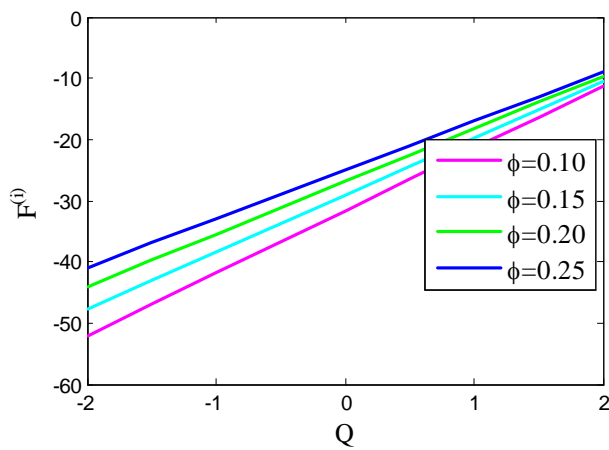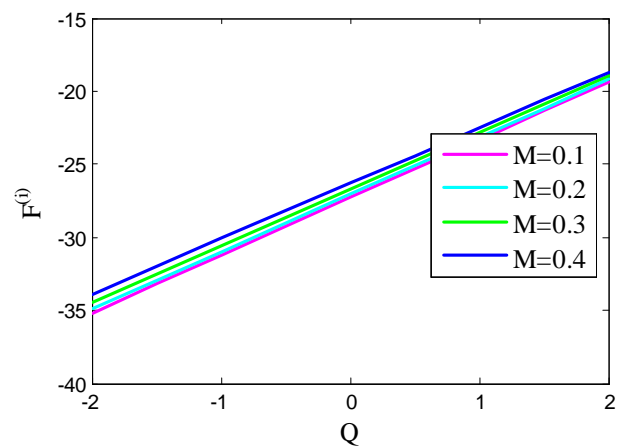Fig.9. Frictional force on inner tube versus flow rate for different values for ϕ.
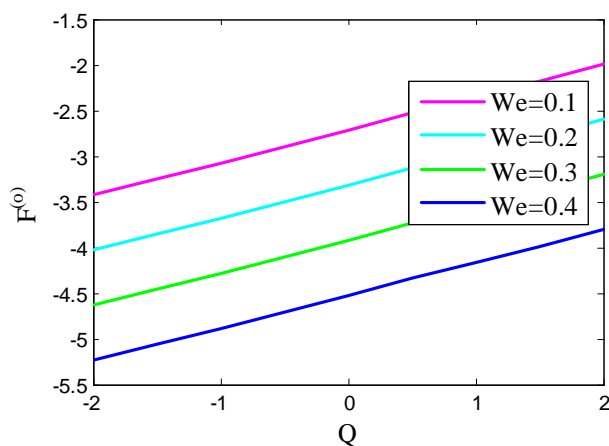
Fig.10. Frictional force on inner tube versus flow rate for different values for ε.
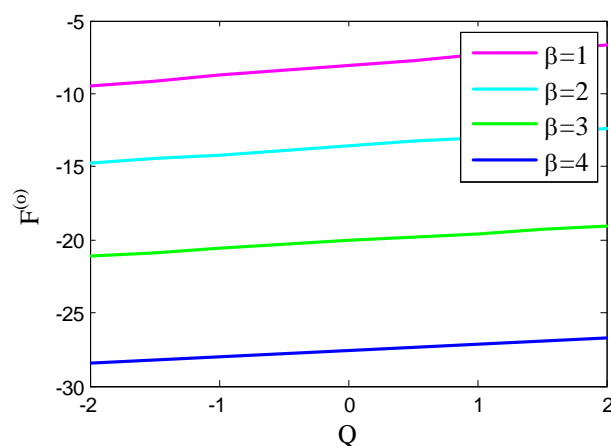
Fig.11. Frictional force on inner tube versus flow rate for different values for β.
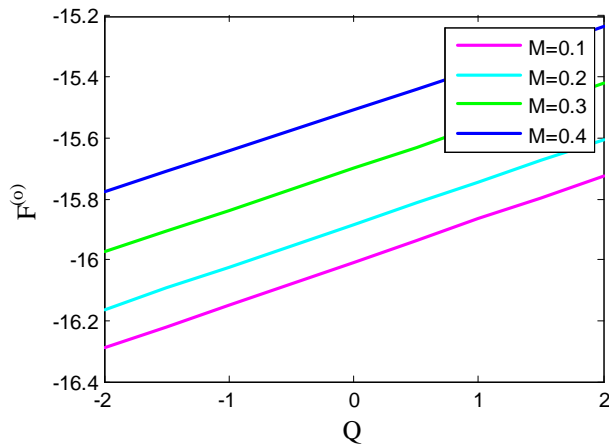
Fig.12. Frictional force on inner tube versus flow rate for different values for M.
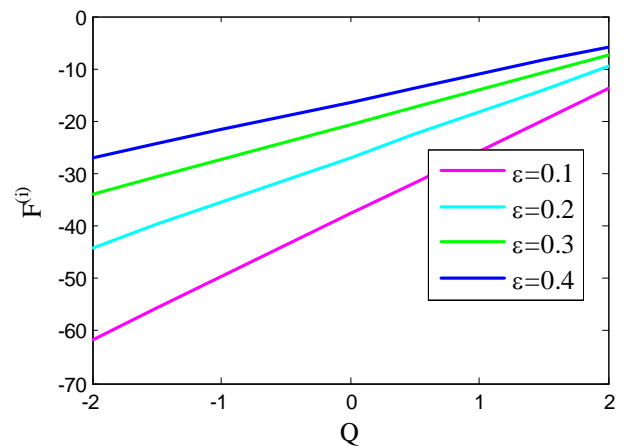
Fig.15. Frictional force on outer tube versus flow rate for different values for ε.
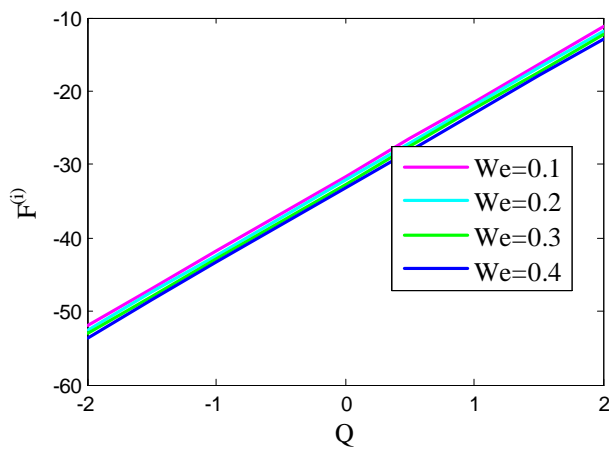
Fig.13. Frictional force on outer tube versus flow rate for different values for We.
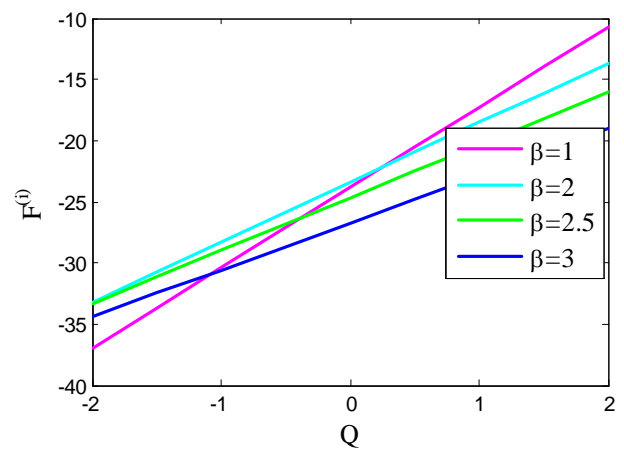
Fig.16. Frictional force on outer tube versus flow rate for different values for β.

Fig.14. Frictional force on outer tube versus flow rate for different values for ϕ.

Fig.17. Frictional force on outer tube versus flow rate for different values for M.

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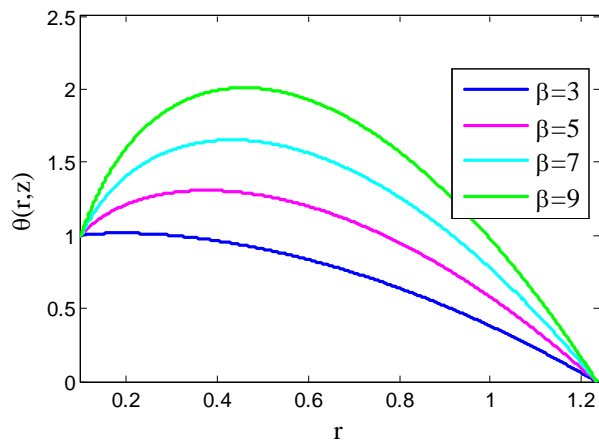
Fig.18. Plot for Temperature field for different values for β.
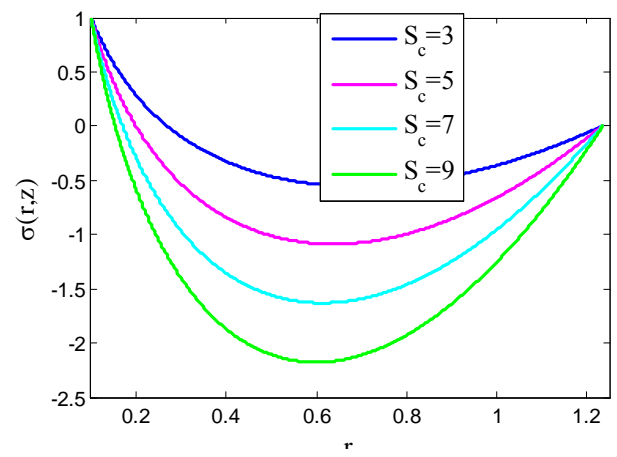
Fig.21. Plot for Concentration for different values for Sc.
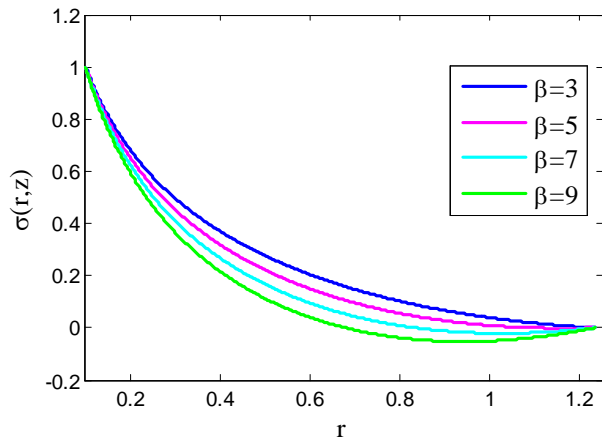
Fig.19. Plot for Concentration for different values for β.
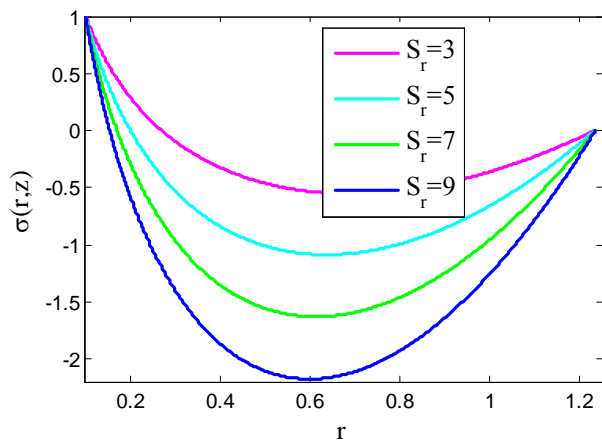
Fig.20. Plot for Concentration for different values for Sr.

V. CONCLUSIONS

In this paper, we have investigated the influence of the effect of radially varying MHD and mass transfer on peristaltic flow of Williamson fluid in a vertical annulus under the assumptions of low Reynolds number and long wave length approximation. The analytical solutions are obtained for the angular velocity using Perturbation method and solution for Pressure Rise is calculated using Numerical integration. The behaviors of the flow characteristics are analyzed through graphs.

1. The angular velocity of the fluid is curved channel in the annulus.

2. The magnitude of the pressure rise ΔP decreases with the increase in $We, \phi, \beta, \varepsilon$ and M .

3. The frictional force on inner tube $\left(F^{(o)}\right)$ is increasing as the values of ϕ and M are
    increasing.

4. The frictional force on outer tube $\left(F^{(i)}\right)$ is decreasing as the various values of We and β .

5. If $M = 0$, it is good agreement with Reference[25].

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CHANGING TRENDS AND GROWTH OF SORGHUM IN SELECTED DISTRICTS OF TAMILNADU – INDIA

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ABSTRACT

Sorghum, commonly known as Jowar or cholam is the most important cereal crop in the world after wheat, rice, maize and barley. It is found in the arid and semi-arid parts of the world, due to its feature of being extremely drought tolerant. This study was conducted to examine growth trends in area, production, and productivity of major cereal crop sorghum in selected districts of Tamil Nadu, viz., Salem, Dharmapuri and Namakkal in India, over the period of 2010-2015. The data used for the study were collected from the annual season and crop report of Tamil Nadu, from each District Statistics Office. The trend analysis in the time series of area, production and productivity would be helpful to make future plans and to take appropriate decisions to safeguard the situation for the sustainability in food production and future food security. Drastic reduction was observed in the production and area of cultivation of cereal crop Jowar in Tamil Nadu. Shifting of farmer's focus toward the horticultural and plantation crops may be the main cause for negative trend in the production of major cereal crops. Linear, exponential, and logarithmic model observing trend in production, productivity and area under the cultivation of cholam were used for the trend analysis. In this study, the selected districts showed positive gradual increase trends in the production and area under the cultivation, over the subsequent years. This shows we have to shift our focus and switched on the more remunerative crops along with major cereal crops than with horticultural and plantation crops.

