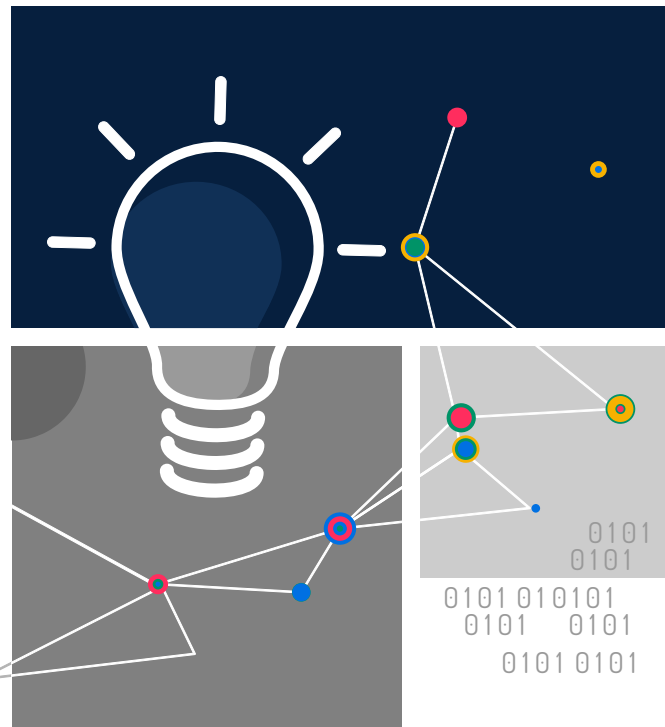


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Preface

Data is the new currency of 21st century. In this era of information and technology organizations are generating large number of data every day, If analysed properly it gives valuable insights which can enhance decision making. Technology is playing a pivotal role in dissecting this large data set and provide intelligence for the business. Emerging technologies and business intelligence (ETBI) conference is organized to disseminate knowledge and information about various emerging technologies used for business intelligence and business analytics. The conference was organised by School of Management in association with the Department of Operation Research and Business Intelligence, Wroclaw Tech, Poland on 17th March 2022. 125+ Participants from more than 3 countries and 8 states have participated in this conference. Participants were able to explore the learning through keynote speeches, Lecture series and interaction meetings with international delegates, research paper presentations organised as a part of conference. Keynote speeches on contemporary tools and technologies were given by experts from Wroclaw Tech Poland, IIM Ahmedabad as well as people from Industry. 65 participants from multidisciplinary backgrounds have presented their research papers in this conference.

We would like to express our gratitude to the management of RK University especially to the chief patron of the conference Shri Denish Patel, EVP, RKU, Shri Mohit Patel, VP, RKU, Dr. TR Desai, Provost, RKU and Dr. Samir Atara, Registrar, RK University encouraging us to organize this international conference. We express our heartfelt thanks to the department of operation research and business intelligence of faculty of management, Wroclaw Tech, Poland for joining hands and being wonderful collaborator for this conference. Special thanks to Mr. Yash Chawla General Chair of this conference for being an initiator of this ETBI series. Conference would have not been possible without the efforts and guidance of Conference Chair Dr. Aarti Joshi who is true torch bearer for this entire conference and continuous support from our conference co-chairs Dr. Ashish Tanna and Dr. Dimitrios, conference co-Convener Dr. Amit Rajdev and all the members of Organizing committee.

The conference proceeding consist of the selected full research/ review papers of the participants. The selection of papers for the proceeding were doing through rigorous review process by the domain experts and published in this proceeding with consent from the authors. Hope the book will be immensely helpful to the researchers, students, people from industry and academicians who would like to explore quality content in the area of emerging technology and business intelligence.

Dr. Chintan Rajani

Conference Convener – ETBI 2023.

Professor & Deputy Director, School of Management,
RK University, Rajkot, India.

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An Empirical Study of Effect of Organizational Politics on Job Stress of Government Employees Of Power Sector In Gujarat State

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Abstract

Organizational politics has been perceived as major source of job-related stress and conflict among employees at workplace. In Today's work life stress is everywhere at workplace may be because employees are working more as compare to their working hours, shortage of staff , favoritism, back biting, flattering and many more. These all together comes under different aspects of organizational politics. This study aims to examines effect of organizational politics on employees' job stress of employees of Power sector in Gujarat State. Total 129 Employees were participated in this study. Employees are from different 7 power sector organizations (Gujarat State Electricity Corporation Limited, Gujarat Energy transmission corporation, Utar Gujarat Vij Company Limited, Madya Gujarat Vij Company Limited, Dakshin Gujarat Vij Company Limited, Pachchim Gujarat Vij Company Limited) under parent organization of Gujarat Urja Vikas Nigam Limited. There are many factors that are contributing in job stress, among all factors organizational politics is one the factor that can increases job related stress. Pearson Correlation analysis has been used in this study to examine relationship of job stress and organizational politics. Result revels perfect relationship of organizational politics on job stress which means both variable move in same direction with increase of one variable other will automatically Increase.

Keywords: Organizational Politics, Job Stress

1. Introduction

Employees in organization are perceived as a human asset, who works for organization in order to increase prolificacy of organization. It is indispensable to utilize maximum capacities of employees', their skill, their expertise in order to achieve maximum organizational goal. Employees can work effectivity when their Job satisfaction is high but there are many factors that affect satisfaction of employees. One of the major factors is job related stress. Workers supposed organizational politics as self-centred activity of individual's , which can be pretend as a cause of absentees, that can be exhausted and can became major source of work tension and turnover intent while enhanced knowledge of awareness of organizational politics increases work satisfaction (Valle & Blake,1). Stress can be defined as detrimental response of employees due to conflict between organizations' demand from employees and employee's skill, authority, employees' capabilities, communication gap, favouritism, unethical practice and many more. Employees in government sector have such benefits of job security, decent pay structure. They should follow ethical practice with integrity, loyalty, impartiality. They have to consider public interest first as their job role is related to public service but somehow to gain more benefits and advantages employees opt unethical practices i.e. flattering, buttering, higher authorities may influenced by these. These can cause job related stress and create negative work environment at workplace.

2. Gujarat Power sector overview: -

Power sector is key building block for economic development of nation. In order to meet demand of rapid industrialization, modern life style power sector of Gujarat has grown drastically in last years (Energy report 2). Mainly power sector is divided in three sub sectors that are Power generation sector, Power Transmission Sector, Power Distribution Sector. These all sub-sectors come under parent organization named Gujarat Urja Vikas Nigam limited (G.U.V.N.L.) which is managed by ministry of Power. Employees under working in these organization have to follow all mandates catered by G.U.V.N.L.

3. Organizational Politics in Government Sector: -

Employees of power sector have such benefits like good perks, job security, fixed income, safe retirement. Plants or job location in these sectors are placed in interior location of Gujarat state so that they have urge to take transfer or promoted in location that may near to metro city.

Employees have different mindset when they join organization like job environment, job safety, facilities and amenities at work place and work load with respect to their need at workplace.

4. Literature Review

This part Include details and data of previous research related to organizational politics , job stress of employees, and effect of organizational politics on job stress for employees of government sector.

Rezwan Ullah, Syed Zubir Ahmed researched on the effect of organizational politics on job related stress; mediating effect of job satisfaction. Objective behind this study was to examine the effect of organizational politics on job related stress with mediating effect of job satisfaction. Researcher use regression analysis and baron Kenny approach to validate hypothesis. Result derived that there is no significant difference between organizational politics and job stress among employees of banking sector in Peshawar District in Pakistan Country.

RK LETSHABA, E Chainomona researched on Organizational Politics and Job stress among SMES Employees. Objective behind conducting this study was to examine the influence of job stress on organizational politics for employees in Matlosana Local District of south Africa. Researcher used smart PLS 3 to test hypothesis. Result revealed positive relation political behaviour and stress.

Dr.Bhavani Shree, Dr. Lakshmi.P2 Dr.Bharthi , et al. researched on Job stress and its effect on employee's productivity and employees commitment. Objective behind conducting this study was to analyses impact of job stress on employee's productivity and commitment among employees of manufacturing sector in maysoor. Result revealed effect of job stress on employee's productivity.

Mr. Devulapally Venkataramana Rao researched on Human Resource Management in India: Some issues and Challenges.

Mahummad Abbas, Usman Raja researched on Impact of Perceived Organizational Politics on Supervisory-Rated Innovative Performance and Job regard Stress. Objective behind conducting this study was to examine effect of organizational politics on job stress and innovative performance. Result revealed detrimental effect of job stress on employee's innovative performance.

Ekawarna, Farida Kohar researched on The Effect Of Perception Of Organizational Politics And Work-Family Conflict On Job Stress And Intention To Quit: The Case Of

Adjunct Faculty Members In One State University. Objective behind conducting this study was to analyse influence of perception of organizational politics and work-family conflict on job stress and intention to quit. Result revealed direct influence of perception of organizational politics on job stress. Researcher also conclude that work environment is major cause of politics and stress.

Pamela L. Perrewe' and Christopher C. Rosen researched on POWER, POLITICS, AND POLITICAL SKILL IN JOB STRESS. Researcher discussed effect of Power, politics and political skill in job stress. Researcher discussed positive and negative effect of organizational politics with reference to job stress.

Gerald R. Ferris, Dwight D. Frink, Maria Carmen et al. researched on Perceptions of Organizational Politics: Prediction, Stress-Related implications with outcomes. Researcher discussed about stress related implication and predictions with reference to organizational politics.

Humera Abdul Hakeem, Sakina Khuda Bakhsh, Kiran Afzal researched on Impact of Organizational Politicking on Occupational Stress, Workplace Incivility and Impression Management in Higher Education sector of Quetta, Pakistan. Objective of this study was to examine the relationship of organizational politics and on occupational stress with reference to impression management. Researcher used Regression analysis to test the hypothesis. Result shows positive relationship of organizational politics on occupation stress and impression management.

Leon Swartz and Chery A Potgieter researched on Work stress, Burnout and Organizational Politics: Perceptions with Experience of Senior Managers in the South African Government Sector. Main objective behind conducting this study was to understand the causes of job-related stress and burnout with reference to organizational politics. Researcher used cross sectional approach to test hypothesis. Result revealed high impact of organizational politics on job stress and burnout.

Rizwan Qaiser Danish, Asad Afzal Humayon, Nauman Aslam researched on Employee's Perceptions of Organizational Politics and Stress at Workplace; A Comparative Study of Public and Private Sector Universities. Main objective behind conducting this study was to impact of employee's perception on organizational politics and job stress. Researcher used regression analysis to test hypothesis. Result revealed positive relationship of organizational politics on job stress which means by increases of one other will also increase.

Chris N. Uzundu, Sampson K. Nwonyi and Onyinye P. Ezema researched on THE RELATIONSHIP BETWEEN JOB STRESS, PERCEIVED ORGANIZATIONAL POLITICS AND TURNOVER INTENTION. Main objective behind conducting this was to analyses relationship between organizational politics and job stress with turnover intention. Researcher use regression analysis to test hypothesis. Result revealed that there is no relationship between organizational politics and turnover intention , job stress and turnover intention.

Relationship of Organization Politics on Job stress

(5 Humera) defined , Stress is a result of socio-economics intricacy and to a degree it is also stimuli producing. Stress has a direct relation with job in addition to employees at workplace. Job stress also identified as occupational and work stress. Work place politics is proposed to be identified as a negative outcome either on organizational front or on an individual front (6,Gilmore et al.). Various researcher conducted by number of researches like (7Jex, 6,Gilmore et al.) revealed that many stress oriented effects are likely to be caused by the employees' involvement in politics at work place(5 Humera). There are many factors that relates stress and organizational politics, one factor can be the presence of uncertainty is identified as a primary factor affecting the level of stress experienced by the individual (8 McGrath). The other point that relates politics in organization with stress experienced is the opportunity or threats are identified. Stress is being defined by (9 Caplan et al.) constraints or threats that are posed to a person as environmental characteristics. After that stress was the featured as opportunity as well as threat (McGrath, 1976). organizational politics offers similar option to the employees therefore that can be concluded as in a similarly comparable manner (10 Schuler).

5. Research Gap

Previous researcher derived mix effect of organizational politics on job stress for employees of Education sector, Hospital, Manufacturing Sector, MSME, Bank in various country like Pakistan, south Africa, Canada, Indonesia. From all literature considered for the study maximum literature are from Pakistan country. No one has done research for government employees of Gujarat Energy sector.

6. Objective

- To identify effect of Organizational politics on job stress.
- To study factors affecting job stress.
- To study factors affecting organizational politics.

7. Research Methodology

To analyse job stress, two factor is considered conflict, Interpersonal relationship and to analyses organizational politics two factors is considered Favouritism and intention to get more and more.