Key Words: Area, Production, Productivity, Growth trends, Sorghum, Tamilnadu.

INTRODUCTION

Agriculture play an important role in the overall economic and social well being of the country. Though the share of the agricultural sector in the GDP is declining, it still accounts for nearly 16.1 percent and remains one of the biggest sector after services. India ranks second worldwide in farm output. Agriculture's contribution to GDP has steadily declined from1951 to 2011, yet it is still the largest employment source and a significant piece

of the overall socio – economic development of India. Crop yield per unit area of all crops has grown since 1950, due to the special emphasis placed on agriculture in the five - year plans and steady improvements in irrigation, technology, application of modern agricultural practices and provision of agricultural credit and subsidies since the Green Revolution in India.

India is the second largest rice (paddy) and wheat producing country in the world, next only to china [1, 2] as of FAO). Major cereal crops grown in India are wheat, paddy, sorghum, maize, bajra, barley, ragi. As on date the cultivation of these crops account to around 975.19 lakh hectare of land and a total production of 238.739 million tonnes (Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India). India is not only the largest producer of cereal as well as largest exporter of cereal products in the world. The huge demand for cereals in the global market is creating an excellent environment for the export of Indian cereal products. India occupy the major share in India's total cereals export with 64.40% during the year 2014-15. Whereas, other cereals including wheat represent 35.60% share in total cereals exported from India during this period [3].

More than ninety percent of high yielding varieties are for irrigated ecosystem and very few improved varieties are available for rainfed eco-system; which constitutes more than sixty percent of cultivated rice areas in the country. The complex ecological situation of rainfed ecosystem consisting of upland, shallow low land, semi-deep water and deep water conditions is one of prime reasons for low productivity.

Present investigation is an endeavour to search out the progress achieved in Jowar despite the agroclimatic setbacks in Tamil Nadu. As these crops are important to the state. The study is undertaken to have a close look on trends of area, production and productivity of these crops in different agroclimatic regions of Tamil Nadu. Lastly, the study seeks to provide the basis for the future investigation and for developing a programme for higher production.

In view of the prevailing situation in cereals in Tamil Nadu, this paper aims to investigate the following objectives – viz., to study the trend and growth rate in area, production and productivity of this major cereal crop in different agroclimatic regions of Tamil Nadu, to project the expected area and production of Jowar by 2025 and to suggest Policy implication based on the analysis.

MATERIALS AND METHODS

The study is carried out in three districts of Tamil Nadu viz, Dharmapuri, Namakkal and Salem. Dharmapuri is situated in the North Western corner of Tamil Nadu and is bounded by Eastern Ghats on the east with the total geographical area of 4497.77Km^2 which 3.46% of Tamil Nadu. Namakkal is located close to Kolli Hills which is the part of the Eastern Ghats with the total are of 3,368.21Km^2. Salem is the fifth largest city in Tamil Nadu by population and cover 91.34Km^2 and is the center place of the Southern region connecting the states of Tamil Nadu and Kerala and solution part of Karnata states. The share of cultivators and agricultural labourers of these districts are comparatively higher to the state proportion.

The data used for the study is entirely based on secondary source from annual season and crop report of Tamil Nadu, from each District Statistics Office. The study covers 5 years from 2010-2015. Various analytical tools and procedures used to determine empirically the changes, trends and variations in area, production and productivity and relative contributions to the changes in the production of Jowar in these three agroclimatic regions were studied.

RESULTS AND DISCUSSION

An attempt has been made to analyse the collected data in the light of objectives in an established sequence.

A discussion has been carried out at different aspects, i.e. absolute and relative changes in area, production and productivity of major cereal crops, their trends and growth rates.

For measuring the absolute change in area, production and productivity. Absolute change can be carried out by the base and end year of the concerned period. These years (beginning and end) may be exceptionally good/bad and will give a distorted picture of the change. Therefore, it was considerable proper to take an average of three years, base and end of a particular period. Absolute change in area, production and yield are carried out by the formula:

$$\text{Absolute change} = Yn - Yo$$

Where,

Yn = Mean value (area, production and productivity) for the last ending.

Yo = Mean value (area, production and productivity) for the first base ending.

The absolute change have been worked out for three agroclimatic regions and absolute change fails to depict a comparative change among the variables and therefore, in addition to absolute change, has also been included in the present study.

$$\text{Relative change} = Yn - Yo / Yo \times 100$$

This measure has been worked out for the variables, for which absolute change has been worked out, as shown in Table 1.

Table 1: Absolute and Relative change in area, production and productivity of

Jowar in different agroclimatic regions Tamil Nadu, India

District	Area				Production				Yield / Kg ha			
	Current Period	Base Period	Absolute Change	Relative Change (%)	Current Period	Base Period	Absolute Change	Relative Change (%)	Current Period	Base Period	Absolute Change	Relative Change (%)
Dharmapuri	17365	15696	1,669	10.633	45461	12545	32,916	262.383	2617	799	1818	2275.344
Namakkal	85992	19800	66,192	334.303	160096	13817	146,279	10.586	1861	698	1163	116.618
Salem	47452	20702	26,750	129.214	85010	19459	65,551	336.867	1792	940	852	90.638

As shown in the Table 1 and in the bar diagram (Figure 1) the absolute and relative changes in the area three different agroclimatic regions we have studied, revealed an increasing trend over the last five years. In the case of Area, it may be noted that from the table that there has been a tendency to bring more areas under cultivation in all the three districts of Tamil Nadu, with the little least percentage of relative change observed at Dharmapuri.
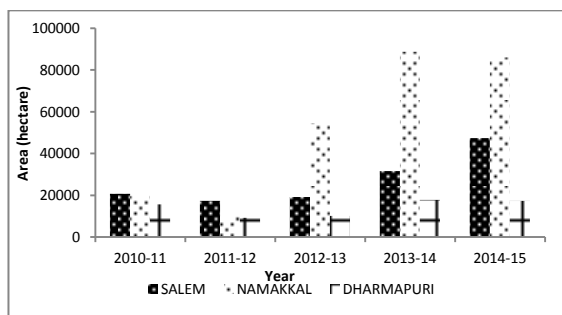
Figure 1. Area under the cultivation of sorghum from 2010-2015.

In case of production (Figure 2) the data showed that, all the agroclimatic regions reported an increasing trend overall. Any how we could see there is downfall in the production at Namakkal district when compare to Dharmpapuri and Salem which revealed that though there is gradual increase in the area of cultivation, the production ratio is limited might be due to various climatic factors and soil parameters.
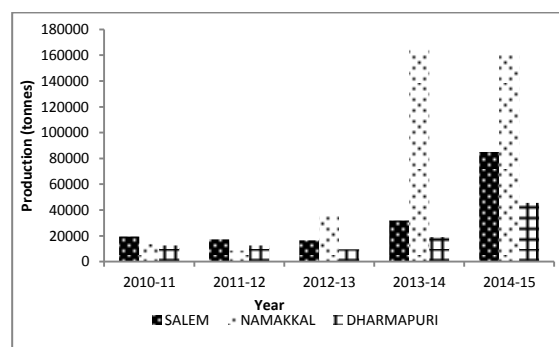

Figure 2. Production of sorghum from 2010-2015.

In all the three district, the state of yield has gone up considerably over the years. All the three parameters - area, production and productivity, when compared shows a continuous constant increase and hence can be concluded that although area and production is high, yield is the responsible factor for the increase in production (Figure 3).
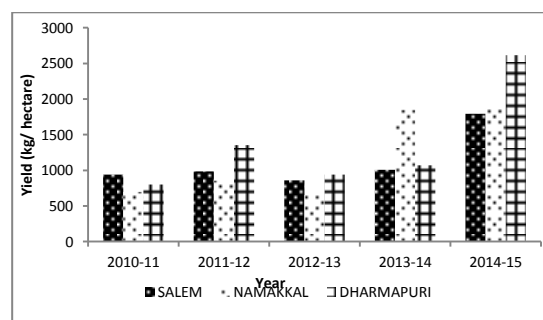

Figure 3. Yield of sorghum from 2010-2015.

The trends in the term of area, production and total productivity of different crops has been analysed by several scientists and researchers in different places throughout the world [4 - 8]. The agricultural area, production and productivity data set when plotted over times scale on the other axis requires application of different statistical curve fitting techniques to get a smooth

trend that can be useful for meaningful interpretation of the data set [9, 10]. Summary of trend analysis of Jowar over the five years in the three different agroclimatic regions were shown in the Table 2.

Table 2. Trend analysis of sorgham.

	AREA	PRODUCTION	YIELD
Salem			
Linear	y = 6775.6x + 6935.6	y = 14595x - 9798.1	y = 335.2x + 350.2
	$R^2 = 0.7244$	$R^2 = 0.6241$	$R^2 = 0.5211$
Exponential	$y = 12845e^{0.2258x}$	$y = 9303e^{0.3574x}$	$y = 724.19e^{0.1317x}$
	$R^2 = 0.7229$	$R^2 = 0.6695$	$R^2 = 0.5076$
Logarithmic	y = 14103ln(x) + 13758	y = 29887ln(x) + 5368.8	y = 727.01ln(x) + 659.69
	$R^2 = 0.507$	$R^2 = 0.4228$	$R^2 = 0.396$
Namakkal			
Linear	y = 21122x - 11597	y = 44850x - 58072	y = 332.4x + 187
	$R^2 = 0.8387$	$R^2 = 0.8063$	$R^2 = 0.7216$
Exponential	$y = 8203.8e^{0.5129x}$	$y = 3831.2e^{0.7865x}$	$y = 467.19e^{0.2735x}$
	$R^2 = 0.7025$	$R^2 = 0.8279$	$R^2 = 0.6908$
Logarithmic	y = 49652ln(x) + 4227.3	y = 101782ln(x) - 20977	y = 746.37ln(x) + 469.55
	$R^2 = 0.7487$	$R^2 = 0.6708$	$R^2 = 0.5877$
Dharmapuri			
Linear	y = 1191.4x + 10471	y = 7239.6x - 1907.8	y = 335.2x + 350.2
	$R^2 = 0.215$	$R^2 = 0.6022$	$R^2 = 0.5211$
Exponential	$y = 10454e^{0.0861x}$	$y = 6787.1e^{0.2998x}$	$y = 649.11e^{0.2137x}$
	$R^2 = 0.1909$	$R^2 = 0.6$	$R^2 = 0.5327$
Logarithmic	y = 1807.4ln(x) + 12314	y = 14757ln(x) + 5681.5	y = 727.01ln(x) + 659.69
	$R^2 = 0.0799$	$R^2 = 0.4042$	$R^2 = 0.396$

It has been observed from the given Bar diagram Figure 1, for the trend analysis, revealed that the area under cultivation of crop Jowar is considerably increasing from the base year 2010-2011 to 2014-2015 except in the year 2011-2012 in all the three districts. Anyhow area under cultivation in Namakkal is exponentially greater when compared to Salem and Dharmapuri. However the area of cultivation in Dharmapuri shows least

value of linear trend of $R^2 = 0.215$ when compared to $R^2 = 0.8387$ and $R^2 = 0.7244$ at Namakkal and Salem respectively.

In the case of production it was observed that, there was considerable decrease over the years from 2010-2013 in all the three districts and increased exponentially greater in Namakkal in the year 2013-2014 and 2014-2015 with the value of $R^2=0.8279$ over $R^2=0.6695$ and

$R^2=0.6$ in Salem and Dharmapuri respectively.

The productivity of the Bar diagram revealed that there was a considerable increase over the years from 2010-2015 gradually in all the three agroclimatic regions. In the trend analysis for area, production, productivity, it was observed that linear and exponential trend showed the best fitted model with reasonable R^2 values for all the three districts when compared to logarithmic model with the least fitting of all the three models for Dharmapuri.

Conclusion and Recommendations

Based on the results of the study, it was concluded that there was a significant decrease in area devoted to sorghum cultivation per annum and a significant increase in productivity per annum for the crop for the period 1993-2004. Both the processes of decrease in area and increase in productivity were slow. However, the rate of decline in area would be doubled by the next 46.3 years from 2004 and the rate of increase in productivity would be doubled in the next 19.38 years would be doubled beginning from 2004. It was suggested that the process of decline in area should be reversed through expansion of area devoted to sorghum cultivation. This could be achieved through increased sensitization and mobilization of the local

farmer on the need to bring back use such land area that were put to fallow. The process of increase in productivity should be enhanced through increased use of advisory services and provision of input supports to the farmers engaged in the cultivation of sorghum.

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Removal of lead from polluted Musi Water using Biosurfactants (Rhamnolipids)

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1. Introduction

Hyderabad, the largest city discharges about 600 million litres of waste water into the River Musi. Due to indiscriminate urbanisation and lack of planning, Musi has been the receptacle for the domestic and industrial waste water in the city. High levels of chemical, biomedical, biological, pharmaceutical and industrial contamination cause ground water pollution has endangered aquatic life(1). People depend on the vegetables and fruits grown on Musi river bed leading to diseases and even miscarriages. The polluted water contains high levels of lead which leads to damage of nervous system, hematopoietic system, renal system, cardiovascular system, reproductive system etc.(2)

Although chemosynthetic surfactants could help ion desorption of heavy metals from polluted water, they cause serious impact on water environment and human health due to high toxicity and non-biodegradable. Bio surfactants have low toxicity and can be easily synthesised from renewable resources(3). Rhamnolipids are surfactants produced by microorganism from renewable energy resources are capable of removing heavy metals by complexion at optimum conditions. The present study involves the measurement of lead in Musi water collected from Peerzadiguda Area and the leafy vegetables (Palak) grown in the same area before and after treatment with bio surfactants.

2. Experiment

Musi water samples and Palak samples were collected from Peerzadiguda Area. The samples were tested for the quantity of lead in the presence and absence of biosurfactants.The bio surfactants are prepared by culturing bacteria in agar media, NaCl(5g/lit) and Rice Bran Oil (10% v/v). Incubation was carried out at room temperature in a rotary shaking machine at 150 rpm for 4 days. The cultured pseudomonas aerugenosa was centrifuged and treated with hexane and chloroform followed by evaporation and drying.

Fresh leafy palak leaves were collected from the farm grown on Muzi river bed at Peerzadiguda. The leaves were crushed and oxidised in the presence of air and then fired. Inert graphite rod was used to test the concentration of lead in water and leaf samples. Atomic absorption spectrophotometer (AA-2759 Shimadzu) was used to find the metal concentration and FT-IR was used to study the absorption of metals by the bio surfactant.

3.Results and Discussions

The surfactant solutions of different concentrations were prepared and treated with the musi water and palak samples. The pH was maintained at 6 and contact time was ten minutes.

Concn of P. Aeruginosa (ppm)	Concn of Pb in Musi water(ppm)	Concn of Pb in Palak leaves (ppm)
0	0.324	0.141
2	0.302	0.122
4	0.263	0.103
6	0.221	0.092
8	0.172	0.080
10	0.098	0.041
12	0.094	0.037
14	0.091	0.033
16	0.092	0.034
18	0.090	0.029
20	0.090	0.028

The effect of contact time has been studied at surfactant concentration 10 ppm.

Contact time in Min	0	2	4	6	8	10	12	14	16	18	20
Concn of Pb in Musi Water(ppm)	0.324	0.322	0.304	0.223	0.161	0.095	0.096	0.095	0.094	0.093	0.093

The optimum concentration of the surfactant was found to be 10 ppm and effective contact time was 10 minutes.
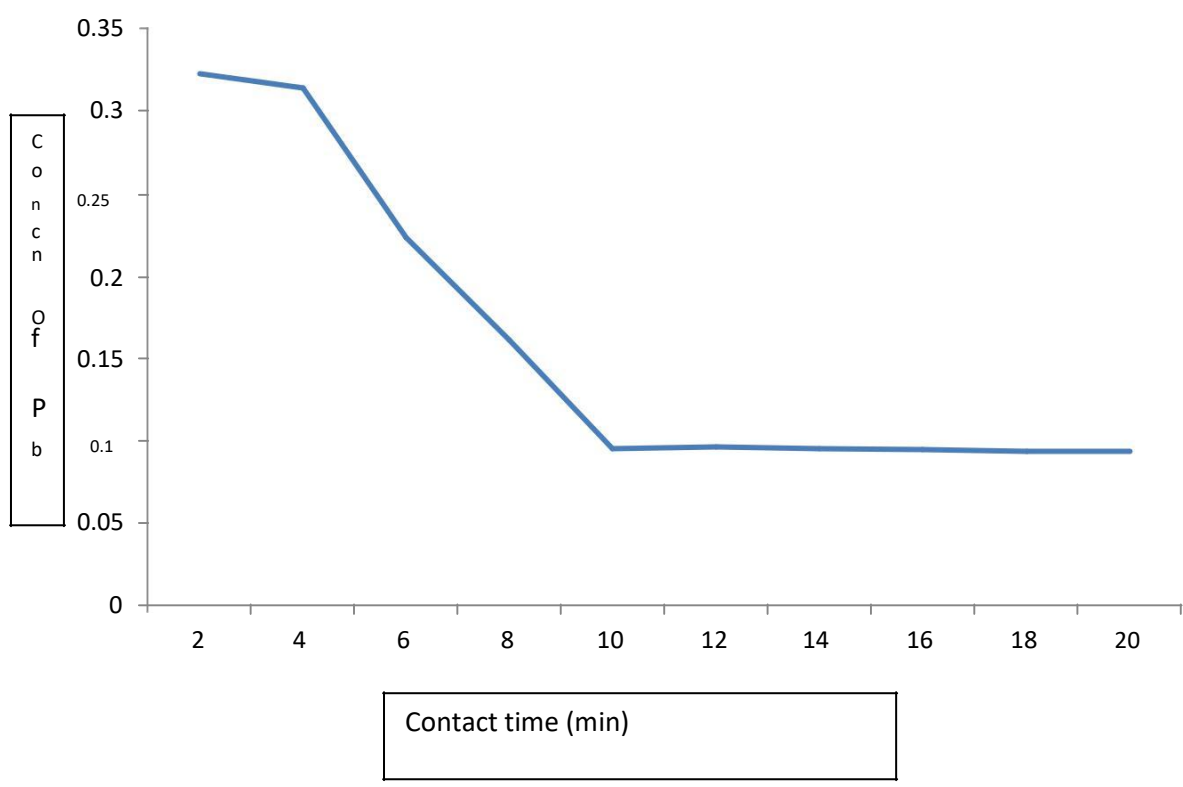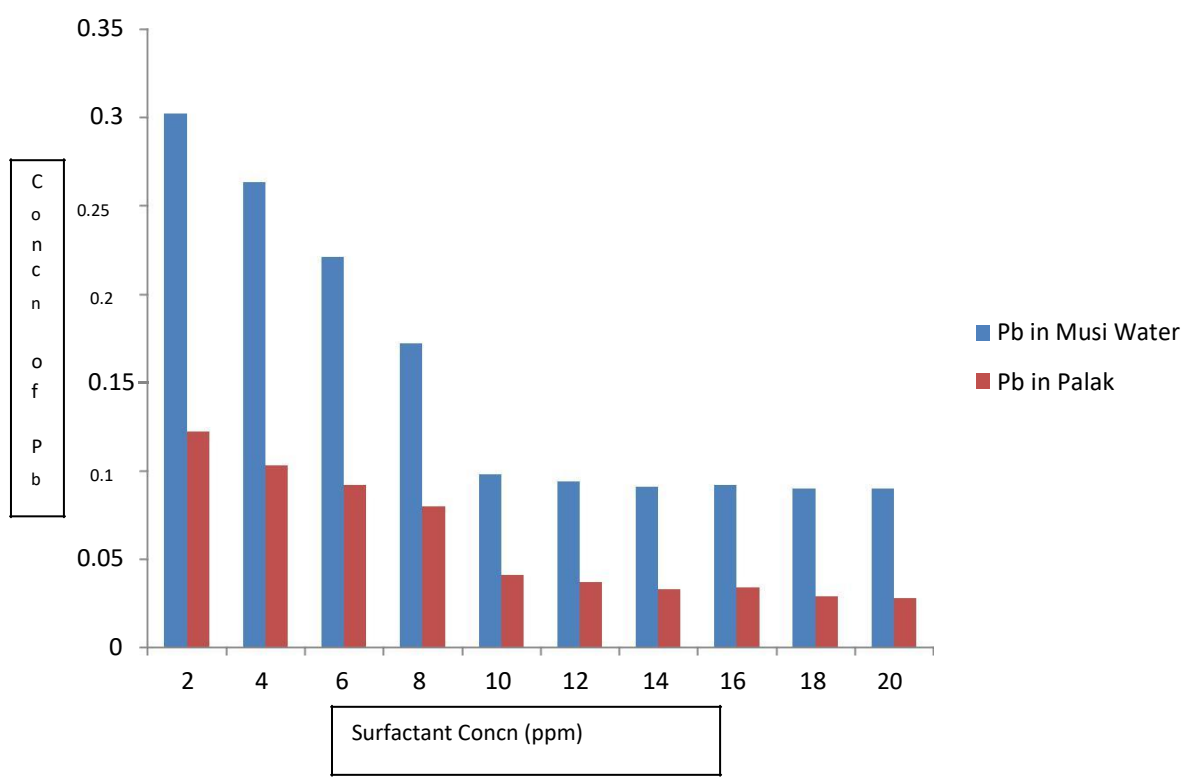
FT-IR spectra indicate a strong peak at 3417 cm-1 and at 1643 cm-1 indicate asymmetric stretching vibration of C=O. The C-H stretching vibration was indicated at 2854 cm-1. The weak band between 1370 – 1470 cm-1 indicate bending vibration of the $-CH_3$ and $-CH_2$ chains. 1110cm-1 peak indicated the C-O stretching vibration. The presence of –OH and COOH in the surfactant act as binding sites in removing toxic pollutants.

The absorption capacity was calculated using the formula

$$C_A = \frac{(C_f-C_i) \times v}{m}$$

Where CA is the Absorption Capacity of the surfactant, C_f is the final concentration of metal ions after treating with surfactant, C_i is the initial concentration of surfactant.

The average absorption coefficient was found to be 110 mg/lit.

4. Conclusions

Lead was absorbed effectively from water and palak by the biosurfactant prepared by the fermentation of Rice bran oil through the formation of pseudomonas Aeriginous. The sorption capacity was found to be 110 mg/lit.

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4.

Massive Open Online Course (Moocs) In India: An Overview

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ABSTRACT

Massive Open Online Course (MOOCS) is an online course aimed at unlimited Participation and open access Via the Web. MOOCS Provide interactive user forums that help build a community for students, Professors and Teaching assistants. MOOCS have recently received a great deal of attention from the media, Entrepreneurial venders, Education Professionals and Technologically literate sections of the public. MOOCS will provide free to access cutting edge courses to students of higher education in India. In recent years, the enrolment in massive Open online Course (MOOCS) has increased tremendously. India after USA is dominating the global growth in enrolments. Seeing the growth of enrolment from the country and satisfy their need of education. India has started various projects for offering MOOCS courses. Currently, NPTEL, MOOKIT, IITBX and SWAYAM are the platforms used in India for offering courses. In this paper, a theoretical and Technical back ground of these platforms is provided with a discussion of their features of MOOCS. There are some challenges that are faced in implementing MOOCS in India. It finally discuss about issues address by SWAYAM.

KEY WORDS

MOOCS,NPTEL,SWAYAM,Indian MOOCS platform

I. INTRODUCTION

 Online learning uses technology for delivering the courses. Education with technology is considered as most promising development in education. With technology globalization, the concept of learning and teaching has undergone a tremendous change. Technological usage in education provides global learning environment, which allows accessing the course material anytime, anywhere, connect other learners,

and get access to the content without considering any geographical boundaries. The significant changes in use of the technology in online education has seen emergence of the concept of Massive Open Online Course (MOOC).

Massive Open Online Courses (MOOCs) are either free or paid open online courses offered by some of the world's leading universities and institutions including but not limited to Stanford, Oxford, Harvard, and Massachusetts Institute of Technology (MIT). It is a gathering of participants, of people willing to jointly exchange knowledge and experiences for each of them to build upon.

Here, introduction of the Indian MOOCS platform is presented by unveiling their potential, technology used, and features supported. The author has formulated a list of features provided by each of these platforms. Furthermore, based on the data collected from the web, using a tool, the MOOCS platforms are compared. Here, various measures are covered for three categories 1) Website, 2) Website Audience, and 3) Traffic Sources. Each category further has sub categories providing different level of details, for each platform. Also, author has mentioned some of the

challenges to offer MOOCS in India and confined the solutions for these issues through the SWAYAM platform.

In this paper, Section II provides a discussion on potential of MOOCS in India. Section III provides an overview of the MOOCS in India with different platforms. Section IV explains what technology is used by these platforms. Section V explains their different features. Section VII discusses the challenges for MOOCS in India followed by the solutions offered by SWAYAM in section VIII. Section IX states the conclusion.