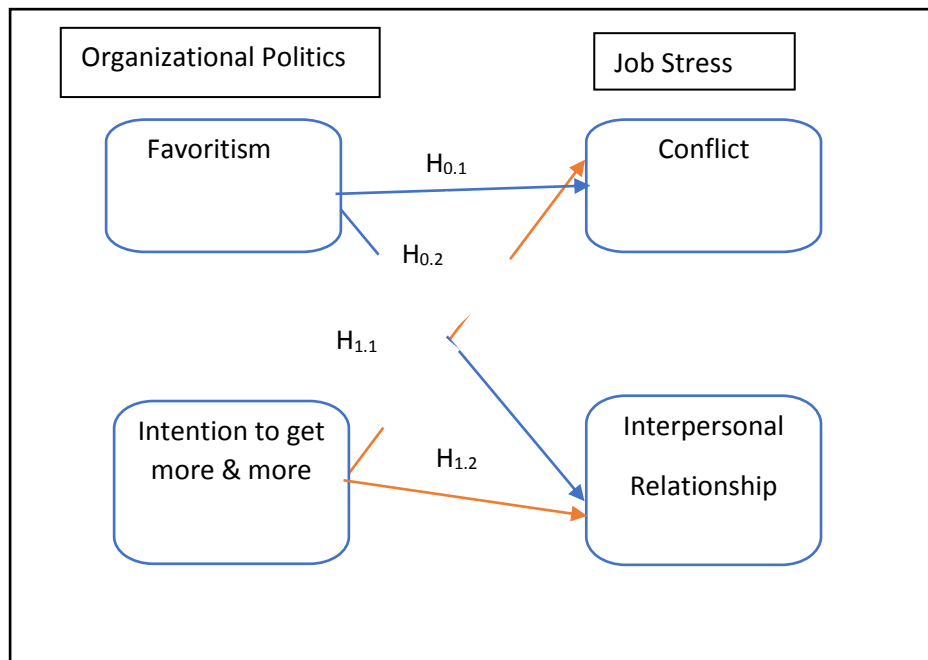


Fig 1. Hypothesis Chart

8. Research Design

Descriptive research is used for this study. The sampling technique used is non-Probability sampling and random sampling method is used for this study. Population is considered as all employees of G.U.V.N.L. Data is collected randomly from its 6 subsidiaries company. Total 110 responses collected for this study.

9. Research Instrument

RQ 1 ;-Many disputes are being unsolved due to malpractice by authorities

RQ 2;-In Organization Higher authorities ignite fight just to break the bond between employees.

RQ 3;-After every conflict, organizations always create win-win situations for both parties.

RQ 4 ;-Employees in organization purposely avoid instruction given by higher authority.

RQ 5 ;-Higher authorities have been rude with other employees.

RQ 6 ;-I feel happy when my team members achieve more.

RQ 7 ;-Employees in organization always feel that they should have friend or relative at high Level Positions to get more advantage

RQ 8 :-Staff are always feel demotivated when employees use direct political contact for getting more.

RQ 9;-Employees in my organization will never be satisfied even if they have enough in their pocket

RQ 10 :-I feel frustrated when my colleagues get more by unethical practice.

10.Data Analysis

Data were collected randomly by questionnaire. 34 responses collected from employees of GUVNL. 15 responses collected from GSECL, 15 responses are collected from GETCO, 15 responses are collected from MGVL, 14 responses are collected from PGVL, 16 responses are collected from DGVCL. 20 responses are collected from UGVCL. There were total 74 Male and 55 females. There were 29 employees from Class 1, 39 from class 2, 35 from class 3, 26 from class 4.

H_{0.1} :- There is no Significant difference between favouritism and conflict.

H_{0.01} :- There is Significant difference between favouritism and conflict

		OPF2	JSC1	JSC2	JSC3
Pearson Correlation	OPF2	1.000	.063	.315	.049
	JSC1	.063	1.000	-.043	.021
	JSC2	.015	.043	1.000	.297
	JSC3	.049	.021	-.297	1.000
Sig. (1-tailed)	OPF2	.	.016	.006	.002
	JSC1	.016	.	.012	.001
	JSC2	.006	.012	.	.006
	JSC3	.006	.001	.006	.

Table No.1 Correlation Table favouritism & conflict

Correlations					
		OPF1	JSC1	JSC2	JSC3
Pearson Correlation	OPF1	1.000	.054	.179	.255
	JSC1	.054	1.000	-.043	.021
	JSC2	.179	.043	1.000	-.297
	JSC3	.255	.021	.297	1.000
Sig. (1-tailed)	OPF1	.	.000	.010	.002
	JSC1	.000	.	.012	.001
	JSC2	.010	.012	.	.006
	JSC3	.006	.001	.006	.

- Here Person correlation test is applied to test hypothesis and measure statistical relationship between variables. If the value of person correlation is between -1 to +1 then both variables have perfect statistical relationship.
- Here all values fall between -1 to +1, thus we can interpret that conflict and favouritism have perfect correlation.
- Significance value is less than 0.05, We reject null hypothesis and accept alternative hypothesis that there is significant relation between conflict and favouritism.

H_{1.1} :- There is no Significant difference between intention to get more & more and conflict.

H_{0.1} :- There is Significant difference between intention to get more and more and conflict

Correlations					
		OPIN2	JSC1	JSC2	JSC3
Pearson Correlation	OPIN2	1.000	.145	.332	.210
	JSC1	.145	1.000	.043	-.021
	JSC2	.332	-.043	1.000	-.297
	JSC3	.210	.021	-.297	1.000
Sig. (1-tailed)	OPIN2	.	.004	.007	.009
	JSC1	.004	.	.012	.001
	JSC2	.010	.012	.	.006
	JSC3	.006	.001	.006	.

Table No. 2 Correlation between conflict & Intention to get more and more

Correlations					
		OPIN1	JSC1	JSC2	JSC3
Pearson Correlation	OPIN1	1.000	.176	.076	.052
	JSC1	.176	1.000	.043	.021
	JSC2	.076	.043	1.000	.297
	JSC3	.052	.021	.297	1.000
Sig. (1-tailed)	OPIN1	.	.023	.019	.028
	JSC1	.023	.	.012	.001
	JSC2	.010	.012	.	.006
	JSC3	.006	.001	.006	.

- Value of person correlation is between -1 to +1 then both variable have perfect statistical relationship. Here all values fall between -1 to +1, thus we can interpret that conflict and favouritism have perfect correlation.
- Significance value is less than 0.05, We reject null hypothesis and accept alternative hypothesis that there is significant relation between conflict and intention to get more and more.

H_{0.2} :- There is no Significant difference between interpersonal relationship and favouritism

H_{0.2} :- There is Significant difference between interpersonal relationship and favouritism.

Correlations					
		OPF2	JSIp1	JSIp2	JSIP3
Pearson Correlation	OPF2	1.000	.166	.026	.292
	JSIp1	.166	1.000	.271	.110
	JSIp2	.026	.271	1.000	-.194
	JSIP3	.292	-.110	-.194	1.000
Sig. (1-tailed)	OPF2	.	.002	.003	.003
	JSIp1	.002	.	.001	.010
	JSIp2	.003	.001	.	.004
	JSIP3	.003	.010	.004	.

Table No. 3 :- Corelation between interpersonal relationship and favouritism

Correlations					
		OPF1	JSIp1	JSIp2	JSIP3
Pearson Correlation	OPF1	1.000	.136	.025	.058
	JSIp1	.136	1.000	.271	.110
	JSIp2	.025	.271	1.000	-.194
	JSIP3	.058	.110	.194	1.000
Sig. (1-tailed)	OPF1	.	.024	.038	.003
	JSIp1	.024	.	.001	.010
	JSIp2	.038	.001	.	.004
	JSIP3	.003	.010	.004	.

- Value of person correlation is between -1 to +1 then both variable have perfect statistical relationship. Here all values fall between -1 to +1, thus we can interpret interpersonal relationship and favouritism have perfect correlation.
- Significance value is less than 0.05, We reject null hypothesis and accept alternative hypothesis that there is significant relation between interpersonal relationship and favouritism.

H_{0.2} :-There is no Significant difference between interpersonal relationship and intention to get more.

H_{0.2} :- There is Significant difference between interpersonal relationship and intention to get more.

Correlations					
		OPIN2	JSIp1	JSIp2	JSIP3
Pearson Correlation	OPIN2	1.000	.166	.047	.100
	JSIp1	.166	1.000	.271	.110
	JSIp2	.047	.271	1.000	.194
	JSIP3	.100	-.110	.194	1.000
Sig. (1-tailed)	OPIN2	.	.012	.028	.033
	JSIp1	.012	.	.001	.010
	JSIp2	.028	.001	.	.004
	JSIP3	.033	.010	.004	.

Table No. 4 :- Corelation between Interpersonal Relationship and Intension to get more

Correlations					
		OPIN1	JSIp1	JSIp2	JSIP3
Pearson Correlation	OPIN1	1.000	.040	.060	.286
	JSIp1	.040	1.000	.271	-.110
	JSIp2	.060	.271	1.000	.194
	JSIP3	.286	-.110	-.194	1.000
Sig. (1-tailed)	OPIN1	.	.004	.031	.032
	JSIp1	.004	.	.001	.010
	JSIp2	.031	.001	.	.004
	JSIP3	.032	.010	.004	.

- Value of person corelation is between -1 to +1 then both variables have perfect statistical relationship. Here all values fall between -1 to +1, thus we can interpret interpersonal relationship and intention to get more have perfect corelation.
- Significance value is less than 0.05, We reject null hypothesis and accept alternative hypothesis that there is significant relation between interpret interpersonal relationship and intention to get more.

11.Discussion and Findings

All hypothesis supports statistical relationship between organizational politics and job stress. For analysing factors contributing job stress; conflict and interpersonal relation were considered. Both factor contribution to the job-related stress at workplace. For analysing factors contributing organizational politics; favouritism and intention to get intention to get more and more were considered. Both factor contribution to the job-related stress at

workplace. Correlation of all 4 hypothesis is positive. That means organization politics and job stress. While analysing research instrument statement respondents are agree with poor work environment. Respondents feel highly favouritism at workplace. Respondents feel stress due to political work environment. Respondent feel that they must have relatives at higher position to get more benefits while having this perception they also feel demotivated when other employees gain more by politics.

12. Suggestion and Conclusion

Result revealed positive relationship of organizational politics and job stress. Employees feel stress at workplace and stress can cause lower productivity of employees as well as organizational productivity. As this study is about power sector and power sector plays vital role in economic development it is important that management and administration should work upon organizational productivity. One can improve organizational productivity by improving employees productivity. Employees of Gujarat energy sector suffers a lot due to politics and politics is becoming major cause of job-related stress. Management should look out at this and encourage class 1 and 2 employees for transparency in all activities. Management should arrange various training programme for employees to deal with daily office politics. Management of organization should opt HR software that can improve transparency in work. Management can also develop their own software that have all customized details of transfer, promotion, daily work, resource allocation any many more. As today's era is of artificial Intelligence, AI can be used to reduce work related stress.

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“A Study on the Effect of Flexible Work Arrangements on Work Life Balance.”

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Abstract

The Research topic “A study on Effect of Flexible Working Arrangements on work life balance” is about effects of work life balance on employees while performing flexible work arrangements. Flexible work arrangement means different kinds of flexible working solutions provided to the employees. It transforms the traditional working timeline to flexible work schedule. Work life balance means what amount of time you spending the on-the-job verses pursuing interest, family time and hobbies. Work life balance is integration of family, health, career and other community. The purpose behind this research is to find out effects of balancing personal and professional life by flexible working arrangements.

Keywords: Flexible working, Work life balance, Work stress, Work pressure, Compressed work week, Telecommuting, Flextime, Flexplace, Flex hours.

1. Introduction of Flexible Working Arrangements and Work life balance

From traditional work environment of 9 to 5 job now a days changed in a new ways of flexible working practices. In covid 19 the scenario has changed for work from office to work from home. The arrangements of flexible working are a different set of options of time period according to the employee's suitability to fulfill their responsibilities. The different kinds of flexible work arrangements are Part time, Flextime, remote work, compressed workweek, job sharing, shift work etc.

Work life balance means the spending of total time at work place and the personal life, family time and on hobbies. When work demand more attention than work life proposition will be broken. In this fast forward century adjustment of time between work and family is difficult. This is just to set the priority in between personal and professional life.

Flexible work arrangements have different effects on work life proposition of men and women. There is positive, negative, direct or indirect effects can be referred by different researches. FWA practices has many advantages like retention and talent management, reduction in stress and absenteeism, job satisfaction at work that will ultimately boost the productivity. But to apply FWA practices requires the certain systematic arrangements on side of employer and employee also required clarification.

2. Research Methodology

The paper is having combination of Descriptive means describes your research and Exploratory research means explore the insight of the general research problem regarding research design and it is on the topic "A study on the effect of flexible work arrangements on work life balance."

3. Research Objectives

- To identify the impact of flexible working arrangements on work-life balance.
- To examine the relationship between flexible working arrangements and work-life balance.
- To study the effect of Flexible work arrangements on work stress of employees.

4. Literature Review

- Russell et al., 2009 Study shows that flexi time and part time work decreasing pressure of work and personal and professional life conflict, work from home has association with both. There is difference between kinds of flexible work arrangements to identify their possibility for lessening the work pressure and work life conflict.
- Rosyadi & Bayudhigantara, n.d. This study shows that there is no effect between flexible work arrangements and organizational commitment. This study has taken the responses form advertising industry creative economy workers. There is clear mediation of work life balance between flexible working solutions and social support for organizational commitment.
- Birimisa, 2016 This study shown the correlation in between flexible working and work life balance for generation Y in Croatia. Due to no option of flexibility, generation Y is not achieving work life balance. For future organizations, if they want to retain the generation Y in their workplace, this is the prerequisite.
- Council & Advisers, 2014 Study shows that 1/3 firms facing problems to implements FWA practices with limited funds. But when it adopted it has advantages like reduction in turnover, absenteeism and increasing productivity and the health of workers. In this 21st century requires the wider adoption of these practices at workplace is to manage the work and life.
- Lewis & Humbert, 2010 The agenda od study is to know the impact of FWA on a gender equality and effectiveness at workplace. This work practices supports the mothers. Despite a dedication to flexibility and “work-life balance,” conceptions of competence associated with hegemonic masculinity and the gendered construction of the ideal worker remain dominant.
- Olorunisola et al., 2021 The study finds in Nigeria, it has increase flexible working leads to increase in work life balance. It showcases that employees must has chance to create a balance between their work and family. And to support morally, government must provide social security for survival and decent living.
- Aziz-Ur-Rehman & Ahmed Siddiqui Associate Professor, n.d. The study has found out that flexible work solutions have a positive correlation with work life balance. And balance between work and life has intervention between FWA and satisfaction at

job. So, the highlighted importance of FWA will improve performance, job satisfaction work life balance hereby to increase productivity.