II. POTENTIAL OF MOOCS IN INDIA

MOOC has a huge potential veiled in India. Recent years have seen tremendous hike in the enrolment by Indian students in MOOCS all over world. India is among the leading countries in terms of enrolments in courses offered by many popular MOOC providers including EDX, Coursera, and Udacity.

III. MOOCS PLATFORMS IN INDIA

Many initiatives have been taken by the Indian government to provide and support concept of open education. Initially, the objective was to provide open resources in terms of repositories, libraries, educational media files, e-books, etc. These were made

accessible for everybody. Some of the efforts in this direction started as National Digital Repository of IGNOU, SAKSHAT providing e-content, SHISHYA for XI-XII Standards by CBSE Board, and Vidya Vahini integrating IT into the curriculum of rural schools by providing interactive training and developmental communication. Most of these initiatives started with establishing dedicated department to make education reachable to many learners as much as possible. Some of the common names in this path are, Education and Research Network (ERNET) connecting various colleges and schools by providing network connectivity; EDUSAT, a satellite launched for education in India, Consortium for Educational Communication (CEC), use the power of television to act as means of educational knowledge dissemination;

A. NPTEL

NPTEL stands for National Programme on Technology Enhanced Learning. It is a project funded by MHRD, initiated in 2003. It is a joint initiative of seven Indian Institute of Technology (IITs) and Indian Institute of Science (IISC) for offering courses on engineering and science, initially.

B. MOOKIT

MOOKIT is a lightweight MOOCS management system built entirely using open-source technologies by Indian Institute of Kanpur (IITK), in 2014. It is a powerful system that can be used to offer online courses at any scale, from micro to massive. It is designed to offer MOOCS (connectivist MOOCS). It has been used in 15 courses with about 100,000 registered learners. It is built entirely using open-source technologies, and the core engine runs on the MEAN stack that uses java script based technology, making it extremely scalable.

MOOKIT Standard: It is used to run a single course. It does not require local streaming of video, but YouTube videos can be used. Example; mooconmooc.org.

MOOKIT Enterprise: It is suitable to run a large number of online courses. Users are a part of a portal and will be able to enroll in the courses they're interested in. Example; mooc4dev.org, and agmoocs.in.

MOOKIT Replicated: It is suitable for low bandwidth areas, by allowing the content to be cached on local servers. The serves will sync periodically for updates.

MOOKIT Personal or Mobi-MOOKIT: It can run on the devices with low computation and low storage capability as of

mobile devices. It does not provide forum or social networking due to the device constraint.

C. IIT Bombay X

IIT Bombay X is a non-profit MOOCS platform developed by IIT Bombay using the open-source platform Open EDX, in 2014. It was created with funding from National Mission on Education through

Information and Communication Technology (NME-ICT), Ministry of Human Resource Development (MHRD), Government of India. Currently, it is offering 63 courses on different subjects from multiple disciplines. Some of the courses provided.

D. SWAYAM

SWAYAM stands for "Study Webs of Active Learning for Young Aspiring Minds". It is a MOOCS platform, launched by the Ministry of Human Resource Development (MHRD), Government of India, to bind online and offline education together. It is started with an expectation of launching 2,000 courses, to make it largest course catalogue, among all provided so far. SWAYAM is an independent platform. Learners across the country can get credit

for MOOCS courses offered on SWAYAM, and they can get their credits transferred and recognized at the parent institution, that was not possible in conventional MOOCS platforms.

For SWAYAM, a credit framework has been finalized that would allow the transfer of credits between institutions. An academic institution in India can offer up to 20% of its catalogue in a particular program via SWAYAM.

Some Indian MOOCS Platforms and Providers

Initiative	Year of Launch	Institution Behind Platform	Website Link
NPTEL	2003	IIT Madras	nptel.ac.in/
MOOKIT	2012	IIT Kanpur	www.mookit.co/
IITBX	2014	IIT Bombay	iitbombay.in/
SWAYAM	2016	MHRD and Microsoft	Swayam.gov.in

IV. TECHNOLOGY USED

For offering MOOCS, interested institutions have an option to go for self-hosted platforms, or use proprietary platform such as, Coursera, Udacity etc. When using self-hosted platform, the providers can

choose to 1) develop their own MOOCS platform as done by IITK by developing MOOOKIT, or 2) use open-source platform available already. Indian government always believes in promoting the use of existing open-source platform as their preference. These platforms may require modification and customization as per the needs. Currently, NPTEL and IITBX are live examples of such effort working effortlessly using the open source technology.

A. Course builder

NPTEL courses are run on Course Builder, which is an open-source platform created by Google in 2012. It tie together the software and technology Google used to build their Power Searching with Google online course. Anyone can offer their own courses using course builder platform. It provides basic services such as Google accounts, hangouts, friend circles, which could be used as the social networking feature, if implemented properly. Yet, the platform does not incorporate social networking as such. Course Builder is built on Google app engine

DRUPAL

MOOKIT platform is developed using DRUPAL, an open-source Content

Management System (CMS). Drupal is used as a back-end system for at least 1.5% of all websites worldwide ranging from personal blogs to corporate, political, and government sites. It is also used for knowledge management and business collaboration. Drupal base code is written in PHP and it provides the user various Drupal APIs to work with and implement any feature on their own, or use contributed modules if the feature is already implemented. It is hosted on Apache Web Server as an application. Drupal has a massive support of around 6500 contributed modules which extend features provided by Drupal core.

B. Open EDX

IITBX is powered by the Open EDX . It is an open-source release of EDX platform in 2013. EDX is founded by Harvard University and Massachusetts Institute of Technology (MIT). Open EDX platform is being used by educational providers to host their own MOOCS, all over the world. Including MOOCS, it can also used to host smaller classes and training modules. Also, educators can extend the platform to build learning tools that precisely meet their needs, and developers can contribute new features to the Open EDX platform, due to nature of its availability as an open-source.

Currently, it being used by various elite universities like, stand ford, and the organizations such as Microsoft, and two Indian MOOCS, IITBX and SWAYAM are also on the list. The complete list of its users is available.

C. SWAYAM

It is being run on an independent platform is created in cooperation with the Microsoft. This platform is launched very recently and is in growing stage, so much of its details are not yet available.

V. FEATURES OF MOOCS PLATFORMS

During our study, we carefully analysed the platforms to be familiar with their features. Based on our understanding of studied platform, we have identified certain features of MOOCS platform. MOOCS courses have a schedule with staring and end date. Also, there are some self-paced courses that do not have any time restriction to join a course and always available for enrolment. Self-paced courses are only 6% .All MOOCS offered supports face-to-face learning, while in online learning as in MOOCS, the instructions are delivered in the form of platform, which provides some specific feature. For example, for the native users of different origin belonging to various

states/ countries, not the content but the platform itself is provided in multiple languages.

FEATURES OF THE MOOC PLATFORMS

Providr	Course Format	Learning Model	No. of Courses	No.of Users	Institutional Credits	Platform Language	Mobile App	App Platform
NPTEL	Scheduled	Online	1200	1.5 Million	Partial	English	Yes	Android
MOOK IT	Scheduled	Blended	15	0.1 Million	Partial	English,Hindi, Kannada, French,Russian,Ukrainian	No	-
IITBX	Scheduled, Self-Pace	Online	63	1.25 Million	Partial	English	No	-
SWAYAM	Scheduled, Self-Pace	Blended	172	Not Known	Yes	Hindi, English	Yes	Android iOS

VIII. ISSUES ADDRESSED BY SWAYAM

Education is the foremost sector that shoulders the biggest responsibility of shaping the future of any nation. India is presently facing multiple challenges in offering education through MOOCS. India has started their own MOOCS as SWAYAM, an effort of the government in making the education accessible for all irrespective of any factor such as, their educational qualification, geographical disparity. There are several issues in

delivering MOOCS, as discussed in previous section. Some of these issues addressed by SWAYAM are:

1. Technological Infrastructure: Before launch of SWAYAM, it was clear that as a provider they need the technical infrastructure, for two primary areas; a) access and delivery, b) course content creation. For the access to the network, connections across the institutions/schools and a backbone providing the advanced capabilities has started as a national initiative by the government. Moreover, to create course content, government is investing by partnering with the institutions (IITs,IIMs, IISC, UGC), which are competent in a specific area of education. Also, for the time being until the connectivity reach to each school or college, some local centers are established to train the instructors or teachers for using the platform.

2. Investment: SWAYAM is a fully government funded project that covers cost of everything such as, content creation, technical infrastructure, maintenance, human resources. For technical support the government has signed a deal of 38 crore with Microsoft. According to a report published by UGC, the fund has been allotted to all the contributing institutes of SWAYAM for fasten the process of delivering the targeted courses.

3. Diversified Needs: To satisfy the diversified needs of the Indian learners, firstly the platform is available in both, English as well as Hindi language. It will surely minimize the language barrier for the learners.

4. Adoption of MOOCS among learners: Since SWAYAM supports the blended learning where after learning from the online courses the learner will also go to their college/institute. The learner will experience face-to-face learning along with the online learning. So, the lack of oral communication is not the problem anymore. It will surely help in improving the adoption of courses among the learners.

5. Quality: For technical expertise the government has already hired Microsoft. Furthermore, to enhance the expertise of the teacher or instructors in using the courses offered by SWAYAM, some training programs, workshops are being done all over India at the regional and local centers created for the purpose. These programs are organized by the top institutions that are contributors of SWAYAM such as, IITs, IIMs, and central universities etc. The focus

of these programs is to produce more qualified and technically sound faculties to deliver quality education to the learner. Also, these faculties will be able to solve problems of their learners who belong to the same institution as of faculty.

CONCLUSION

MOOC platforms are being used globally for offering online course and India is no exception. There are various MOOCS platforms that are being used in India for offering the courses, such as, NPTEL, MOOKIT, IITBX, and SWAYAM. Except the NPTEL, these are the new platforms having history of hardly 4 to 5 years, while SWAYAM is launched very recently. Therefore, to set up a ground for understanding including theoretical as well as technical aspects, a discussion is provided about each of these platforms with their features. Also, while using these platforms it is needed to understand their current state, popularity among learners, use of social media for referring, searched etc, and several other parameters or features mentioned here. Some of these issues are already addressed by SWAYAM, which is the most recent platform. According to the research carried out by the authors in some selected colleges in India, little has been

heard of Massive Open Online Courses (MOOCS), rather prestigious colleges have embraced the Small Private Online Courses (SPOCS) because of the limitations faced by MOOCS (already discussed).

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Errors to Eradicate - To reach from College to Corporate Through Collaborative Learning

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Abstract

The specific objectives of the study is to determine the types of errors and the changes in grammatical accuracy during the duration of the English for Social Purposes course focusing on oral communication. Error analysis of oral interactions showed that the five common grammar errors made by the learners are preposition, question, and article, plural form of nouns, subject-verb agreement and tenses. The results also showed an increase in grammatical accuracy in the students' spoken English towards the end of the course. This paper would be helpful to solve the problems through collaborative learning.

Keywords: Grammatical accuracy, Collaborative learning, and Aural communication,

Introduction: Achieving effectiveness in communication requires communicative competence which is the mastery of the knowledge of language and the ability to use the knowledge in actual communication. Studies on linguistic accuracy in written texts have focused on the sources of the errors, among which is L1 (first language) interference. The studies reviewed thus far are error analysis of written student texts, and indicate some frequent types of grammatical errors but there is no common pattern across groups of learners with different characteristics. A search of literature on error analysis of spoken texts in English indicated a near absence of attention in this domain.

Studies on spoken English tend to deal with areas such as speaking skills. However, the grammatical accuracy in spoken language is different from written language. This paper sets out major benefits of collaborative learning is an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task, or create a product. The benefits of learning in collaboration style, begins

With the concept of the term and continues with the advantages created by collaborative methods.

Expectations from the corporate world:

Now a day there is a lot of expectations from the corporate world. The corporate are not only looking for graduates who posses good aggregate but also for a graduate with an excellent communication skills which is the main source of the business development. The entire business runs over discussions, delegations, business emails, customer service etc where communication only plays a key role in it. The below image shows the career development of a graduate to meet the corporate standards.

The following are some of the expectations from the corporate:

- Communication Skills
- Knowledge Beyond the Textbooks
- Ability to Lead
- Positive Approach
- Willingness To Travel
- Ability to Multitask (Nair)

Common existing problems in aspirants with regards to communication skills:

The aspirants from different regions have their own accent and Mother Tongue Influence (MTI) which is an obstacle for effective communication. This is a major drawback for the aspirant who got relieved from the college and in search to reach the corporate may not be easily hired because the source of communication is majorly into International English accent. English is regarded as the vehicle or tool for communication and unites different nations in metropolitan societies. English stands at the very centre of the global language system. It has become a lingua franca (common language used between speakers whose native languages are different) in different countries. It has become the central language of communication in business, politics, administration, science and academic as well as a dominant language of globalised advertising and popular culture. Globalization also affects education in the form of expanding market in cross-border study. Therefore, they need to know English in order to cope academically and socially. (NKOME, 2015)

Most of the times aspirants face these common communication problems especially in education sector. Because classroom is heterogeneous; it's not homogenous. A class room is a combination of multiple regional languages. Without diagnosing the students in the classrooms if we start teaching to them, it will become only teacher-centered class room. Most of the schools and college they are not training the learners effectively. Due to this problem, aspirants loosing the hopes on their career. Below are the some of the common existing problems of the aspirants

- The use of jargon
- Lack of attention, interest, distractions, or irrelevance to the receiver.
- Differences in perception and viewpoint.
- Language differences and the difficulty in understanding unfamiliar accents.
- Fear of public speaking
- Cultural differences
- Lack of practice
- Mother Tongue Influence
- Lack of clarity in voice and accent

- Weaken in providing thoughts
- Using poor vocabulary
- Lack of guidance from the parents/teachers
- Lack of determination among teachers
- Misleading of career guidance
- Lack of self motivation

Methodology: To eradicate all communication oriented problems among the students/ aspirants the following methodology would be helpful. According to Ralph Waldo Emerson

Sow a thought and you reap an act, Sow an act and you reap a habit Sow a habit and you reap a character Sow a character and you reap a destiny. (slideshare.net)

To eradicate communication problems every teacher must train their learner/aspirant very effectively. The major areas to be considered while selecting a method are

- Human Factors- Target Audience
- Classification of subject matter- specific subject and its nature
- Desired change – objectives to be attained,knowledge,skills and nature
- Learning theories- motivation, readiness and so on
- Main functions of the method chosen-feasibility of methods in terms of time, cost and availability
- Availability of the method- in the case of power connections, laboratory and facilities

General methods of teaching:

Normally in every session teachers uses different type methodology to motivate the learners. This can be helpful to implement and adapt new methodology as well as the learner in the class room will become active. By using such kind of methodologies in the classrooms learners will come to the class rooms with flying colors. Here the aspirants learn how well they can use the strategies to complete the task while using the team work process. The methods are

- Lecture and discussion method
- Demonstration
- Seminars
- Computer aided instructions
- E-Learning
- Panel Discussion

(Jain, 2014)

Example Activities

I. We had a group of 4 aspirants, out of which group 1 was given corporate ethics for gender equality.

The outcome of the activity for group1 is group members learn about the difference between the college life and the corporate life about the opposite gender

II. Group 2 was given Team work strategies. Here the aspirants learn how well they can use the strategies to complete the task while using the team work process

III.Group3 was given effective and interactive team leader.
Here the aspirants learn, how a team leader can lead his team with having a good interaction

Collaborative learning: A way to meet the standards from college to corporate:
Collaborative Learning is a technique designed to make learning lively and its successful process**.** We can also call it as peer learning/ team learning/group learning. Collaborative learning is aimed at producing academically stronger. This concept was widely researched, practiced and endorsed by many professionals. Collaborative learning is a good tool where it digs out the learners' creative skills. According to Chinese proverb "**Tell me and I forgot. Show me and I remember. Involve me and I understand ''.** In this method involving the learners / aspirants means they do the work actively.

In this process teacher / trainer will be the facilitator, mentor and guide and learners will be divided into groups and each groupconsisting5-8members. Teacher/trainer will select one person as a team leader. Teacher assigns different tasks to the each team. All group members will together and discuss about the topic and share their views.

The below image gives an idea of Group Discussion

This will be helpful to the each learner to come up and express their views without fear.

In this methodology, we can involve the learners in different sessions like Just a Minute Session; Role Play- is the changing of one's behavior to assume a role, either unconsciously to fill a role, or consciously to act out of an adopted role.The image talks about role play.
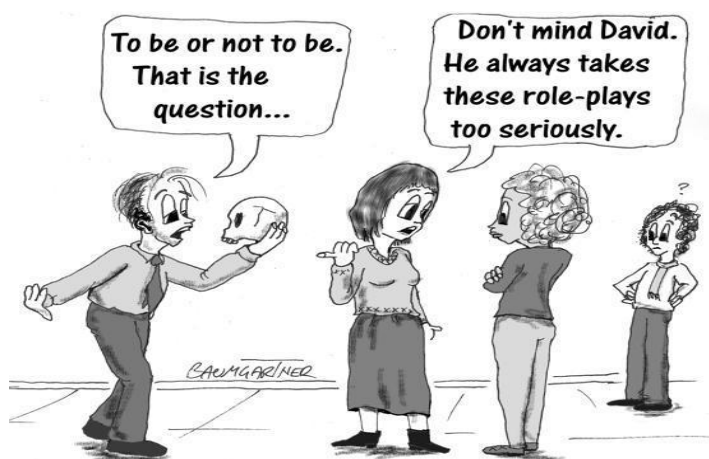
Situational Dialogues, Telephone etiquette-taking the time to speak clearly, slowly and in a cheerful, professional voice is very important.

and Presentation skills [The ability to speak effectively is an acquirement rather than a gift]. Effective presentation skills reflect a person's personality. When things are well explained and

presented, the image of the person is enhanced. Good presentations speak about the person's confident, level of knowledge, logical thinking, range of ideas, and application of ideas to practical situations. Presentation demands multiple communication skills. Remember the adage-small things make perfection, but perfection, is not a small thing.

The same techniques will be enhanced in the corporate world to train the newly joined employees. Because, all the dealings held in the corporate sector are very formal and confidential. It results to them in to train in communication skills, dress appearance, body language, and personality development and soft skills etc. (Sen, 2009)

Conclusion: Eradicating errors are very important to the aspirants from school to college level and to the corporate world too. To eradicate the problems likeauralcommunication,grammar,accuracy,spelli ng, pronunciation etc. Teacher/Trainer must involve every learner in to school / college activities in speaking activities, reading news papers and motivating them to discuss the information what they already have with them. This will be a bright step to overcome from their communication problems.

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MICROWAVE ASSISTED ORGANIC SYNTHESIS (MAOS): A BRIEF REVIEW

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ABSTRACT:

   The history of heterocyclic chemistry began in the 1800s, in step with the development of organic chemistry. Heterocycles form by far the largest of classical divisions of organic chemistry and are of immense importance biologically and industrially.

The majority of pharmaceuticals and biologically active agrochemicals are heterocyclic while countless additives and modifiers used in industrial applications ranging from cosmetics, reprography, information storage and plastics are heterocyclic in nature. For more than a century, heterocycles have constituted one the largest areas of research in organic chemistry. They have contributed to the development of society from a biological and industrial point of view as well as to the understanding of life processes and to the efforts to improve the quality of life. The presence of heterocycles in all kinds of organic compounds of interest in electronics, biology, optics, pharmacology, material sciences and so on is very well known. Between them, sulfur and nitrogen-containing heterocyclic compounds have maintained the interest of researchers through decades of historical development of organic synthesis[1]. . As an integral part of Green Chemistry, the Microwave assisted organic synthesis (MAOS) has seen tremendous development in the recent years. The microwave mediated organic reactions take place more rapidly, safely, and in an environmentally friendly manner, with high yields.

Key words: microwave, greener alternatives, recyclability, chemical entities

INTRODUCTION:

   From the kitchen to the laboratory, 'microwave chemistry' has come up as a boon in disguise for the eco friendly conscious chemists, the field of Microwave assisted organic synthesis (MAOS) is much developed in the recent years. Very little solvent and even the use of water as a solvent is a big advantage of microwave chemistry. In many cases, microwave-mediated reactions are carried out in dry media on solid support, i.e. without the use of solvent. Therefore the use of toxic and expensive organic solvents can be avoided. Such reactions not only reduce the amount of waste solvent generated, but also the products often need very little or no purification. These processes will hopefully be adapted by big industries as well, thereby contributing to the betterment of the environment.[1].

Within two decades is should be possible to:

- Eliminate nearly 100% of emissions in polymer manufacturing and processing.
- Replace all solvents and acid-based catalysts that have adverse environmental effects with solids, or 'greener alternatives'.
- Achieve 30–40% reduction in waste.
- Reduce more than 50% quantity of plastics in landfills.

   Heterogeneous organic reactions have proven useful to chemists in the laboratory as well as in the industrial context. These reactions are affected by the reagents immobilized on the porous solid supports and have advantages over the conventional solution phase reactions because of the good dispersion of active reagent sites, associated selectivity and easier work-up. The recyclability of some of these solid supports renders these processes into truly eco-friendly green protocols. Although the first description of surface-mediated chemistry dates back to 1924[86], it was not until the late 1970s that the technique received genuine attention with the appearance of two reviews[87], followed by a series of books and account articles[88].

   Microwave reactions involve selective absorption of MW energy by polar molecules, non-polar molecules being inert to MW dielectric loss. The initial experiments with microwave techniques centered on the use of high dielectric solvents such as dimethyl sulfoxide (DMSO) and dimethylformamide (DMF).[2] The rate enhancements in such reactions are now believed to be due to rapid superheating of the polar solvents. However, in these solution-phase reactions, the development of high pressures and the use of specialized Teflon vessels and sealed containers are some of the limitations. During recent years, a practical dimension to the

microwave heating protocols has been added by accomplishing reactions on solid supports under solvent-free conditions. In these reactions, the organic compounds adsorbed on the surface of inorganic oxides, such as alumina, silica and clay, or 'doped' supports absorb microwaves whereas the solid support does not absorb or restrict their transmission. The bulk temperature is relatively low in such solvent free reactions although higher localized temperatures may be reached during microwave irradiation. These solvent-free MW assisted reactions provide an opportunity to work with open vessels thus avoiding the risk of high pressure development and increasing the potential of such reactions to upscale.

Microwave assisted organic synthesis

While fire is now rarely used in synthetic chemistry, it was not until Robert Bunsen invented the burner in 1855 that the energy from this heat source could be applied to a reaction vessel in a focused manner. The Bunsen burner was later superseded by the isomantle, the oil bath or the hot plate as a means of applying heat to a chemical reaction. In the past few years, heating and driving chemical reactions by microwave energy has been an increasingly popular theme in the scientific community.

In those early days, experiments were typically carried out in sealed Teflon or glass vessels in a domestic household microwave oven without any temperature or pressure measurements. The results were often violent explosions due to the rapid uncontrolled heating of organic solvents under closed-vessel conditions. In the 1990s, several groups started to experiment with solvent-free microwave chemistry (socalled dry-media reactions), which eliminated the danger of explosions[90]. Here, the reagents were pre-adsorbed onto either an essentially microwave-transparent (i.e., silica, alumina or clay) or strongly absorbing (i.e., graphite) inorganic support, that additionally may have been doped with a catalyst or reagent. Particularly in the early days of MAOS, the solvent-free approach was very popular since it allowed the safe use of domestic microwave ovens and standard open-vessel technology. While a large number of interesting transformations using "dry-media" reactions have been published in the literature, technical difficulties relating to non-uniform heating, mixing and the precise determination of the reaction temperature remained unresolved, in particular when scale-up issues needed to be addressed. Alternatively, microwave-assisted synthesis has been carried out using standard organic solvents under open-vessel conditions. If solvents are heated by microwave irradiation at atmospheric pressure in an open

vessel, the boiling point of the solvent typically limits the reaction temperature that can be achieved. In order to nonetheless achieve high reaction rates, high-boiling microwave-absorbing solvents have been frequently used in open-vessel microwave synthesis. However, the use of these solvents presented serious challenges in relation to product isolation and recycling of the solvent. Because of the recent availability of modern microwave reactors with on-line monitoring of both temperature and pressure, MAOS in dedicated sealed vessels using standard solvents – a technique pioneered by Christopher R. Strauss in the mid-1990s has been celebrating a comeback in recent years. This is clearly evident surveying the recently published (since 2001) literature in the area of controlled microwave-assisted organic synthesis (MAOS). It appears that the combination of rapid heating by microwaves with sealed-vessel (autoclave) technology will most likely be the method of choice for performing MAOS on a laboratory scale in the future. Importantly, recent innovations in microwave reactor technology now allow controlled parallel and automated sequential processing under sealed-vessel conditions, and the use of continuous- or stop-flow reactors for scale-up purposes[3].

Today, microwave chemistry is as reliable as the vast arsenal of synthetic methods that preceded it. Since 2001, therefore, the number of publications related to MAOS has increased dramatically, to such a level that it might be assumed that, in a few years, most chemists will probably use microwave energy to heat chemical reactions on a laboratory scale. Not only is direct microwave heating able to reduce chemical reaction times significantly, but it is also known to reduce side reactions, increase yields and improve reproducibility.[4,5] Therefore, many academic and industrial research groups are already using MAOS as a technology for rapid reaction optimization, for the efficient synthesis of new chemical entities or for discovering and probing new chemical reactivity.