- Lonska et al., 2021 Study tries to figure out the how the employees manage the work of home and job during covid 19 where the additional responsibility of home work. It founds those women in 18-44 age group with the minor children faced troubles while having work and life balance during covid 19 with the other group of employees as well.
- Ghimire, 2020 The aim of study is to know the perception of service industry employees on FWA practices and work life balance. As per the study it shows the clear perception the employees are feeling that the Flexible work practices has right support system for the management of time at work and for certain personal tasks as well.
- Saxena, 2018 The research is suggesting good work solution where the family is at most priority in India. So, to level down the work load pressure and stress only one option let that is different designs of work schedule than tradition time binding culture. Organization must have the kind of aim for personal and professional life cannot be matched with each other.
- Ray & Pana-Cryan, 2021 It found a strong association between being able to take time off and three well-being outcomes, including a reduced reported likelihood of job stress, an improved reported likelihood of job satisfaction, and healthy days, as well as that the ability to change one's schedule was associated with reduced reported likelihood of job stress.
- Lahti, 2017 The research founds that flexibility at work is advantageous for the work life balance of teachers in Finland. Work of teachers are seasonal and exam time is kind of period where work load is higher which creates work pressure and stress. Flexible working hours is not essentially affecting positive personal and professional life balance.
- Wöhrmann et al., 2020 This study highlights that the employer must grant the flexible work time for such personal work emergency, such as they change time as per requirement in short time and also this facility for all employer that creates personal and professional balance. Study creates importance of flexible work arrangements for work life balance.

- Hofäcker & König, 2013 Regularity and predictability of working hours have a detrimental effect on work-life conflict for both sexes beyond the normal work hours. But greater freedom in selecting one's working hours is put to quite diverse uses: Men typically utilise these arrangements to raise their job commitment, which increases their perceived work-family conflict, whereas women typically use them to attain a better work-life balance.
- Albion, 2004 Work and family issues are the main predictors for the use of flexible working options than the barriers. The attitude of Parents is doing to balance between the work and family to choose the flexible work option.
- Prowse & Prowse, n.d. Due to they must arrange their schedules around those of part-time midwives and are increasingly required to handle extra work, full-time midwives and those without care responsibilities feel disadvantaged by flexible working and work-life balance rules. Although work-life balance and flexible scheduling are crucial for attracting and keeping midwives, they are also a part of the continuous conflicts and difficulties faced by midwives.
- *WORK AUTONOMY, FLEXIBILITY AND WORK-LIFE BALANCE Final Report*, n.d By enabling women to keep their jobs after having children, flexible working helps address some of the gender disparities in the workforce. Flexible working may reinforce gender norms by increasing the amount of time men spend at work and the amount of time women spend at home. Study suggests the modification in the labour laws to reflect the profound changes taking place in the workplace.
- Capnary et al., 2018 The study indicates that flexibility at workplace has positive effect on loyalty and satisfaction of employee. Work life balance has partial influencing intervention in the relation in between workplace flexibility and loyalty. But work life balance has no relation in between workplace flexibility and employee satisfaction with millennial at startup companies.
- Setiyani et al., 2019 The result of this research shows that there is impact of flexible hours of working and work life balance on engagement of employees. Motivation of employees has the impact of mediation between environment of work and flexible hours of working on engagement of employees.
- Chung & van der Lippe, 2018 To understand the outcome of flexible working, the result of study shows that gender matters a lot but it matters differently and in

different contexts. Work life balance and family functioning would be achieved thorough flexible work. But Women and men use flexible work in different ways that leads to different outcomes for work life balance.

- Shagvaliyeva & Yazdanifard, 2014 Introduction of flexible working hours brought benefits from both sides. So, it has a positive point of view. This kind of work place flexibility will give the employee time to complete there both personal and professional role. So, this study supports the flexibility at workplace.
- Lit Bagnes, 2021 This study examines the workplace flexibility of Filipino virtual home-based worker and make a path for organizational improvement. The results of study revealed that worker believed that they would not incur the cost of career and barriers of administration when they employed under this workplace flexibility. Filipino virtual home-based workers are participated in cognitive and social activities occasionally and all they are rarely engaged their selves in physical activities.
- Gunaprasida & Wibowo, 2019 Female employees have moderate's relationships between intention of turnover and work life balance due to flexible work arrangement. So, get the work and life in balance female are more demanding the flexible work arrangement more than men.
- Bambra et al., 2008 This study found that work life balance can easily achieved by the compressed work week and it may be reflecting no adverse effects on health and organization. For Work life balance the compressed work week is good option for organization to go for.
- Shockley & Allen, 2007 Flexible working time provides more supports the personal and professional life management. While in workplace flexibility is supporting less work life balance than flex time. As per the survey of employed women, flexible work arrangements highly interfering work and family life.

EFFECTS	FINDINGS AS PER LR
Direct Relationship	According to Russell et al., 2009, Ghimire, 2020, Lahti, 2017, Albion, 2004, Lit Bagnes, 2021, Bamba et al., 2008, Shockley & Allen, 2007, shows direct relationship between Flexible working arrangements and work life balance.
Positive Relationship	According to Birimisa, 2016, Olorunisola et al., 2021, Aziz-Ur-Rehman & Ahmed Siddiqui Associate Professor, n.d., Wöhrmann et al., 2020, Capnary et al., 2018, Shagvaliyeva & Yazdanifard, 2014, shows positive relationship between flexible work arrangements and work life balance.
Indirect Relationship	According to Lewis & Humbert, 2010, Saxena, 2018, Ray & Pana-Cryan, 2021, Hofäcker & König, 2013, Prowse & Prowse, n.d., Setiyani et al., 2019, Chung & van der Lippe, 2018, Gunaprasida & Wibowo, 2019, shows indirect relationship between flexible work arrangements and work life balance.
Adverse Relationship	According to Rosyadi & Bayudhigantara, n.d., Council & Advisers, 2014, Lonska et al., 2021, shows that adverse relationship between flexible work arrangements and work life balance.

5. Scope for Further study

- Flexible work arrangements have less researches done in Indian origin regarding its effects on employees.
- International studies have less in detail researches about the work life balance, job stress, satisfaction at work correlation with flexible work practices.

6. Research limitations

- This paper has covered only 30 research papers and literature review.
- The research papers that served as the basis for the data are very diverse from one another geographically.
- Research contains only effect on work life balance by arranging flexible work.

7. Conclusion

Flexible work arrangements have various direct and indirect impact on work life balance. Direct effect flexible work practices on reducing the stress in personal and professional life balance which creates morale booster in the life of employees.

There is indirect effect of flexible work arrangements on work load and stressful life and job satisfaction at work place has a positive preview in somewhat level.

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Cloud Computing:- A Contemporary Review

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Abstract

Cloud computing is an internet based service that provide operators with the option of storing, managing, and accessing virtual assets on the internet. Cloud computing plays a significant in everyone's digital life on a daily basis. Cloud computing has penetrated many industries for e.g. retail, banking, logistics, manufacturing etc. Companies around the world are increasingly using cloud computing technologies to give better service to its consumers. Be it Google, Yahoo or Amazon all are very much onto the development of cloud computing technologies to stay ahead in the race of digital revolution. Also just like with any other new technology there are also issues associated with cloud computing. This review paper takes a look on the concept of cloud computing and how it is functions in today's world. It also includes the basic knowledge of cloud computing and concerns that surrounding this technology.

Keywords: Internet, cloud computing, security, services, networks

1. Introduction

Internet has now become an inherent part of majority of logical being on the planet. Today people equate the quality of with not just with the availability of internet but with the other attributes of it for e.g., speed, access across multiple devices etc. Before proceeding to the discussion of cloud computing we have to take a detailed look at the birth and evolution of Internet which provided bedrock for the development of numerous technologies including cloud computing.

Internet means network of networks connected together by a variety of media exchanging information every now and then. [1]The origin of internet dates back to the time of 1960's when the United States government was trying to create a somewhat of public network. This project was led by the department of defense of United States government. The project's name was ARPANET and it was led by the Pentagon's advance research agency established in 1969. The main objective of this exercise was to develop a communications network which is secure and strong for institutions involved in defense related research. To make this non-personalized network global special and standard protocols were developed. In 1977 standard protocols known as TCP (Transmission Control Protocol) and IP (Internet Protocol) came into existence. These software codes allowed people to connect different branches of computer networks directly to ARPANET, which later evolved even further by the name of internet.

Scientists and engineers from different fields started to make use of this network. During the same time National Science Foundation of United States government had also developed a same kind of network. It is was called NSFNet . This NSFNet superseded the aforementioned TCP/IP frameworks created by ARPANET. NSF made NSFNet capable of handling distributed networks with a much higher traffics density. In 1985 NSF initiated a project which saw the establishment of Internet related infrastructure across the USA. Initially NSFNet was developed as a backbone network and its access was given to government agencies, academic establishments, reputed research institutes. And as the time progressed, by 1990 NSFNet now called as Internet achieved a superior exponential growth. It was then believed that the number of computer connected to internet will double each year.

Not so late businesses also, across the US and world saw the great potential in Internet. They realized that with its help they can make their business operations more efficient and can offer new and better experiences to their customers. Thus they also started allocating huge sums of money for the development and enhancement of internet. This resulted in the

emergence of fierce competition between hardware and software vendors to meet the increased demand. This further made the capacity of information carried across the communication links go higher on internet and costs dropped. Thus the development of internet also enabled the development of country's economy.

[3] Internet has now become synonymous with the World Wide Web(WWW). For common people Internet and WWW mean same thing. World wide web allows a computer get a unique identifier across the internet and access documents, media etc. World wide web is a much recent phenomena as compared to almost half a century old internet. The credit of developing WWW goes to Tim-Berners Lee of European Particle Physics Laboratory. Many protocols developed by Tim became the foundation of World wide Web.

Thus we can say that Internet should be included in Humankind's most important and fascinating creations. Today Internet has made our life easier by providing communication and computing technologies simultaneously. Thus it becomes possible for individuals or groups or corporations to easily coordinate work activities and achieve results.

In the past majority of programs were running locally on a computer. But nowadays applications installed on a particular computer can be run by another computer located at a different location. Thus just as internet grew and developed further, so as the related technologies and application capabilities. But with these developments of internet, new user requirements were also born. And among these requirements there was one need to share resources across different computers connected to a network separated by large distances. And thus cloud computing was born.

[2]Cloud computing is made up of two words "Cloud" and 'Computing'. 'Cloud' here refers to the amalgamation of various network utilities like servers, data centers, routers, terminals etc. shared across different geographical location whereas 'Computing' refers to the analytical or computing power offered by these digital resources. The origins of cloud computing could be traced back to 1960's when Joseph Carl Robert Licklider imagined a world where anyone would be able to connect to any application and data irrespective of their location on planet. His efforts gave rise to 'ARPANET' ((Advanced Research Projects Agency Network) mentioned earlier in this article. 'ARPANET', by many experts, is considered as the predecessor of the internet. He developed his vision even further naming it the intergalactic network where anywhere a person could access any information at any time regardless of his position. The term Cloud Computing was coined in 1997 by Ramnath Chellappa an academician in University of Texas in the show "New Computer Paradigm".

According to National Institutes of Standard and Technology(NIST) Cloud Computing is a model for enabling, ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”. Thus as per NIST thus cloud computing model have features such as Resource pooling, metered service, Rapid elasticity, On-demand self service and network access.

Thus, as per the definition of NIST one can understand that cloud computing provides software and hardware resources to the consumer as per his or her requirement. In cloud computing same set of hardware-software resources are provided to multiple users at a time in a pooling fashion. Cloud Computing in real works totally like a business model where interested parties can hire cloud computing utilities from third party business and use it as per their requirement and return it back to the original owners. Here all the related hardware and software facilities like applications, servers, computers etc. are provided by the cloud computing companies to the general public. The user only pays the amount for which he/she has used these cloud services and pay as they go by. The user, with the help of cloud service providers, can use an application or the disk space as per their requirement without having to install that application or disk space on their local machine thus saving resources at a time. For accessing a cloud service a person only needs internet and web browser.