### Representative examples of the microwave reactions:

1. R. S. Varma *et al*., have reported the microwave assisted solvent-free K-10 Clay supported synthesis of 2-Aryl-2,3-dihydroquinolin-4(1*H*)-ones **(1.2)** by the cyclisation of (*E*)-1-(2-Aminophenyl)-3-arylprop-2-en-1-ones **(1.1)**.[6,7]

**Scheme-1.1**: *Synthesis of 2-Aryl-2,3-dihydroquinolin-4(1H)-ones* **(1.2)**

(1.1) → (1.2) (70 80%)

$R_1 = C, Br, CH_3, OCH_3$ $R_2 = H, OCH_3$
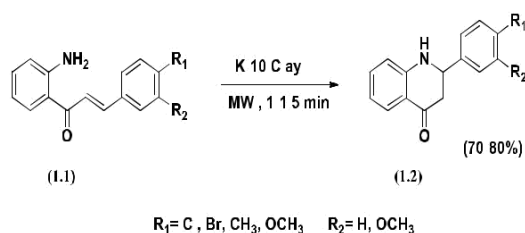
2. M. G. Gündüz[94] *et al.,* have synthesized 9-(1*H*-Indol-3-yl)-3,3,6,6-tetramethylde cahydroacridine-1,8(2*H*, 8a*H*)-dione (**1.6**) by the reacting a one pot multi component mixture of indole

carboxaldehyde (**1.3**), 4,4-dimethyl-1,3-cyclohexanedione (**1.4**) and ammonium acetate (**1.5**) was irradiated under microwave (power 50 W, maximum temperature 120 °C) in 5 mL methanol.

Scheme-1.2: *Synthesis of 9-(1H-Indol-3-yl)-3,3,6,6-tetramethyldecahydroacridine-1,8(2H, 8aH)-dione* (**1.6**)[15]
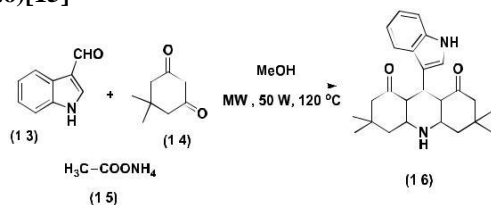
3. P. Ghattas *et al.,* have synthesized *N*-Phenethylbenzenesulfonamide (**1.9**) by reacting 2-vinylpyridine (**1.7**) and benzenesulfonamide (**1.8**) under microwave irradiation (170 °C at a maximum of 60 W).

Scheme-1.3: *Synthesis of N-Phenethylbenzenesulfonamide* (**1.9**)
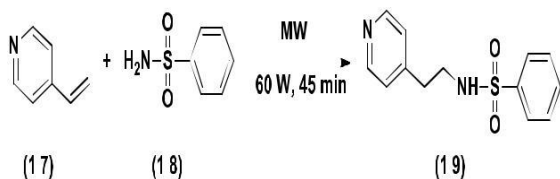
4. R. S. Varma[96] *et al.,* have been reported the microwave assisted solvent-free and KF-Al$_2$O$_3$ supported synthesis of Benzofuran-2-yl (aryl) methanones (**1.12**) by the reaction of Substituted salicylaldehyde (**1.10**) and α-Tosyl oxyketones (**1.11**).

Scheme-1.4: *Synthesis of Benzofuran-2-yl(aryl)methanones* (**1.12**)[8,9]

(1.10)   (1.11)   (1.12)
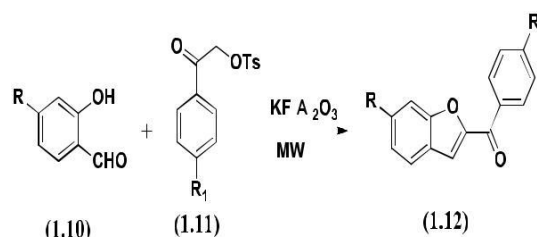
CONCLUSION:

In view of the applicability of heterocyclic compounds, It is endeavor to undertake the synthesis of heterocycles bearing aurones, imidazolyl-pyrimidine, imidazole, 1,2,3-triazole, isoxazoline, flavanone and flavonols moiety. The placements of a wide variety of substituents on these moieties have been designed in order to evaluate their biological activities such as, Antifungal ,Anti-inflammatory ,Anti-bacterial ,Anti-convulsant ,Anti-allergic ,Herbicidal, Anti-cancer activity by using green methods.

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Recent Trends in Biodegredable Polylactitde

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*Abstract—***Polylactide is the polymer of lactic acid which is obtained from the natural source of starch, sugarcane, corn, cassava roots etc., is one of the alternatives for petroleum based polymer material. Nowadays we are facing much problem in solid waste, main think is to reduce SW and environment have to sustain for future generation through eco-friendly activities. So that polylactide can be substituted in place of non-biodegradable polymer, by increasing its mechanical, chemical & biological properties. In recent year much more research were done in order to meet the eco-friendly requirement based on PLA. Nowadays there is a need for intended consumers & biomedical applications ,however the demand have been increasing significantly in the last decade. In the first part of review we discuss about advantages, limitations and applications of unmodified PLA and in the second part the major drawbacks, while preparing bulk PLA and whatever the research had been proceed to overcome the issues.**

Keywords - polylactide ,biodegradability, eco-friendly,

Solid waste management &biomedical.

I. INTRODUCTION

In the recent years we are facing much trouble over the solid waste management that too highly by means of petroleum based polymer. From the last 70 years tones and tones of non biodegradable polymers are produced. Plastic polymer although it is simple small molecule combines to form large polymer and having properties of resistance to corrosion ,light weight ,high strength, transparency, low toxicity. Out of that some of them are recycled and most of them are disposed in the ecosystem as a waste. So that huge amount of solid waste is produced by means of non-biodegradable plastic. Generally plastics are resistance to microbial activity and the plastic will take much time to degrade. But in case of enzyme microbes also it is short term living organism so that microbes can't easily destroy the non-biodegradable polymer. Disposal of this type of waste also produces carbon dioxide which also contributes to global warming and some of them release toxic gases also. Nowadays each and every place say like, industry, research, food packing markets etc., plastic is an important ultimate commodity of convenience .Alongside a solution to the existing plastic waste problem, a new plastic future is also required.

Reduce; reuse & recycle have been embraced as the common approach to combat the escalating plastic waste problem. The dream is to create a circular plastic economy where products are 100% recyclable, used for as long as possible and their waste has to be minimized.

Therefore in addition to these three solutions to the plastic waste problem (Reduce, reuse& recycle) we need a fundamental change in order to make a noticeable change in the environment .So a new plastic future is introduced in which biodegradable polymers replace conventional plastics. The common synthetic biodegradable polymers are polylactide, polyglycolide, polycaprolactone. Etc., these polymers come under 'environment biodegradable polymer'. Under that for several years application of biodegradable polymers in different areas where studied. In such a case high molecular weight PLA polymer have been obtained by ring opening polymerisation of lactic acid monomer which in turn obtain form sugarcane stocks, corn etc. There are no toxic or global warming gases are emitted. Globally biopolymers make up nearly up to 3,00,000 metric in the plastic market. Nevertheless even the biopolymer market has been going increase in 20-30% every year. Polylactide contains α-hydroxyacid with chiral atoms and existing two enantiomers L-lactic acid and D-lactic acid.

A large number of investigation are made in PLA and its future application might be in biomedical applications like tissue engineering, drug delivery, pesticides in agriculture and to replace of plastic water bottles etc., The commercial attractive is, it can be synthesised by natural availability. It includes production from renewable resources and while disposal it easily biodegraded able .But main problem as easy brittle in thicker character .So PLA is one of the commercial overcoming the product in market with its use and decrease in bulk price. According to Bogaert and coszach suggested PLA price could decreases with increase in market potential by factor 10. So that while utilization increases automatically the production will be in bulker and the production cost can be compensated. The natural material whatever we are utilising it has to be undergo some compensation with their physical & chemical properties. So will have discussion over polylactide structure and its properties. Polylactide generally have bio-degradability, toughness heat resistance, tensile stress partially, even though we are in need of some other property like antibacterial, resistance to reaction , reduction in green house gases, etc., So, this can be attained by doing some modification in PLA either by using some physical treatments like using, modifiers ,blending co polymerisation, etc.,

Generally it is preferable it having following advantages when we go with alternatives because ,a) renewable energy b)significant energy savings) ability to recycled) improves the agricultural economize)production of hybrid paper-packing matter and f)it physical property can be improved by material modifications.

1.1General properties

It is colourless and made up of alpha hydroxyl group and it can be prepared from natural as well as synthetic method. It has L-lactic acid & D-lactic acid as well as racemic

mixture in equal form. Generally it is a hygroscopic nature. Some of the properties like brittleness, flexibility, glass transition temperature, etc are main responsible for preparation of bio plastic.

1.2 PLA advantages

a. Biodegradable: Renewable resources it can be obtained naturally and easy biodegradable.

b. Power savings: While preparation it will consume minimum energy

c. Compatibility: Due to compatibility & thermal processibility it is used in medical purpose.

1.3 PLA disadvantages

i. Poor toughness which has less than 10% elongation it starts to break its due to non crossed linked monomer.

ii. Slow degradation rate: PLA has started to degrade with ester groups and degradation depends on PLA crystalinity, molecular weight & water diffusion rate sometimes it has 3 to 5 years.

iii. Hydrophophicity. Its highly hydrophophic and having static water contact angle of 80ºc, so that result in less contact towards water.

iv. Lack of reactivity on side chain. It is chemically inert group no inert group is there to undergo chemical reaction. So that modification of PLA is also one more problem over the modification to meet the needs.

v. Heat resistance. Whenever material we are using in commercial purpose it has to hold properties at maximum temperature for prolonged period of time. So in such case PLA has 3 forms, crystalline form, rigid & mobile amorphous forms. Already PLA had low degree of crystalinity has a great proportion in it MAF state which exhibits high mobility in its glass transition temperature, so it has very low heat resistance.

1.4 Application s of PLA

Business products	Commercial applications
1. Rigid thermoforms	—cool drink cups,
	—disposal article,
	—shelf life trays etc.
2. Biaxially oriented films	—consumer packaging
	— twist rap for candy & flower wrap
	— bags & cartons
3. Bottles	— short shelf life milk & oil packing
4. Apparel	— sports
5. Non-Wovens	—wipes ,
	—hygienic products,
	—Agriculture and geo textiles
6. Household & Industrial fabric	—bedding, diapers,
	— Table clothes
	— Cubicle fabrics
7. Carpet	— surface yarn, fabrics
8. Fiberfill	— mattress
	— Pillow

These above are all applications are running under the present generation by Cargill Dow who is the natural preserver.

In order attain eco-friendly environment still many applications are over then running but our main target to replace the petroleum based non-biodegradable plastic to eco friendly biodegradable plastic.

Now we have clear three draw backs as toughness, slow degradation rate, hydrophophicity, lack of reactivity, heat resistance, etc. Out of which we have to overcome mainly toughness, degradation& reactivity.

There are more methods are nowadays coming over the polylactide field .so let we have overview of the references and what as the application over now will be discussed in forth coming part.

II. EXPERIMENTAL PARTS

Let we see the experimental modification and reports

1. Polylactide with silicate nanocomposite

The biodegradability of nanocomposite is increased when PLA nanocomposite with OMSFM[1](organic modified synthetic fluorine mica), they had a conclusion that when there is alteration of if any factor that increase the hydrolysis of PLA matrix, ultimately control the degradation process. By second think they had concluded by its state say in case of amorphous state get degraded easily compare to crystal phase. The results show there is increase in amorphous state PLACN4 than in neat PLA .So that it concludes biodegradability increases by increase in nanocomposite PLACN4 than neat PLA.

2. Increase of biodegradability of polylactide

PLA is naturally degraded by hydrolysis generally it is more challenging because largely resistance to attack by microorganism in the soil. Till six week no degradation takes place in the soil and there is reduction in molecular weight takes place .By experimental part they had a degradation at 65ºc for 30 days. Some of the enzyme are started to depolymerise hydrolyse, that to not as PDLA (D lactic acid), but as PLLA (L lactic acid) by bacteria using casein, silk fibroin. A bacteria Amycolatopsis[2] strain from soil environment which having the capable of degrading 60% of PLA film within 14 days.

3. Polylactide based sustainable material for application

i) Based on Heat resistance generally PLA depends on three category

a. Crystalline fraction

b.Rigid Amorphous

c.Mobile Amorphous

Main drawbacks over the heat resistance based on the crystalinity , when increases in crystalinity in PLA then there is increase in heat resistance of PLA.It has improved by[3] i) addition of nucleating agent & stereo complex ii) blending with heat resistance polymer, iii) adopting different processing strategies & iv) fabrication of biocomposites. Mainly by means of annealing the, crystalinity have been increased .In most of the work addition of nucleating agent in combination of annealing or high temperature also increase the heat resistance. Blending PLA with heat resistance polymer like polycarbonate, nylon etc., will improve the balanced toughness and stiffness of the PLA . Incorporation of nanocomposites over the PLA is one of the important strategies inorder to improve the heat resistance of PLA. Layered silicate nanocomposite offer desired improvement in heat resistance HDT only when the silicate layers of clay are intercalated and distributed in PLA matrix.

ii).Poor toughness

PLA super toughening studies have not done in particle size distribution, bimodal particle size distribution was observed when PLA with high molar was used to toughen PLA sample prepared by compression moulding. Although super toughening effect was not attained higher impact strength compared and it's due to relative size of larger domains. In PLA toughened with POE the particle size and the rubber content was increased. But still there are no proper experiments as gone through to attain the increase in toughness.

4. Biodegradable composite based on Poly L-lactide with jute fibre.

There is a one main commercial attractive features of PLA is packing material, where disposing it might be done by incineration or by land filling's , but during the biodegradable there is close of loop takes place mainly to increase in strength and stiffness is needed. As per earlier researches PLLA have to combine with suitable light weight compound. So in such case here utilizing jute fibres which are commercially available in India & Bangladesh. Here they had utilized jute Non-woven mat along with L-polylactide and they examined the results[4]

i. Tensile Stress

The tensile strength yields, determined the graph plat between slope of tangent to stress strain curve through origin and elongation to maximum on curve is determined.

ii. Impact test

The comparison of impact resistance test have been conducted in between Neat PLA and PLA & jute composite .The conclusion as PLA & jute composite have better resistance.

5. Polylactide with organically modified layer of silicate as nanocomposite increase in biodegradability.

Preparation of PLA with OMLS[5] montmorillonite (mmt) modified with octadecylammonium cation (C18-mmt). WAXD analyse & TEM observed that there is improvement of biodegradability.

The oxygen gas transmission rate of neat PLA and PLACN4 was measured at 20 °C and 90% relative humidity by the ASTM D-1434 differential pressure method (GTR30XAU, Yanaco Co.). Test samples were prepared by compression moulding (thickness) $\sim$ 300 μm), and melt quenched amorphous samples were used for this measurement. It seems the biodegradability increase from neat PLA to PLACN4. The decrease of molecular weight and residual weight percentage in time are recorded and found it out biodegradability of poly lactide increases.

III .RESULTS & DISCUSSION

The above cited discussion from the part of experimental values its came to that (1) by using nanocomposite of synthetic fluorine mica will increase the main property of biodegradability. Next part (2) they had discussed over the biodegradability by using enzyme that to specific to PLLA. In part (3) they had been observed the increase in property of polylactide like, toughness & heat resistance. Next to that part of (4) PLLA with jute increase of tensile strength & impact resistance. In the final there is discussion over the PLA with OMLS modified octadecyl ammonium cation which shows us increase in biodegradability.

IV CONCLUSION

Plastic, a highly useful and convenient material, is also one of the world's greatest environmental problems, yet both industry and society are still heavily reliant on its usage. Following 80 years of innovation involving disciplines spread across industry and academia, mass production of plastic became successful and revolutionized consumerism in a post-World War II generation. Plastic, although a simple synthetic polymer, with properties ranging from, resistance to corrosion, light weight, high strength, transparency, low toxicity to durability. Used by almost every industry in the world, from food packaging to space exploration, plastic is the ultimate commodity of convenience. Household names in the plastic industry include polyethylene terephthalate (PET), polyethylene (PE), polypropylene (PP), polystyrene (PS) and polyvinyl chloride (PVC). Reduce; reuse and recycle have been embraced as the common approach to combat the escalating plastic waste problem. For now, progress remains slow despite advances in molecular level recycling, which enables different plastics to be recycled together. Recycling is costly, reliant on human behavioral changes and produces lower quality materials, in terms of both thermal and mechanical properties. Additionally, recycling does not curb our plastic addiction; if we want to maintain our current lifestyles modification to plastic manufacture needs to go hand in hand with effective recycling. So that now a day's worldwide research have been undergoing based on biodegradable polymers. The most commonly known synthetic biodegradable polymers are polylactide (PLA), polyglycolide (PGA), polycaprolactone (PCL), polyhydroxyalkanoates (PHA), poly(butylene succinate) (PBS) and poly(butylene adipate-co-terephthalate) (PBAT).So in such a case here selected PLA and what are all the mechanical problems and how homes it can be overcome are all discussed here .And here we are in need of still increase of properties like heat resistance,   biodegradability,   tensile   stress,   impact

resistance etc.,. Still we are in need of research developments in increase of property like toughness, corrosion resistance, while food packing antibacterial activity, durability, etc., So in such a case if we improve the properties PLA will play a vital role in replacing of non-biodegradable plastic in future.

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EFFECT OF DIFFERENT PROCESS PARAMETERS ON THE SYNTHESIS AND CHARACTERIZATION OF CARBON NANOTUBES

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ABSTRACT:

Carbon Nanotubes (CNTs) have been of great interest, since their discovery, both from a fundamental point of view and for the future applications. The present work includes the synthesis of Carbon Nanotubes by Arc Discharge Method and the effect of various process parameters during the synthesis. Optimization of the process parameters is necessary for the high yield and good quality of the CNTs with low carbon subsidiary impurities. In the case of synthesis of Multi walled carbon Nanotubes, the study pertains to analysis of the effect of the buffer gas used; the effect of the partial pressure of the buffer gas and effect of shape of cathode on the synthesis of MWCNTs. From the experimental trials, synthesis of MWCNTs seemed to be favorable in Hydrogen atmosphere as the synthesis time of 80 mins in Helium is reduced to 8 mins in Hydrogen. There also appears to be no effect of variation of partial pressure of buffer gas Helium between 300 Torr & 440 Torr on the co- synthesis of SWCNTs & MWCNTs.

KEYWORDS:
Carbon nanotubes, MWCNTs Amorphous carbon, Graphite nano particles, Arc Discharge.

1INTRODUCTION:

1.1CARBON

Carbon is the lightest member of the IVA family of the periodic table with atomic number 6 and electronic configuration $1s^2 2s^2 2p^2$. Its first ionization potential is 11.26V. The atomic weight of $C^{12} = 12.0000$ was established by the IUPAC in 1961 as the standard of atomic weights. . It is a non-metallic solid which comes under p- block elements of the periodic table. It is a tetravalent compound having four valence electrons to form covalent chemical bonds

1.2ALLOTROPES OF CARBON

The three relatively well-known allotropes of carbon are amorphous carbon, graphite, and diamond. Once considered exotic, fullerenes are nowadays commonly synthesized and used in research; they include buckyballs (C_{60}), carbon nanotubes, carbon nanobuds (C_{60} attached to Carbon nanotube wall) and nanofibers. Several other exotic allotropes have also been discovered, such as lonsdaleite, glassy carbon, carbon nanofoam and linear acetylenic carbon.

1.3CARBON NANOTUBES

Carbon nanotubes are extraordinary macromolecules containing only carbon. They are formed by rolling up graphene sheets. Nanotubes are members of the fullerene structural family, which also includes the spherical buckyballs. The ends of a nanotube might be capped with a hemisphere of the buckyball structure.

Carbon nanotubes (CNTs) are one of the most commonly mentioned building blocks of nanotechnology. With one hundred times the tensile strength of steel, thermal conductivity better than all but the purest diamond, and electrical conductivity similar to copper, but with the ability to carry much higher currents, they seem to be a wonder material.

1.3.1TYPES OF CARBON NANOTUBES AND RELATED STRUCTURES

Carbon Nanotubes are categorized as Single-walled carbon nanotubes (SWCNTs) and Multi-walled carbon nanotubes (MWCNTs).A Single walled carbon nanotube is a rolled up sheet of graphene, which is a planar- hexagonal arrangement of carbon atoms distributed in a honeycomb lattice. Nano tubes can have a single wall (SWNTs) or multiple walls (MWNTs), which consist of several concentric single-walled nanotubes.

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1.3.2 SYNTHESIS OF CARBON NANOTUBES

There are several techniques for producing single and

Multi walled nanotubes. And, all of them have advantages as well as disadvantages. The most established methods are the high temperature techniques, namely arc discharge and laser ablation, as well as chemical vapor deposition.

THE ARC DISCHARGE METHOD

The carbon arc discharge method, initially used for producing C60 fullerenes, is the most common and perhaps easiest way to produce carbon nanotubes as it is rather simple to undertake. However, it is a technique that produces a mixture of components and requires separating nanotubes from the soot and the catalytic metals present in the crude product. This method creates nanotubes through arc-vaporisation of two carbon rods placed end to end, separated by approximately 1mm, in an enclosure that is usually filled with inert gas (helium, argon) at low pressure (between 50 and 700 mbar). A direct current of 50 to 100 A, driven by approximately 20 V creates a high temperature discharge between the two electrodes. The discharge vaporises one of the carbon rods and forms a small rod shaped deposit on the other rod. Producing nanotubes in high yield depends on the uniformity of the plasma arc and the temperature of the deposit form on the carbon electrode.

2. EXPERIMENTAL PROCEDURE

2.1 SYNTHESIS OF MULTIWALLED CARBON NANO TUBES:

Arc Discharge set up consists of a cylindrical stainless steel chamber with dimensions of 480 mm length and 730 mm diameter. Enclosed in the chamber are two graphite electrodes, a stationary cathode of 75 mm diameter, 20 mm thick, of pure graphite and a movable anode of dimension 15x15x180mm of pure graphite. Fig 1 (a) and (b) shows the Graphite anode bar and the Flat Graphite cathode that are used for the synthesis of Multi walled carbon nanotubes. The chamber and the graphite electrodes are independently water cooled up to 6.5 bar. Each run begins by evacuating the chamber followed by backfilling with buffer gas.
For igniting the arc, the movable graphite anode is made to touch the stationary graphite cathode. Fig 1 (c) shows the plasma arc that is produced inside the chamber, during the process of arcing.

instantly adjusted in the range of 0-3 cm min^{-1}. The arc current and voltage are monitored automatically and can be precisely controlled by adjusting the output of the arc power supply and the gap between the two discharging surfaces. A self-sustained stabilized arc-discharge is established by carefully adjusting the arc-discharge parameters. The anode is continuously sublimated and some of the carbon vapour gets condensed and is deposited on the stationary cathode. The cylindrical cathode deposit grows steadily while the gap between the two surfaces remains constant (about 1 mm). Fig 1 (d) shows the Cathode deposit that is obtained when the synthesis is carried in Helium buffer gas. The remaining carbon vapour is condensed and deposited on the walls of the chamber as soot. After the completion of each run, the chamber is allowed to cool. Scraping tools are used to remove and collect the soot material that remains affixed to the chamber walls. The cathode deposit which consists of pristine Multi walled carbon nanotubes and other carbonaceous impurities are characterized by a variety of analytical techniques including Field Emission Scanning Electron Microscopy (FE-SEM, S4300SE/N) and Thermo Gravimetric Analysis (TGA, NETZCH STA 449 Jupiter).

For the synthesis of Multi walled carbon nanotubes, five production runs were carried out using Helium as buffer gas under the partial pressure of 300 Torr. Details of the production runs mentioned in Table 1. For evaluating the effect of the type of the buffer gas on the synthesis of Multi walled carbon nanotubes, three more production runs were carried out using Hydrogen as buffer gas at partial pressures of 200,350and 500 Torr. Details of the experiments are mentioned in Table 2.

Figure 1 (e) shows the cathode deposit. For evaluating the effect of the shape of cathode on the synthesis of Multi walled carbon nanotubes, five more experiments were carried out using Hydrogen as buffer gas under the partial pressure of 350 Torr. Details of the experiments are mentioned in Table 3.The cup shaped cathode is shown in Figure 1 (f). The time taken for each experiment was 80 min in Helium compared to that of 8 min in Hydrogen.
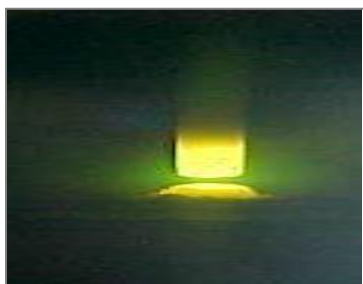
(a)Graphite Anode bar

The power supply is set to 40V and the current may fluctuate between 180 and 742 Amps. An accurate positioning system is employed to maintain a steady feed rate of the movable anode, which can be

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(b) Flat graphite cathode

(c) Plasma arcing inside the chamber

(e) Cathode deposit In Hydrogen

(f) Cup shaped graphite cathode

Fig 1

Table 1: Details of the Synthesis of Multi-Walled Carbon Nanotubes in Helium atmosphere at 300 Torr

Expt. No.	Initial Weight of the anode (Grams)	Cathode deposit (Grams)	Current (Amps)	Voltage (Volts)
1	63.7320	36.801	742-212	40
2	59.8098	31.45	302-220	40
3	60.02	36.7475	456-212	40
4	64.0221	43.982	304-207	40
5	54.0747	25.0405	386-180	40

(d) Cathode deposit in Helium

(d) Cathode deposit in Helium(b) Flat graphite cathode
(e)   Cathode   deposit   In   Hydrogen

(f) Cup shaped graphite cathod

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Table 2: Details of the Synthesis of Multi Walled Carbon Nanotubes in Hydrogen atmosphere

Ex no	Initial weight of the anode (grams)	Partial pressure of hydrogen (Torr)	Cathode deposit (grams)	Yield,%	Current (Amp)	Voltage (Volts)
1	12.6155	200	3.2048	32	623-465	40
2	47.8436	350	17.999	41	714-305	40
3	32.7046	500	9.0901	34	631-264	40

Table 3: Comparative study of Multi Walled Carbon Nanotubes synthesized with Flat type cathode and cup Shaped cathode

Expt. No	Shape of the cathode	Initial weight of the anode (grams)	Partial pressure of hydrogen (Torr)	Cathode deposit (grams)	Current (Amps)	Voltage (Volts)
1	Cup	28.1647	350	10.94	610-406	40
2	Cup	18.55	350	7.8	175-150	30
3	Flat	18.49	350	7.9397	201-145	30
4	Flat	18.2734	350	9.1146	175-110	25
5	Flat	17.6983	500	7.8056	159-120	25

3.0 CHARACTERIZATION

The as grown Multi walled carbon nanotubes were characterized by FESEM (Field Emission Scanning Electron Microscope) and the Thermo Gravimetric Analysis (TGA).