The arrival of internet and with its soaring popularity in 1990's paved the way for the emergence and deployment of cloud services. The first attempt at cloud services was done by Compuserve in 1983 where it provided users with little disk space on internet where they can upload their files. After this a major milestone came in 1999 when Salesforce.com innovated the idea of delivering enterprise level services via its website. Post this Amazon became first major company to launch its Amazon Web Service in 2002 where a suite of cloud utilities like storage, computations etc. were provided to users. Then in 2006 Amazon, again, launched its Elastic Compute Cloud (EC2) as commercial web services that allowed other businesses and individuals to rent compute services and run their computer applications. Amazon's EC2 and S3 were the first widely available cloud computing platforms to different organizations like UK TV stations and newspapers. Then in 2009 when Web 2.0 hit streets, major companies like Google and others started offering their cloud services. Some examples of cloud computing are Gmail, SKYPE, Yahoo mail etc. Development of virtualization services and availability of high speed bandwidth has enabled cloud computing to evolve at a

steep pace. Cloud Computing, nowadays, is fast emerging as one of the top services on the internet. Researchers are estimating that cloud services will pervade major parts of businesses and human life in future.

2. Research Objectives/ Research Gap

- ☐ To better grasp the concept of Cloud Computing
- ☐ To understand the working of Cloud Computing
- ☐ To take a stock of recent developments in Cloud Computing

3. Literature Review

Keiko Hashizume et al [4] asserts that cloud computing is relatively a new concept that offers myriad benefits to the people. Thus as it is a new technology it consist of vulnerabilities which needs to be resolved before its widespread adoption. Different cloud models like IaaS, Paas, etc have different security issues. Networks, virtualization and storage are some of the biggest security concerns for cloud services. Also because there are different virtualization technologies each method poses different challenge. Virtual networks also are a focus of attacks especially when they try to connect to other remote networks.

Aakash Tyagi[5] believes that cloud services have biggest security concern with respect to sharing of resources. Cloud computing provides large number of benefits to people for e.g. energy management, automatic resource positioning etc. Because there are numerous issues with cloud computing it presents good opportunities to bring about significant progress in the IT industry.

According to K. Sharmila[6] Cloud computing is rapidly developing and new application services are introduced frequently. Organizations can choose a particular cloud model as per their need. Cloud Computing will continue to evolve in the future as well which will increase the adoption of cloud platform as new and better services are in the fray.

CH. V. Raghavendran et al[7] tells that cloud services are at the top focus of major IT businesses around the world. Cloud and its related applications have tremendous potential for the benefit of companies. Multiple types of businesses from accounting firms to zoological societies are adopting Cloud computing. Also competition in cloud business is also increasing day by day. Lastly the authors recommend that cloud business should pay greater attention to horizontal scalability of virtualized resources rather than onsingle node performance.

Abhishek Gautam[8] concluded that there are mainly three types of cloud models (1) SaaS (Software as a Service), (2) PaaS (Platform-as-service) (3)IaaS (Infrastructure-as-service).

Each models offers a different set of advantages according to the requirement. Also numerous services are benefitted from cloud computing.

Ion Stoica et al[9] has described various challenges faced by cloud computing in order to evolve into sky computing. Challenges faced by cloud computing are both technical as well as economical in nature. Though economical challenges amount for a greater share here. Sky computing requires a group of cloud services to adopt reciprocal data peering so that jobs can easily migrate within this large and heterogeneous collection of business clouds.

Pratik Narendra Gulhane et al[10] says that cloud computing is emerging technology where users can use computer programs in a distributed environment. Thus it will save time on installing and maintaining that software on their personal machine. Cloud computing is excellent and intelligent technology that provides advanced computing capabilities on-demand without worrying about maintaining the infrastructure. The reason cloud adoption is increasing day-by-day because it provides numerous benefits such as cost savings, high computing capability and increased productivity. Cloud computing will have a major impact on society in future.

Markus Böhm et al [11] says that with the rise of Cloud computing new concepts and approaches have been invented. Though cloud computing is a buzz word in the IT industry many of them are not fully aware of this new technology. Cloud computing is a IT model which is deployed on the basis of virtualizations, distributes server services etc. Cloud services are scalable and are priced on pay-per-use-basis.

Swaminathan et al. [12] believes that cloud computing can become useful for software development and testing as resources are scalable and costly infrastructure expenses is avoided. Cloud services can compensate for load peak server demands and can provide tailor made solution to its users.

Nanda Banger et al [13] estimate that cloud computing market will hit \$623 billion by 2023. This is because of its increased adoption among businesses. According to her the Cloud model is flexible and elastic to serve consumers of all kinds for e.g. coders, model builders etc.

Shagun Srivastav et al[14] concludes that Cloud computing has emerged at perfect time where businesses can extract maximum benefit from it. Cloud providers offer number of services like online storage, concurrent work sharing etc. But still variety of other services that come under the umbrella of cloud technology remains unexplored. Global data-decentralization can become a reality if Cloud model achieves a necessary scale through

rapid transition and adoption. Thus for time to come Cloud services will continue to be a catalyst for development of number of technologies.

Kandil, A.M.N.A., et al [15] reveals that complexity of cloud services affects organizations expectations negatively. The lesser complex a cloud model is the more it helps in fulfilling job role efficiently. Also security and trust are two important parameters for adoption of cloud services.

Chen, Y., V. Paxson et al[16] observes that security has played a major in hindering the acceptance of cloud model. Uploading you data appers on internet or using the computing abilities of someone's else computer are intimidating for some users. Because cloud services offers low cost and reliable pereformance it becomes a prime attack focus of hackers.

Nelson Gonzalez et al[17] lays emphasis on plugging the vulnerabilities of cloud computing like authentication, privacy, server issues etc. Also they believe that it is difficult to move from one cloud provider to another because of lack of protocols and formats that directly affects such movement. Currently there are good numbers of security concerns for which number of solutions are developed but still many issues are pending like virtualization.

BV Pranay kumar et al[18] asserts that the success and profitability of cloud services lies in the hands of cash rich companies and government sector. Cloud Computing can provide major boost in improving quality and content of education.

N.Sultan [19] shows how cloud services are helping university in terms of cost, efficiency and environment.

Aparna Joshi et al [20] concludes that cloud computing is a new technology with great potential for big impact. Cloud services are beneficial to both individuals and businesses. Businesses can benefit from the fact that they can reduce their operating cost by allocating less cash for maintenance and software updates. Also people are skeptical about cloud security. On the other there is no rule or regulation governing the data transferred on cloud plus there is no certainty that who in actuality have control over user's data on cloud.

Amit Kumar Jain [21] analysed the hybrid cloud model to get a sense of its security and speed with respect to public clouds. He found that Hybrid offers greater security and much higher speeds with respect to public clouds.

Akshata Dinesh Patankar et al [22] believes that cloud technology is highly useful for business accounting. The reasons for this is that cloud services provide easy-handling, cost reduction, reduce data storage requirements etc. Cloud accounting can be very helpful in developing businesses.

Arya M Nair [23] believes that cloud infrastructure offers good results to e-commerce businesses. E-commerce and cloud provide can collaborate to improve the former's business capabilities. Cloud computing is very flexible with respect to business scalability. Cloud computing plays a important role in making a smart economy.

Susheel Harsoor et al [24] concluded that cloud services can be hugely helpful to small businesses and start-ups. Because cloud computing offers low cost, flexibility in managing business operations etc.

4. Cloud Computing – An Overview

Very simply Cloud Computing can be understood as your own computer resources like Hard disk drive (for storage), Central processing unit (for processing), an application for e.g. a database stored at different geographical location but accessible to you simultaneously at a time as per your need via Internet. Thus, one can think of cloud computing as distributed network computing. Here a server located at a different location co-ordinates activity for various applications and users accessing cloud services. The users of cloud services are supposed to pay as-they-use these services.

Cloud Computing Architecture

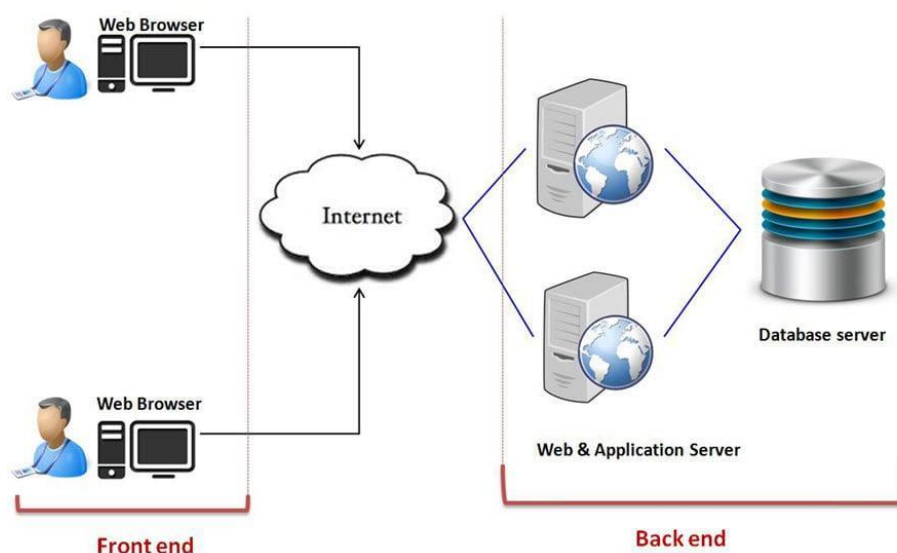


Figure 1 [26]

Architecture of cloud computing

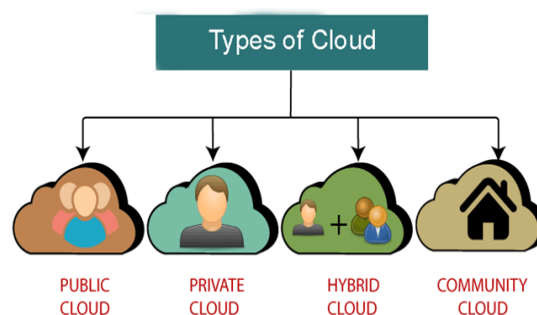
A Cloud Computing architecture consist of various components for e.g., storage, programs, client infrastructure, security etc.

Front End:

It is that part of cloud architecture that is used by the client to access cloud services. It includes of a computer, a browser application like Google Chrome, Mozilla Firefox etc. and internet.

Back End:

This part is managed by the cloud providers like Amazon, Google etc. Here are the main applications like spreadsheet and storage parts are located which provide services to cloud subscribers.

Types of Cloud Networks**Figure 2 [25]****Cloud Network Types**

Public Cloud:- This cloud type is open to everyone to access and store their data through internet. Here cloud resources are managed by the cloud provider.

Advantages:

- Cost is lowest among all types.
- There is no limit on numbers of users who can use this service
- It has the highest scalability among other types

Disadvantages:

- Public cloud are less secure among other types
- Users do not have control over their data on the cloud

Private Cloud:- Public cloud also called company cloud or corporate cloud. It is used by businesses and private organizations. Either this cloud is owned by the company itself or is provided by a third party.

Advantages

It provides highest security and privacy to users.

It provides maximum speed for data storage and processing.

Because limited people use this, it becomes easy for the IT dept to deploy and upscale this.

Disadvantages

People managing this cloud type should have high technical skill.

It is costly as compared to other cloud types.

Hybrid Cloud:- Hybrid consist of both private as well as public clouds. One can think of Hybrid clouds as Private cloud + Public cloud = Hybrid cloud.

Advantages

This cloud is suitable for those organizations which require extra security than public cloud

Hybrid clouds reduce risk easily

This cloud is flexible in including or excluding users

Disadvantages

These clouds less secure than private clouds

It is complex and tedious to manage a hybrid cloud.

Community Cloud:- This cloud type's resources are shared amid different offices of same organization. For example if in a building all the floors are occupied by different businesses and they all share same cloud service then it will termed as a community cloud. Another example, in a university there are departments like engineering, management, pharmacy etc and if they use same cloud service exclusive that campus then it can be termed as Community cloud.

Advantages

Community cloud provides a distributive and collaborative working environment.

Because this cloud is share by different offices of same organization it is cost effective in nature

Disadvantages

It has inferior security features than private cloud

If there is no collaboration between participants then this cloud is not a good choice.

Types of cloud services



Figure 3 [27]

Types of services by cloud providers

There are basically three types of cloud services.

- IaaS (Infrastructure as service)
- PaaS (Platform as service)
- SaaS (Software as service)

IaaS

The first type that is Infrastructure as a Service (IaaS) is also called Hardware as a Service. This service allows provisioning of basic computing resources like storage, networking, other hardware etc. on the cloud. Here extensive virtualization is used. On the top of that resources are added or dumped on-the-go as per the user's need. Example of IaaS include Amazon's Elastic Compute Cloud(EC2), GO GRID, Rackspace.com etc.

PaaS

PaaS stands for Platform as a Service. It allows for the development software that is hosted on the cloud (SaaS) and are used by people/organizations for their task. PaaS hold both completed as well as in-development programs. Google Compute Engine, Microsoft Azure etc. are some of the examples for PaaS.

SaaS

Software as a Service offers online software as per user's requirement. In short, software that one uses natively on its computer like excel is now used on the internet like Google spreadsheet. This saves both time and resources on having to install software locally. It is a

multitenant architecture where multiple users use the same program or application. Some of the examples of SaaS are Google Docs, Gmail, Microsoft Office 365 etc.

DaaS

Desktop as a Service (DaaS) provides virtualized desktop environment to the user just like the normal computer GUI based desktop on their PC. So just like a person can change or add/delete elements from his local desktop environment he can do the same in this virtualized environment as well. Thus a small business can, according to their requirements, customize the desktop environment. Examples of DaaS are Xignite and Urban Mapping.