3.1Field Emission Scanning Electron Microscope (FESEM):

The FESEM is very useful tool to observe the nano particles. Under vacuum, electrons generated by a Field Emission Source are accelerated in a field gradient. The beam passes through Electromagnetic Lenses, focusing onto the specimen. As a result of this bombardment different types of electrons are emitted from the specimen. A detector catches the secondary electrons and an image of the sample surface is constructed by comparing the intensity of these secondary electrons to the scanning primary electron beam. Finally the image is displayed on a monitor. This instrument is used for observing sample surfaces at high magnifications.

3.2TGA: Thermo Gravimetric Analysis:

Thermo Gravimetric Analysis (TGA) is a type of testing that is performed on samples to determine changes in weight in relation to change in temperature. Such analysis relies on a high degree of precision in three measurements: weight, temperature and temperature change. A derivative weight loss curve can be used to tell the point at which weight loss is most apparent. TGA is commonly employed in research and testing to determine characteristics of materials such as polymers, to determine degradation temperatures, absorbed moisture content of materials, the level of inorganic and organic components in materials, decomposition points of explosives and solvent residues. It is also often used to estimate the corrosion kinetics in high temperature oxidation.

4.0 RESULTS AND DISCUSSION

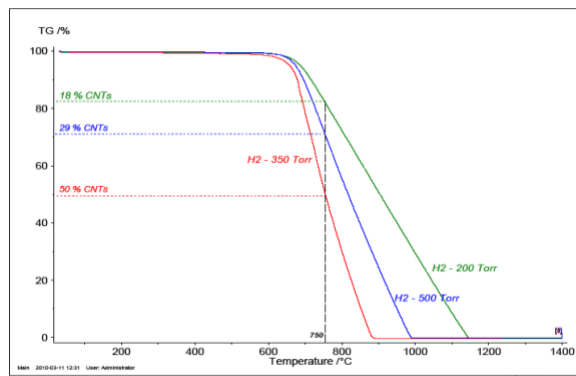## SYNTHESIS OF MULTI WALLED CARBON NANOTUBES

Fig2: TGA of cathode deposits obtained at different partial pressures of Hydrogen

Figure 2 above shows the thermo gravimetric analysis of the cathode deposits obtained in hydrogen atmosphere at different partial pressures of 200 Torr, 350 Torr and 500 Torr. From the TGA Curves, shown in Figure 2, it is observed that the onset of oxidation for MWCNTs synthesized at partial pressure of 200,350and 500 Torr commenced at temperature of 600,550 and 650 deg C respectively. From the above observation, it can be inferred that amorphous carbon does not exist. From the TGA Curves, it is further observed that, MWCNTs, appears to be maximum (~50%) for the deposit obtained at 350 Torr, compared to deposits obtained at 500 Torr (~29%) and 200 Torr (~18%).
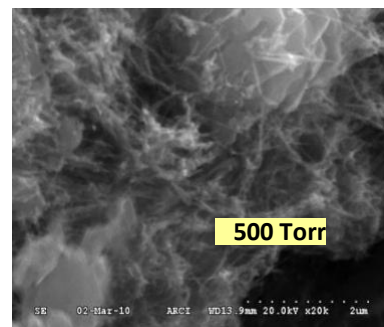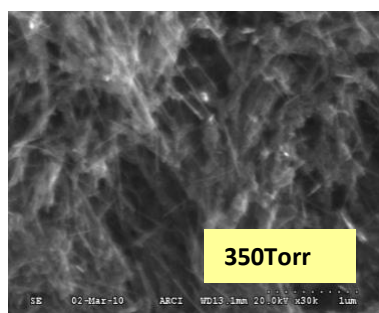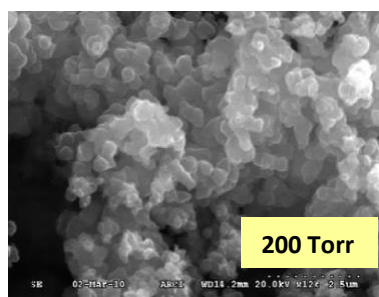
Fig 3: SEM images of the as synthesized deposits obtained in hydrogen atmosphere

Figure 3 shows the SEM images of all the three deposits obtained in hydrogen atmosphere at different partial pressures of 200 Torr, 350 Torr and 500 Torr. From the SEM images, maximum amount of MWCNTs are seen in the deposit obtained at 350 Torr. The amount of CNTs is slightly more on the bottom portion of the deposit obtained at 500 Torr. Maximum amount of graphite nanoparticles are seen in the deposit obtained at 200 Torr.

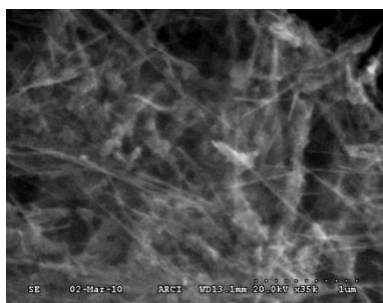**Fig 4: TGA of the deposits obtained in Helium**
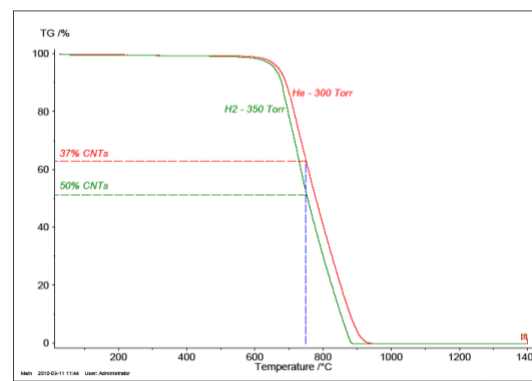
and Hydrogen atmospheres

Figure 4 shows the thermo gravimetric analysis of the deposits obtained in helium and hydrogen atmospheres. From the TGA curves shown in figure 4, MWCNTs synthesized in Hydrogen and Helium atmospheres at partial pressure of 350 and 300 Torr respectively, it is observed that more number of MWCNTs are present in the deposit obtained in hydrogen atmosphere (~50%) compared to that obtained in helium atmosphere (~37%).For the purpose of the above comparison, MWCNTs synthesized in Helium atmosphere at partial pressure of 300 Torr is selected based on the earlier experimental results, which established that MWCNTs synthesized at partial pressure of 300 Torr gives better yield of MWCNTs than other partial pressures.

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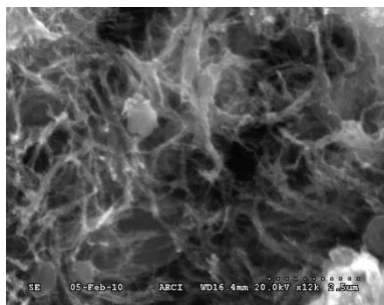
SEM image of the deposit obtained at 300 Torr of Helium

SEM Image of the deposit obtained at 350 Torr of Hydrogen
Fig 5

Figure 5 shows the SEM images of the deposits obtained in helium and hydrogen atmospheres at partial pressure of 300 and 350 Torr respectively. It is clear that the CNTs are more and amorphous carbon is less in hydrogen atmosphere compared to that in helium atmosphere. Also, the CNTs obtained in helium atmosphere are bent and randomly oriented Whereas, the CNTs have linear orientation and are well distributed, when the synthesis is carried out in Hydrogen atmosphere.

Synthesis of MWCNTs is favourable in hydrogen gas because the ionization energy of hydrogen (1312 kJ.mol^{-1}) is very less compared to that of helium gas (2372.3 kJ.mol^{-1}). Under such conditions, the plasma arc generated in Hydrogen is of higher quality and the erosion of graphite rod is faster than in Helium. Hence, synthesis time in Hydrogen is 8 mins as compared to synthesis time of 80 mins in Helium. In addition to that, the Thermal conductivity of Hydrogen (0.1805 W.m^{-1}.K^{-1}) is higher than that of Helium (0.1513 W.m^{-1}.K^{-1}). Dynamic viscosity of Hydrogen is 0.173 x1^{-7} kgf.s./m^2,where as, the Dynamic viscosity of Helium is 0.394x10^{-7} kgf.s/m^2.

The density of Hydrogen is 0.08987 kg/m^3, whereas, density of Helium is 0.1785 kg/m^3. Higher thermal

conductivity accompanied by lower dynamic viscosity and density of Hydrogen enables faster cooling rate of sublimated carbon as compared to Helium.
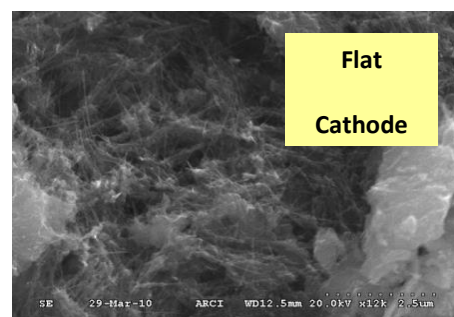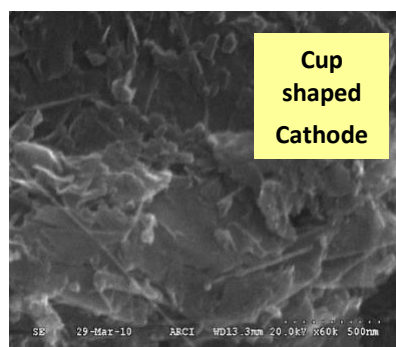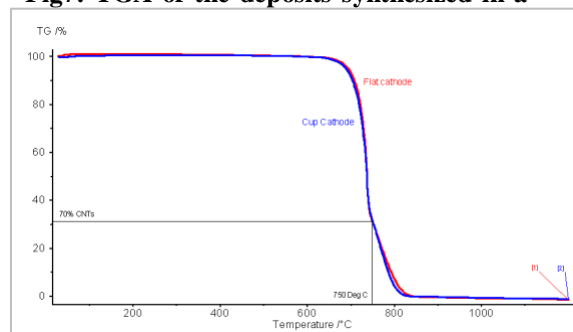

Fig.6: SEM images of the deposit synthesized in a cup shaped cathode and on a Flat cathode.

Fig7: TGA of the deposits synthesized in a

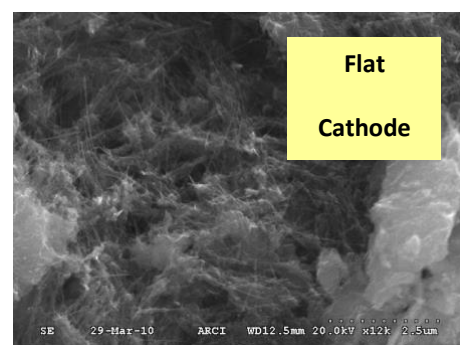**cup shaped cathode and on a Flat cathode**

Figure 6 shows the SEM Images of the deposit synthesized in a Cup shaped Cathode and on a Flat

Cathode respectively, at 30 V and 350 Torr of Hydrogen. It is quite clear that an appreciable number of MWCNTs are present in both the cases

From the TGA curves shown in figure 7, it is observed that 70% of MWCNTs are present in the deposit, when the synthesis is carried out in a cup shaped cathode and on a Flat cathode. Not much difference could be seen, on comparison.

5. CONCLUSIONS

1. Selective growth of both SWCNTs and MWCNTs can be produced within the same arc-discharge run by using appropriate catalyst composition and run conditions, without isolating the tubes of one type from the other.

2. During co-synthesis of SWCNTs & MWCNTs, the as-prepared cathode deposit do not contain the amorphous carbon & catalyst particles which suggests that the wet chemistry may be completely avoided in order to obtain purified MWCNTs from the cathode deposit.

3. Following inferences could be drawn while optimising the parameters, during synthesis of only MWCNTs

   a) Partial pressure of 350 Torr has given better yield of MWCNTs in Hydrogen atmosphere.

   a) Better yield of MWCNTs can be obtained in Hydrogen than in Helium.

   b) No significant improvement in the yield of MWCNTs, with respect to the synthesis in cup-shaped cathode or flat type cathode.

   c) As-prepared cathode deposit does not contain the amorphous carbon which suggests that further purification is not required.

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