5. Some Recent Trends in Cloud Computing

FaaS – It stands for Function-as-a-Service. This technology is a subpart of serverless computing. Programmers can directly test their cloud applications without buying and building server space.

Serverless Computing – Instead of an organization buying a server space and then using it to develop applications here server resources are provided as a service which one pays as one uses. Thus the company is free from dedicating resources to manage the servers.

Multi and Hybrid Cloud – Companies nowadays prefer on-site dedicated clouds which can be either public or private. On top of this organizations also desire to have data risk redundancy thus they prefer multiple cloud services.

Edge computing – Here the data is managed by resources which are located geographically closer to the user. Thus, the central cloud server is under less workload. Also, other resources like time, internet bandwidth is saved.

6. Conclusion

In this paper a comprehensive overview of Cloud Computing is taken. Cloud Computing will, as in the past, continue to provide beneficial services to individuals as well as organizations. Unlike other technologies, Cloud Computing is relatively a new entrant so much of the development and awareness regarding its usefulness and knowledge still remains. Issues of security and data privacy occupy prime concern for cloud service providers. So necessary development needs to take place in these areas at a quick pace. But on the bright side Cloud Computing is highly beneficial to big as well as small businesses, colleges, university, governments etc. and will continue to become more useful in the future itself.

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Nestle V/S Britannia: Comparison of Financial Statements

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Abstract

This paper conducts an analysis of the performance of two packaged food companies, Nestle and Britannia, through the examination of various financial ratios. The data used in the analysis was collected from the annual financial reports of both companies from 2016 to 2022. The ratios analysed include liquidity ratios, solvency ratios, profitability ratios and activity ratios. By comparing the performance of both companies through these ratios, it was determined which company performed better.

One of the key components of the analysis is the liquidity ratio, which measures a company's ability to repay short-term creditors and its overall cash position. The solvency ratio, on the other hand, examines a company's ability to effectively utilize and control its assets. It is further broken down into four categories for each company, such as debt-to-equity ratio and total assets-to-debt ratio. Profitability ratios, such as the return on assets and return on equity, are used to evaluate how well a company is performing in terms of profitability, by analysing the relationship between profits and sales, total assets, and shareholders' equity. Lastly, the debt coverage ratio is used to evaluate a company's ability to meet its debt obligations.

Overall, the analysis aims to determine the best performing ratios for both companies in the packaged food industry, using both quantitative and qualitative methods.

Keywords: Financial Analysis, Food Industry.

Introduction:

Financial statement analysis is the process of evaluating an organization's financial statements to make informed investment decisions. The financial statements include the balance sheet, income statement, statement of cash flows, and statement of changes in equity. This method of analysis is used by various stakeholders, including shareholders, creditors, management, the public, and decision-making organizations. The approach of financial statement analysis includes fundamental analysis, DuPont analysis, horizontal and vertical analysis, and the use of financial ratios. Accurate information and a series of assumptions and adjustments to the financial data can be used to predict future performance. Professional financial analysts may be consulted for expert financial analysis.

It is common for investors to find the large number of numbers in an organization's financial statements to be confusing and intimidating. However, when analyzed correctly, these statements can provide valuable insights into an organization's financial performance. Financial statements serve as the means by which an organization reveals information about its financial performance. Proponents of fundamental analysis use the quantitative data from financial statements to make investment decisions. In this section, we will briefly outline each financial statement's specific purpose, along with where they can be found.

Purpose of analysis of financial statement

- To recognize the earning ability of an organization
- To realize the solvency of an organization.
- To recognize the financial strength.
- To recognize the effectiveness to rewards interest and payments
- To know the comparative data from other firms
- To know the tendency or aim of an organization
- To know the adaptability and capability of management
- To give beneficiary data to management

Clients of Financial Statement Analysis

- **Management** - The managers of the organization use their financial statement analysis to make informed decisions regarding their performance. For example, they assess the distribution of costs, or the amount of money they have left over, from their accounting records and make decisions based on the results of this analysis.

- **Proprietors** - Small business owners need financial information from their operations to determine if the business is generating a profit. This information is used to make decisions such as whether to continue operating the business, upgrade business systems, or exit the business entirely.
- **Investors** - Individuals who have invested in stocks or hold shares in a company need financial information to analyze the performance of the organization. They use financial statement analysis to determine what to do with their investments in the company. Based on how the company is doing, they may choose to hold onto their stock, sell it, or purchase more.
- **Lenders** - Banks are interested in determining if an organization will be able to meet its payments as they become due. They use income analysis of the company's accounting records to evaluate the organization's liquidity, or its ability to make short-term payments.
- **Government** - Governments and regulatory bodies use financial statement analysis to assess the overall performance of the economy and make informed decisions on their monetary and industrial policies. Tax authorities also analyze an organization's financial statements to determine the tax rate that the company needs to pay.
- **Workers** - Employees need to know if their job is secure and if there is a possibility for a salary increase. They need to be aware of their organization's profitability and stability. Employees may also be interested in understanding the financial state of the organization to see if there are plans for expansion and, therefore, career opportunities for them.
- **Clients** - Customers need to evaluate the ability of the organization to serve its customers in the future. This is especially important if the customer (such as a distributor or buyer of specific goods) is completely reliant on the organization for its supplies.
- **General Public** - Anyone in the general public, such as students, researchers, and experts, may be interested in using an organization's financial statement analysis. They may want to evaluate the impact of the organization on the environment, the economy, or the local community. For instance, if the organization is conducting corporate social responsibility programs for the

benefit of the community, the public may want to be aware of the company's future operations.

Ratio Analysis

Fundamental analysis is a comprehensive approach that encompasses both qualitative and quantitative aspects of an organization. The qualitative aspect involves general factors such as the company's management, competition, and industry trends. The quantitative aspect, on the other hand, involves the analysis of numbers from the financial statements. When combined with other techniques, the results of quantitative analysis can be quite insightful. Ratio analysis involves comparing different numbers from the balance sheet, income statement, and cash flow statement, not just within the company, but also against other companies, the industry, and the economy as a whole. The ratios highlight the relationships between financial elements and can provide insight into how the company performed in the past and how it might perform in the future.

Meaning of the Ratio

A ratio is a mathematical expression that represents the relationship between two quantities. It is determined by dividing one quantity by the other related quantity. In other words, a ratio expresses the relationship between two numbers. It can be represented as a fraction, decimal, or pure ratio or in absolute terms as a number of times.

Meaning of ratio analysis

The practice of analyzing and interpreting numerical relationships based on financial statements is referred to as ratio analysis. This process involves determining the relationship between two figures by using a statistical metric. The relationship can be expressed as a percentage or a fraction. Ratios are simple to calculate and understand. Those interested in financial statement analysis can be divided into three categories: shareholders, creditors, and management.

- Proprietors or Financial Specialists
- Creditors
- Budgetary Administrators

Review of Literature:

Gopinathan (2009) has displayed that the money related proportions investigation can spot better venture alternatives for speculators as the proportion examination measures different parts of the execution and breaks down essentials of an organization or an establishment.

Ho and Zhu (2004) have reported that the assessment of an organization's execution has been centering the operational adequacy and productivity, which may impact the organization's survival straightforwardly.

Harrison (2003) conducted study and argued that financial ratio analyses are very useful. During his study he found that financial ratios analysis is also effective in automobile industry, it guides governing body to determine effective and efficient strategies and identify the weak areas which need attention.

Dr. Sugan C.Jain (2002) in his study examined the performance of automobile industry. He used composite index approach to analyze the operational efficiency and profitability and suggested to strengthening the soundness, profitability improvisation, working capital and in the performance of fixed assets.

Wang (2001). in their study inspected and focused on the need of selecting significant budgetary proportions with the end goal of investigation. They proposed new approach for finding helpful money related proportion furthermore stressed that industry contrasts in item, in size and have its own one-of-a-kind business hones and inward and outside environment along these lines monetary proportion investigation ought to accord to industry which suit it the most

Zopounidis (2000) in his study proposed methodological framework based on financial ratio analyses for estimating small and medium size enterprises performance.

Hitchings (1999) in his study understood that proportion examination is a touchy and profitable apparatus in credit evaluation which is to figure the capacity of a borrower to meet its obligation commitments

Andrew and Schmidgall (1993) in their study classified financial ratios into five categories—liquidity ratios, solvency ratios, activity ratios, profitability ratios, and operating ratios. They indicated that financial ratios themselves do not provide valuable information about a performance, Andrew (1993) in his study conducted on automobile industry investigated the leverage ratio of companies are suggested that a value maximization capital structure.

Virtanen and Yli-Olli (1989) in their study tested the temporal behavior of financial ratio distributions and found that business cycle affects the cross-sectional financial ratio distributions.

Chen and Shimerda (1981) in their study noted that there are 41 different financial ratios which were earlier used sufficiently in studies and conclude that it is difficult to select ratio

with the approximate and absolute factors loading as the representative financial ratio for the observed factors.

Research Methodology:

Objectives:

- To compare the financial performance of Nestle and Britannia over a certain period.
- To analyze the financial ratios of Nestle and Britannia to determine their profitability, liquidity, efficiency, and solvency.
- To evaluate the investment potential of Nestle and Britannia based on their financial performance.
- To provide insights into the financial strategies adopted by Nestle and Britannia.
- To draw conclusions about which company has a better financial performance and investment potential based on the analysis.

Hypothesis:

- **H₀:** There is no significant difference in the financial performance of Nestle and Britannia.

H₁: There is a significant difference in the financial performance of Nestle and Britannia.

- **H₀:** There is no significant difference in the profitability ratios of Nestle and Britannia.

H₁: There is a significant difference in the profitability ratios of Nestle and Britannia.

- **H₀:** There is no significant difference in the liquidity ratios of Nestle and Britannia.

H₁: There is a significant difference in the liquidity ratios of Nestle and Britannia.

- **H₀:** There is no significant difference in the efficiency ratios of Nestle and Britannia.

H₁: There is a significant difference in the efficiency ratios of Nestle and Britannia.

- **H₀:** There is no significant difference in the solvency ratios of Nestle and Britannia.

H₁: There is a significant difference in the solvency ratios of Nestle and Britannia.

Tools and Techniques:

Ratio Analysis:

The calculation of ratio analysis for two companies over a period of five years involves the use of specific techniques and tools. The ratios that are analyzed using the balance sheet of the enterprises are referred to as balance sheet ratios.

Liquidity Ratio	These proportions demonstrate the capacity of the undertaking to meet its short-term financial commitments.
Current	It is a relationship of current resources for current liabilities and is processed

Ratio	to survey the short-term money related position of the endeavor. It demonstrates the quantity of times current resources are in abundance of the present liabilities.
Quick Ratio	It is a relationship of fluid resources with current liabilities and is registered to evaluate the short-term liquidity of the venture. Speedy proportion of 1:1 is an acknowledged standard, since for each rupee of current liabilities, there is a rupee of current liabilities, and there is a rupee of quick resources.
Solvency Ratio	These proportions are computed to judge the long-term money related position of the business. Solvency means association's capacity to meet its long-term liabilities Debt to Equity Ratio – Obligation Equity Ratio demonstrates the relative extent of shareholder's assets and obligation, i.e., capital contributed by long term loan specialists and shareholders, used to back organization resources.
Total Assets to Debt Ratio	The goal of processing the proportion is to set up relationship between aggregate resources and long-term obligations of the business. It quantifies the security edge accessible to the suppliers of long-term obligations.
Proprietary Ratio	The target of processing this proportion is to quantify the extent of aggregate resources financed by the proprietors' assets.
Interest Coverage Ratio	The proportion builds up the relationship between net benefit before interest and tax and interest payable on long term obligations. The target of figuring this proportion is to find out the measure of benefit accessible to cover the interest.

Hypothesis Analysis:

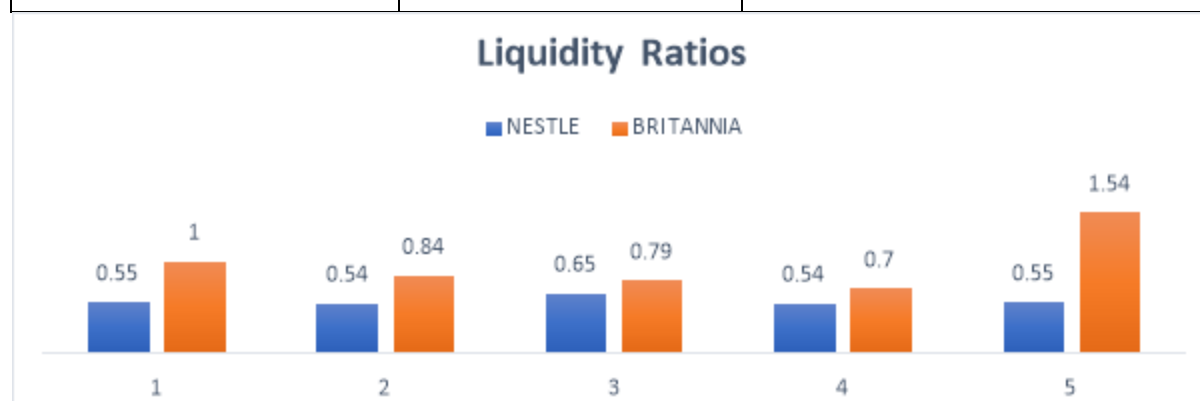
Independent Samples t-test	The independent samples t-test is a statistical method used to compare the means of two independent groups. In the context of "Nestle v/s Britannia: Comparison of Financial Statements", this test can be used to compare the financial performance of Nestle and Britannia.
Two Sample t-test	The two-sample t-test is a statistical method used to compare the means of two independent groups. In the context of "Nestle v/s Britannia: Comparison of Financial Statements", this test can be used to compare the profitability, liquidity, efficiency, and solvency ratios of Nestle and Britannia.

Data Analysis & Interpretation:

Ratio Analysis:

Liquidity ratios: Current ratio

YEAR	NESTLE	BRITANNIA
2015	0.55	1.00
2014	0.54	0.84
2013	0.65	0.79
2012	0.54	0.70
2011	0.55	1.54

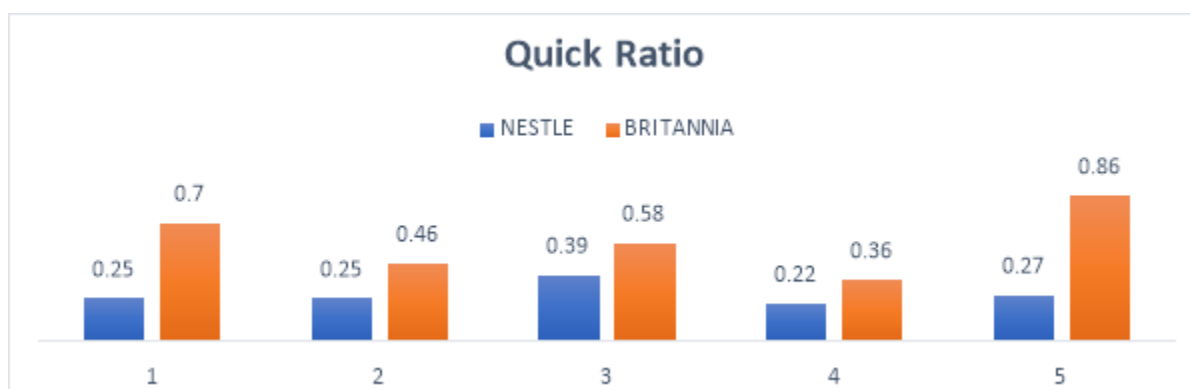


Analysis:

From the above analysis, we can see that in 2011 the present proportions were 0.55 times in nestle India ltd. It was diminishing the following year. Then again, Britannia ltd Company in 2011 was 1.54. It was additionally diminishing one year from now. So, we comprehend that both sustenance area organizations are not performing great in regard of current proportion as perfect current proportion is 2:1 and deviation from the perfect proportion is more for both the organizations.

Quick ratio:

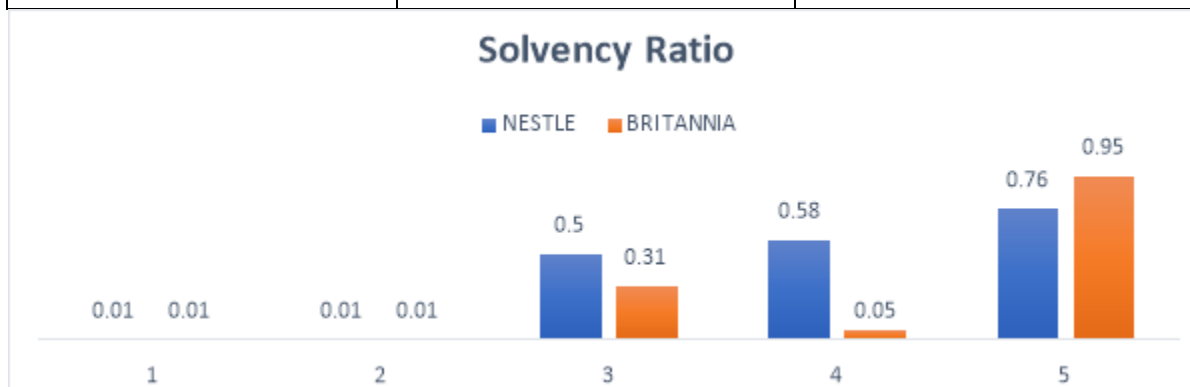
YEAR	NESTLE	BRITANNIA
2015	0.25	0.70
2014	0.25	0.46
2013	0.39	0.58
2012	0.22	0.36
2011	0.27	0.86

**Analysis:**

From the above analysis, we can view that in 2011 the quick ratio were 0.27 times in nestle India ltd. It was fluctuating year to year on the other hand Britannia ltd company in 2011 is 0.86 its also fluctuating its year to year. Both companies are showing fluctuating results for quick ratio because these figures also showing these situations.

Solvency ratio: Debt to equity ratio:

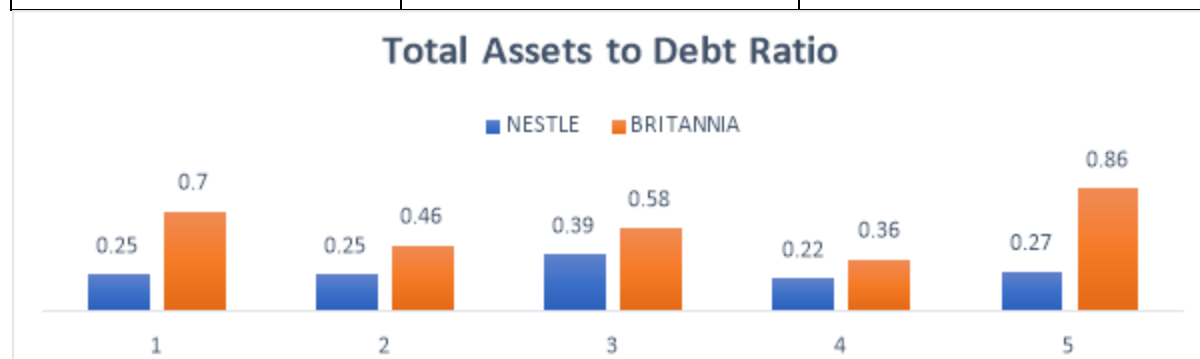
YEAR	NESTLE	BRITANNIA
2015	0.01	0.01
2014	0.01	0.01
2013	0.50	0.31
2012	0.58	0.05
2011	0.76	0.95

**Analysis:**

Ideal ratio for debt equity ratio is 2:1. For nestle in year 2011 is 0.76 and it is continuously decreasing till 2015. For Britannia in year 2011 is 0.95 and it is fluctuating for the rest of the years till 2015. The overall situation for both the companies is not good as there is great deviation from the ideal ratio.

Total Assets to Debt Ratio:

YEAR	NESTLE	BRITANNIA
2015	0.25	0.70
2014	0.25	0.46
2013	0.39	0.58
2012	0.22	0.36
2011	0.27	0.86

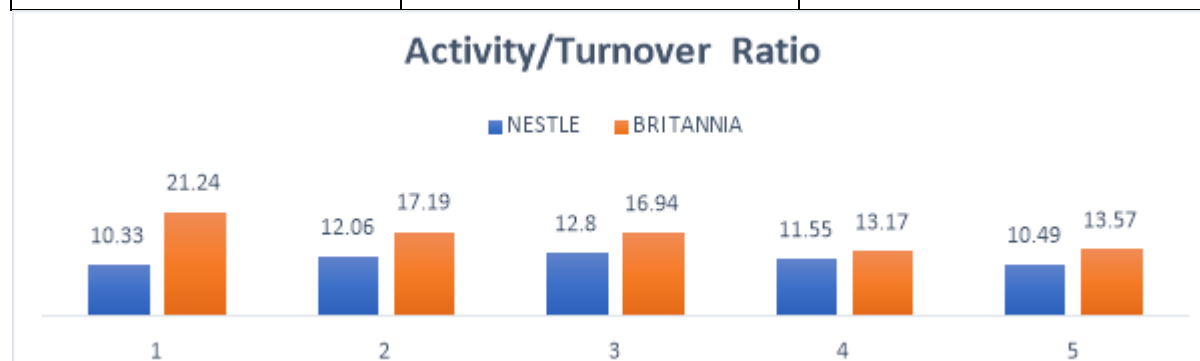


Analysis:

There is no ideal ratio but higher the ratio, better for the company. Ratio for Nestle in the year 2011 is 0.27 and it is fluctuating for the rest of the years till 2015. And for Britannia in the year 2011 is 0.86 and same fluctuating for the rest of the years till 2015. The overall situation for the company is not good. When comparing both the companies Britannia is in better position as compared to Nestle.

Activity/Turnover ratio: Stock / Inventory Turnover Ratio

YEAR	NESTLE	BRITANNIA
2015	10.33	21.24
2014	12.06	17.19
2013	12.80	16.94
2012	11.55	13.17
2011	10.49	13.57

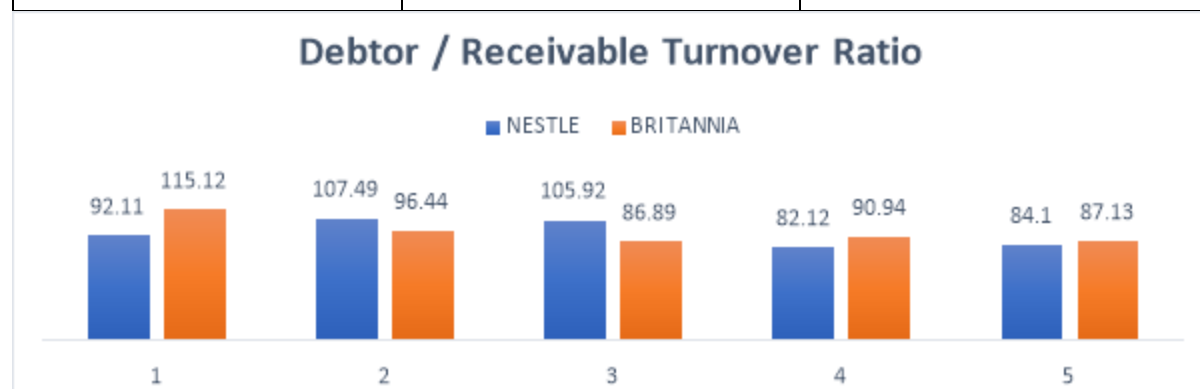


Analysis:

From the above analysis we can observe that in 2011 ratio is 10.49 for nestle and it is fluctuating between 10 to 13 for rest of the years till 2015. For Britannia it is continuously increasing from 2011 till 2015. This ratio should not be so high or so low it should be just an average number. The overall situation for both the companies is OK.

Debtor / Receivable Turnover Ratio

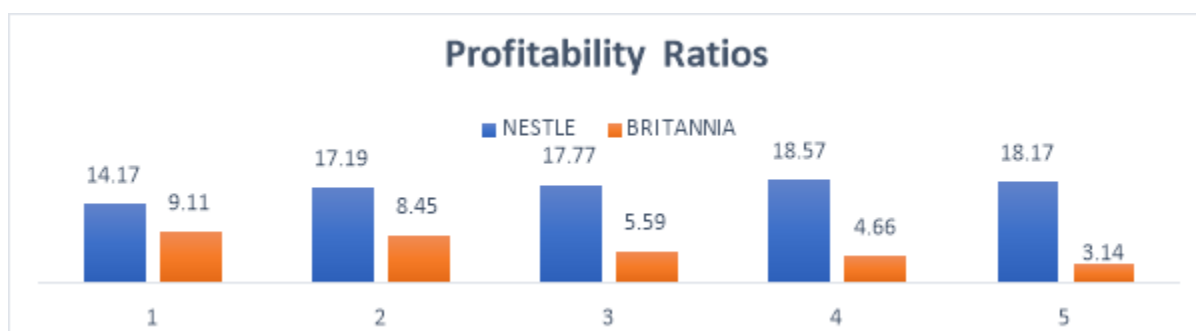
YEAR	NESTLE	BRITANNIA
2015	92.11	115.12
2014	107.49	96.44
2013	105.92	86.89
2012	82.12	90.94
2011	84.10	87.13

**Analysis:**

The above ratio depicts how rapidly credit sales are converted into cash. The higher ratio is better for the company. For Nestle and Britannia both ratio is fluctuating between 80 to 120. Overall situation for both the companies is good.

Profitability ratios: Gross Profit Ratio

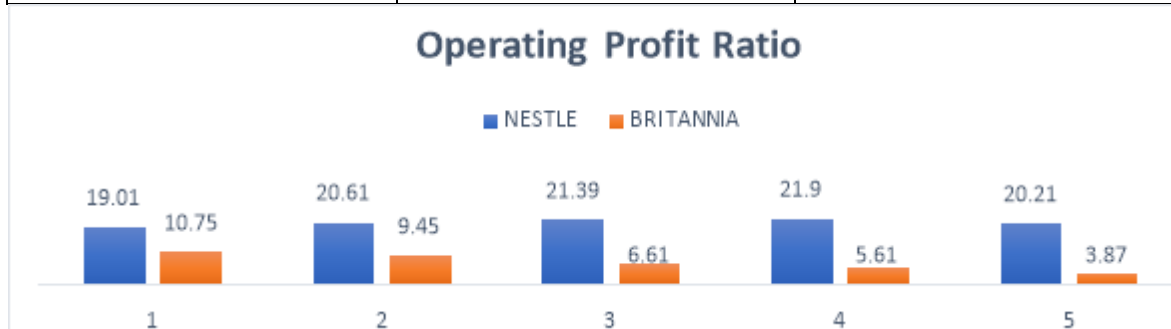
YEAR	NESTLE	BRITANNIA
2015	14.17	9.11
2014	17.19	8.45
2013	17.77	5.59
2012	18.57	4.66
2011	18.17	3.14

**Analysis:**

There is no ideal ratio but higher the ratio better it is. For Nestle in the year 2011 is 18.17 and from then it is continuously decreasing till 2015 on the other hand for Britannia it is continuously increasing till 2015. For nestle the situation is not in favor but for Britannia the situation is good. When comparing both the companies Nestle is in better position as compared to Britannia.

Operating Profit Ratio

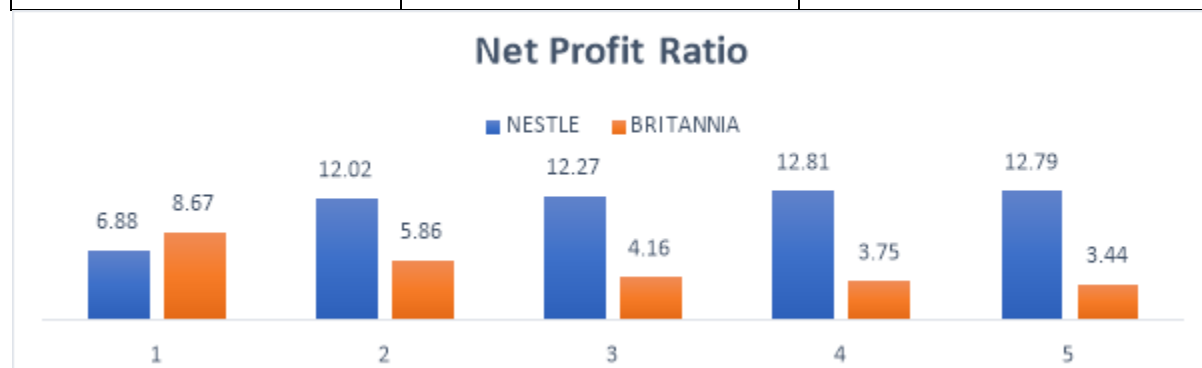
YEAR	NESTLE	BRITANNIA
2015	19.01	10.75
2014	20.61	9.45
2013	21.39	6.61
2012	21.90	5.61
2011	20.21	3.87

**Analysis:**

There is no ideal ratio but higher the ratio better it is. For Nestle in the year 2011 is 3.87 and from then it is continuously fluctuating till 2015 on the other hand for Britannia it is continuously increasing till 2015. For nestle the situation is not in favor as it is decreasing but for Britannia the situation is good as graph is increasing but if we compare both the companies Nestle is better than Britannia.

Net Profit Ratio

YEAR	NESTLE	BRITANNIA
2015	6.88	8.67
2014	12.02	5.86
2013	12.27	4.16
2012	12.81	3.75
2011	12.79	3.44

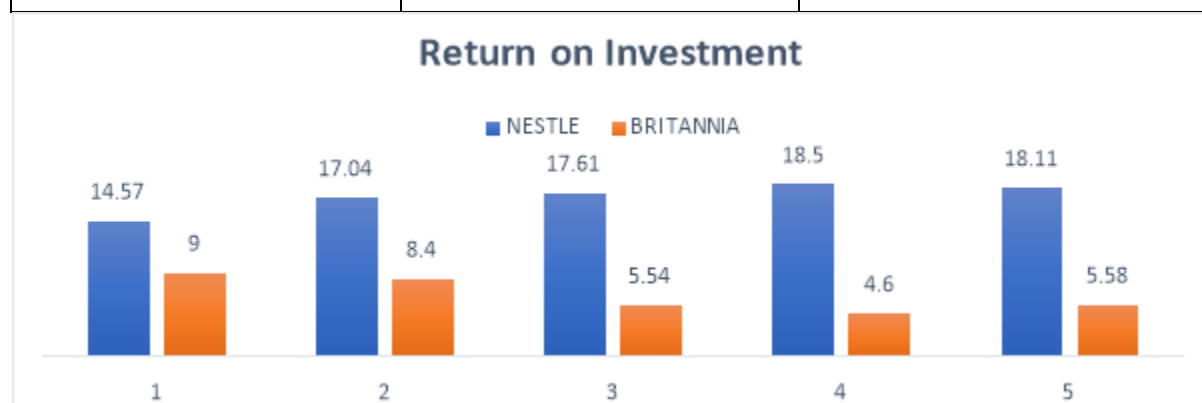


Analysis:

There is no ideal ratio but higher the ratios better it is. For Nestle in the year 2011 is 12.79 and from then it is decreasing continuously till 2015 on the other hand for Britannia it is continuously increasing till 2015. For nestle the situation is not in favor but for Britannia the situation is good. When comparing both the companies Nestle is in better position as compared to Britannia

Return on Investment

YEAR	NESTLE	BRITANNIA
2015	14.57	9.00
2014	17.04	8.40
2013	17.61	5.54
2012	18.50	4.60
2011	18.11	5.58



Analysis:

In this analysis we can observe that in 2011 ratio is 18.11 for nestle and it is decreasing for rest of the years till 2015. For Britannia it is fluctuating from 2011 till 2015. This ratio depicts the return on capital employed the higher the ratio the better is the position. The overall situation for Nestle is not OK on the other hand for Britannia is it OK.

Hypothesis Analysis:

Null Hypothesis H₀	Alternate Hypothesis H₁	p – Value	Interpretation
There is no significant difference in the financial performance of Nestle and Britannia.	There is a significant difference in the financial performance of Nestle and Britannia.	0.23	H ₀ Accepted
There is no significant difference in the profitability ratios of Nestle and Britannia.	There is a significant difference in the profitability ratios of Nestle and Britannia.	0.09	H ₀ Accepted
There is no significant difference in the liquidity ratios of Nestle and Britannia.	There is a significant difference in the liquidity ratios of Nestle and Britannia.	0.03	H ₁ Accepted
There is no significant difference in the efficiency ratios of Nestle and Britannia.	There is a significant difference in the efficiency ratios of Nestle and Britannia.	0.04	H ₁ Accepted
There is no significant difference in the solvency ratios of Nestle and Britannia.	There is a significant difference in the solvency ratios of Nestle and Britannia.	0.14	H ₀ Accepted

Key Future Prospects:

Grocery store deals will extend at a much higher rate than other retail arrangements. This is on account of more prominent number of higher pay Indians will like to shop at general stores in light of accommodation, higher gauges of cleanliness, and alluring feel.

- It is normal that natural product utilization will increment at a CAGR of 4.33% for the period spreading over from 2007-2011, most astounding among all the sustenance items taken in this report.
- The handled sustenance market is the primary center for remote organizations as this section is immature and presents colossal potential for development. The development of present day, sorted out retailing — as opposed to the stands and little shops from which Indians have been buying nourishment generally — will likewise build the interest for esteem included sustenances.
- Rising family wages, expanding urbanization, changing ways of life and the quick development of the private-part and dairy-handling industry ought to prompt more noteworthy interest for esteem included, drain based items, for example, prepared cheddar, table spread and frozen yogurt.
- Rising livelihoods will make angle more reasonable for a bigger portion of the populace. It is normal that the utilization per head will increment at a CAGR of 3.45% for the estimated period.
- The development rate of soda pop deals will decelerate amid the determined period because of pesticide tainting issues and developing notoriety of natural product juice drinks and filtered water.
- Coffee utilization is probably going to extend at a quick rate amid the estimated period. It is normal that it will increment at a CAGR of 10.05% for the period spreading over from 2007-2011.

Conclusion:

In this we do the extent examination of two packaged sustenance division associations Nestle and Britannia they are both awesome performer associations. By extent examination we identify the genuine position of an association. We can understand what the point of confinement of an association to pay its long to a transient duty and the benefit status of an association. In liquidity extent we understand that the liquidity position of an association is terrible at all its extent are decreasing in both associations and they are not in immaculate extent in solvency extent we understand that the utmost of the relationship to pay its long-term duties is terrible as its exhibit its fluctuating results in both the associations. In real life/turnover extent its exhibit that Britannia has incessantly growing in their extents whereas settle is terrible in performing awesome according to their extents. So, Britannia has growing awesome turnover however settle not extraordinary in extending its turnover. In advantage

extent the position of Britannia is awesome its continually growing in its benefit of an association however as settle shows OK execution in its examination So, both associations demonstrate their execution by their extents examination and we know the genuine position of both the associations.

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A Systematic Literature Review on Retirement Planning

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Abstract

Retirement planning is the establishment one does to be complete for lifetime when paid work ends, not just carefully but in all parts of life. Retirement is an end to the regular struggle for the salaried persons. If you take a pension plan, you will be economically autonomous and permitted in this gorgeous phase of life even if there is no received salary. But people in private jobs, a proper plan for retirement would help them to decide retirement income goals, and then design an achievable path to enjoy the benefits of planning retirement plan and make life better. The purpose of this paper is to systematically review the literature published in past 10 years on the impact of retirement planning. The paper highlights the major factors such as demographic factors, financial literacy and behavioral finance in making decision regarding retirement planning. This paper aims to present a comprehensive review of literature available for retirement planning in public sector and private sector, between male and female, between working women and non-working women, between people living in urban and rural areas etc. So, from this we will come to know how many people are planning for their retirement income.

Keywords: Financial literacy, Behavioral finance, Demographic, Retirement planning

Introduction

Retirement planning is the planning one does to be prepared for life after paid work ends, not just financially but in all aspects of life. The non-financial aspects include lifestyle choices such as how to spend time in retirement, where to live, when to completely quit working, etc. A holistic method to retirement planning considers all these areas. Retirement is an end to the daily struggle for the salaried persons. If you take a pension plan, you will be financially independent and free in this beautiful phase of life even if there is no incoming salary. People in private jobs, needs a proper plan for retirement as it will help them to determine retirement income, which will give them the benefits of retirement plan and make life better. Financial decision making is a vital part of daily life. Most of these choices are made without checking proficient financial advisors.

Financial literacy is the term used to describe the amalgamation of economic and theoretical knowledge. A combination of knowledge, skill, awareness, attitude and behavior are necessary to make sound financial decisions which ultimately achieve individual financial wellbeing. Some financial decisions have far-reaching effects for the individual and society, and chief among these are decisions pertaining to retirement planning. Recent demographic and socio-economic developments, including the increase in life expectancy, the restructuring of the capital market and changes in career path, have concentrated retirement planning more crucial in past years. The composition and level of retirement savings affects the lives of individuals after retirement. Difficulties met in financing retirement may cause some to become a burden on their families and community, as well as on the public welfare system.

Literature Review

Dr. Swati Modi, 2019 the aim of this study were to examine the retirement planning behavior of working individuals. The findings of this research support the research model in which potential conflict in retirement planning, attitude toward retirement and retirement goal clarity are the important predictors of retirement planning behavior. The results of this study have inferences for working individuals to do early planning for retirement to enable them to have a solid monetary base for retirement.

Smruti Vakil, 2019 In this study on individual retirement planning behavior they studied the individual likings towards retirement along with the satisfaction level of the investment made by individual, which concluded that the sources most influence people's decision about retirement planning are-Family, Friends, Self-Research and Work, it also found that there are 50% people who believe that there is no sufficient awareness for retirement planning in

market. It shows that only 30-40% people invest for their retirement. According to this paper there are different avenues which respondents prefer to have retirement investment.

Prof. Suyog chachad, 2018 in their research paper” Are you making yourself retirement ready- A study on salaried individual” has focused on the requirement and importance of retirement planning and it also highlights the alertness and manners preparation of persons towards retirement. The consequence exhibited that individuals do not plan for their retirement; they also need to have some financial education programs to have the awareness and learn importance of retirement.

Vinmalar J, 2018 in their study on retirement planning of working individuals with special reference to Chennai city intended to study how working individual are aware and which avenues they opt to invest for retirement life. The findings indicate that there is no association in investment done in avenues and marital status. Married working individuals invest in avenues on a huge basis for retirement life compared to unmarried ones.

J, V., & Joseph, D. T. (2018). Conducted a study among working individuals from both gender as well as sectors (public and private) to examine the awareness in different investment avenues for having a secure retirement life. The data was collected in form of questionnaire from 100 respondents across Chennai City. Simple random sampling technique was used to as sampling technique. The research shows no relationship between demographic factors and investment pattern. It also shows using Mann Whitney U Test that there is no association marital status and investment done in different avenues. The research finds out that most of the respondents saving habit on monthly bases.

Biobaku (2018) and Kagan (2017) The purpose of this paper, is that the stages of human development are divided into three broad categories-Young adulthood (21-35), Early Midlife (36-50), Later Midlife (50-65).In early life of person when they are working , retirement planning is about setting aside enough money for retirement. During the middle of the career, it might also include setting specific income or asset targets and taking the steps to achieve them. Once you reach retirement age, you go from accumulating assets to what planners call the distribution phase. You are no longer paying in; instead, your decades of saving are paying out.

Parveen Kumar, 2017 in their study they found that many people are aware about the retirement planning and according to them the factor which mainly influence is living expense and expected inflation. It also shows that the people are aware about risk and return

and they properly understood the inflation rate but are less aware about diversification. It also highlighted that some people start investment in the age of 31-40.

Shailesh singh Thakur, 2017 there is an impact of financial advice in retirement planning of many individuals according to the study which intended to focus on the perception of individual behavior on retirement planning and role of financial advice in it.

Thakur, Jain, & Soni (2017) they conducted a study on perception of individuals towards retirement planning. The research collected data from 1144 individuals from different age groups and occupation. The study focuses on retirement planning and not on retirement investment plans. The study reveals that 50 percentage of the respondent want to get retired in next 20 years and almost 50 percent of individuals invest towards their retirement, contrarily the rest of the respondents do not invest or are unsure about their investment towards retirement planning. The study shows that most of the respondents were positive when asked the question retirement planning is important irrespective of their income, age and occupation.

Fatemeh Kimiyaghalam, et.al(2017) The authors has studied financial retirement planning in Malaysia. The motivation for the study was a report by Employees Provident Fund (2015) government agency which manages savings for retirement. The report said that employees engaged in private sector do not have enough savings for retirement and therefore it compels individuals to work after retirement. The authors have considered two behavioral theories relevant for retirement financial planning. These theories are ‘planned behavior’ and ‘time perspective theory’. Primary data is collected from 900 respondents and structural equation is used to analyze the data. The study revealed that individual’s planned behavior and future orientation has direct relationship with retirement planning behavior.

Nurul Faezah Mohd Talib et.al. (2017) the research regarding retirement behavior was carried out among the employees of ‘Employees Provident Fund’ (EPF). The study is interesting as EPF is a government agency in Malaysia, which is in charge of managing savings of private sector employees for retirement. The study considered ‘self-awareness’, ‘organization role’ and ‘environmental factors’ as independent variables, dependent variable being ‘retirement planning behavior. It is worth noting that 71 percent of the respondents never followed any retirement plan even though all of them agreed that retirement plan would help them to have secured retired life with regular income. There is no correlation between self-awareness and retirement planning as employees are aware of the financial needs after retirement but have very little financial literacy.

Xiao and O'Neill (2016) they explored the potential effects of financial education received at a workplace on five different measures of financial capability, both objective and subjective, and found positive associations with these financial capability indicators as well as for financial education received in high school, college, or from any source.

Arayavechkit et al. (2015) It imply that a growing number of self-employed workers may experience financial inadequacy during old age due to their potential inability to save because of low productivity and unpredictable incomes. Self-employed workers tend to delay saving and may fail to plan appropriately for retirement due to a lack of financial capability and an unstable career path.

Lusardi and Tufano (2015) It found low levels of financial literacy in the US population, an inability to understand basic financial concepts, such as the importance of retirement savings and poor judgment in borrowing decision.

Pant, Gargi(2015) That women faculty members are very much aware about the retirement planning, they know the importance of retirement planning ,amount of corpus needed for retirement planning and they are investing in various investment avenues but mostly women invests in FD/RD and some mutual fund, women faculty members considers intuition while investing in stocks.

Kadam and Thakar (2014) Human resource is the prime asset for IT companies as it is knowledge based industry. High attrition rate would have adverse impact on organization's performance. The author has conducted the study in the city of Pune to identify the reasons for attrition in IT industry. The study reveals that the average age of employees is 26 years with 2 to 4 years of experience. Prime reasons for employees to leave the job is dissatisfaction with salary and career advancement. Besides this study also shows that non-monetary benefits are valued by the employees. Chi square analysis is done to draw the inference from the data analysis.

Caruana Briffa, 2014 A survey carried out by the Central Bank of Malta in 2013 reports that less than a quarter of Maltese households are net savers, with mean savings of around 4% of household income (Caruana Briffa, 2014). The same study reported that 24.6% of households reported holding some form of a voluntary pension scheme or life insurance product, compared to onethird in the EEA

Pant Gargi (2013) Author has considered female faculty members of Banasthali University, Rajasthan for the study. The female faculty members are divided between married and unmarried. The author has concluded the study by stating that married women are more

aware about the retirement planning and done more for retirement as compare to unmarried women and they are moderate risk bearer and like to invest in less risky avenues. These design features help less sophisticated investors while maintaining flexibility for more sophisticated types.

M Krishna Moorthi et.al. (2012) Understand influence of demographic factors and psychological factors on retirement planning behavior. The authors have considered three demographic factors namely- age, education and income. Besides these two psychological factors such as goal clarity, potential conflicts in retirement planning and attitude towards retirement are considered for the study. Primary data is collected from 300 respondents between the ages of 25 to 55 years. Statistical tools such as correlation, one-way ANOVA and regression used to analyze the data. The authors conclude the research paper by stating that demographic factors, education and income have significant influence on retirement behavior. Psychological factors namely goal clarity, attitude toward retirement and potential conflict in goals also has impact on the retirement behavior of the individual.

HSBC (2012) the survey done by HSBC on working people above age 25 reveals that saving and investing for retirement is a challenge for them, they can only think of retirement savings in the later years of their job. This report also reveals that those who are saving for retirement in planned manner they have accumulated three times money as compared to those who don't have plan for retirement.

Narang, K. (2012) Ameriprise India advisory services conducted the survey and assessed the financial savvy of residents of six major cities of India and ranked them according to their financial intelligence. Mumbai tops the financial intelligence index, followed by Delhi, Hyderabad, Pune, Bangalore and Chennai in last. Mumbai has received one ranking as they have diverse portfolio, they are utilizing professional advice and start investing early and also shows room for goal based planning with long term approach.

Hinz, L. (2012) Was a speaker at a panel for National retirement planning week, she told that women are capable to manage the daily finances and family budget but do not want to involve in big pictures like retirement planning for them, women don't understand that there is sufficient chances for women to live after age 85, if women was given basic knowledge also they will do it with confidence.

Bipul Kumar (2012) has applied the theory of planned behavior to the environmentally sustainable products. Consumption of sustainable products is important as it has impact on

the sustainable development of the country. Consumers' attitude towards sustainable products has strong association to individual's buying behavior in respect to environmentally sustainable products. The author has used the Theory of Planned Behavior framework developed by ajzen, to assess the association between environmental knowledge and attitude towards environmentally sustainable products. The study revealed relative strength of determinants of purchase intention with regards to environmentally sustainable products.

Moorthy, et al., (2012) undertook a study on the retirement planning behavior of working individuals in Malaysia is a cross section explanatory research. A total of 300 individuals between the age group from 26 to 55 years participated in the research. The study reveals that different age group of working individuals have different thinking and behavior toward the retirement planning and the most ideal age to start planning for retirement is between 26 to 35 years. Therefore, stating that ahead of time may take advantages and benefits to them in order to prevent them from not affording to retire since they have sufficient time to plan on it.

Clark, Morrill, and Allen (2012) when a worker is first hired (to sign up for retirement savings plans) and near retirement (to make choices that optimize lifetime well-being). Topics for learners in the accumulation phase of retirement planning (roughly 20s through early 60s) include the impact of compound interest over time, how to do a retirement savings need analysis, characteristics of retirement plan investments (e.g., target date mutual funds), and basic cash flow management strategies to "find" money to save.

Conclusion

Despite all the above caveats, the literature review enriches our understanding of retirement planning behavior among individuals and its development can be influenced by these determinants - financial literacy, behavioral finance, saving behavior, personal attitude and goal clarity. Overall, the results indicated that goal clarity, personal attitude and saving behavior serve as a primary role in affecting retirement planning behavior in people and is useful indicator to promote higher retirement confidence. Goal clarity is the strongest factor that influence the retirement planning behavior, which shows they have a clear vision of how life is when they retire. They are also show concern on the quality of their retired life. Apart from that, personal attitude and saving behavior are found to influence employee retirement planning behavior. This is to confirm that individuals who aim for good future retirement and give attention to financial planning decisions, be prepared with the necessary knowledge and practice good behavior when they retire. However research shows the retirement planning behavior is relatively high and significant but it is also found that working individuals are not

well-prepared for their future financial. Accordingly, a better understanding with a clearer picture of how savings can potentially help them achieve their future goals is essential by providing better retirement preparedness so that they can save and learn to generate returns from their savings. A better financial well-being is essential for long-term development and could be contingency for individuals during retirement periods and for any critical situations.

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An Analysis of the Income and Investment Pattern of Working Women in The City of Rajkot

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Abstract

Women are great administrators in maintaining their personal goals to satisfy family needs. Women should start thinking about and understanding the significance of income, savings, and investment in order to prevent potentially dangerous situations at any point of their lives. To meet their financial needs, they must make investments. The objective of the study was to determine the relationship between the income and investments pattern among working women. A variety of investment choices are accessible, including banks, gold, real estate, postal deposits, life insurance, mutual funds, and others. Working women invest their money for a range of benefits, security, recognition, and income stability purposes. Using convenient sampling method, 102 working women were selected from public and private sectors in Rajkot. A structured questionnaire was forwarded through email and responses were collected. Responses were analyzed using various statistical methods to derive relationship between income and investment pattern. It was found that respondents have been saving for future needs in spite of having low income. The research shows that the age, income, yearly savings and expected return on investments have significant relationship. When working women investors are making investment decisions pertaining to financial matters and financial planning, this study aids in understanding their investment behaviours. The research will be helpful for academicians, research scholars and practitioners.

Keywords:

Investment Pattern, Income, Working women, Public and private sector

Meaning of Income:

Income is the amount of money received by an individual, business, or organization in exchange for providing goods or services, or through investments and other financial dealings. It is typically measured as a flow of funds over a specific period of time, such as a year. The concept of income is used in various contexts, including personal finance, economics, and tax law.

For households and people, however, “income is sum of all wages, salaries, profit, interest payments, rents and other forms of earnings earned...in a specific period of time.”

It also refers to the money or other types of compensation, (received on a regular or recurring basis) from business, employment, endowment, investments, royalties etc.

Meaning of Investment:

Investment is the act of allocating money or capital to an endeavor with the expectation of obtaining an additional income or profit. The purpose of investing is to increase wealth over time through the growth of assets or production of income.

Investment, in its broadest sense, refers to spending money with the intention of earning more. It also refers to financial commitments or the acquisition of property for future financial gain.

In general, there are two main types of investments: (1) Fixed income investments like bonds, fixed deposits, and preference shares, and (2) Variable income investments like stock ownership in businesses or real estate.

Working Women's Work:

Within the family, women's income is always viewed as a supplement.

Women and children in the household are generally seen as consumers rather than producers.

Without the participation of women in the development process, no country can advance.

"Women's work" is a term that has historically been used to describe the types of jobs and tasks that are traditionally performed by women, often seen as less valuable or prestigious than work typically done by men.

In the 1990s, women's work was characterized by a growing participation in the labor force and a shift towards more professional and managerial occupations. However, women still faced significant barriers in terms of equal pay and advancement opportunities compared to men. In the twenty-tens (2010s), there has been a continued increase in women's labor force participation and a closing of the gender pay gap in some industries. Women have made gains

in traditionally male-dominated fields, such as technology and finance. However, the COVID-19 pandemic has disproportionately affected women, leading to job losses and increased caregiving responsibilities.

Despite the progressive attitudinal change, it is significant to note that barely 1/3 of the total working population are women. The majority of women's careers historically have been in the hospitality industry, in personal services like air hostessing or beauticians, in teaching, cooking, marketing, and clerical work, all of which need women to possess certain intrinsic personal attributes.

Women's Empowerment:

Women's empowerment in India refers to the process of increasing the social, economic, and political power and status of women. The Indian government has implemented various policies and programs to empower women, including reservation of seats in local bodies, provision of financial assistance, and laws to prevent gender-based violence and discrimination.

Women's direct involvement in the independence movement created numerous opportunities for them to take part in economic development. While from the beginning of Indian planning, one of the goals was to promote the wellbeing of women.

The Tenth Five-Year Plan (2002-2007) in India had a specific focus on women's empowerment. It aimed to improve the status of women through various measures, including:

1. Promoting education and health of women
2. Enhancing employment opportunities
3. Strengthening legal rights and protection against violence
4. Encouraging women's participation in decision-making processes
5. Addressing discrimination and promoting gender equality

The Plan recognized that women's empowerment was crucial for sustainable development and emphasized the need for a multi-dimensional approach that covers economic, social, and political aspects. The Plan allocated specific funds for programs aimed at empowering women and improving their status in society.

Role of Working Women in Investment in 21st Century:

The role of working women in investment has become increasingly important in the twenty-first century. As more women enter the workforce and attain financial independence, they are taking a greater role in managing their own finances and making investment decisions.

Women still lack the ability to make thoughtful financial decisions, despite having solid saving habits. Working women have the potential to drive significant economic growth through their investment decisions, and they are also helping to close the gender wealth gap by building wealth and financial security for themselves and their families. Many financial institutions and organizations now offer investment products and services specifically tailored to the unique needs and goals of working women. By taking an active role in their own financial futures, working women are creating a more secure and prosperous future for themselves and their communities. Women are gradually joining riskier portfolios and adopting more analytical investment practices, though, so things are changing. The goal of this study was to examine how working women in Rajkot city invested their money.

Review of Literature:

Dr. Sarita Bahl (2012) came to the conclusion that working women are committed to their financial strategy. Women love investing their money after becoming financially independent. The majority of working women are aware of the several financial options and have already made investments. The majority of working women put their money in risk-free products.

Gaurav Kabra (2010) came to the conclusion that the contemporary investor is aware of a variety of investing options. Despite the security market's amazing growth and favourable returns, investors still make investments based on their own demographics.

Dr. Priyanka Zala and Dr. Dhara Jethwa stated that the safest investment possibilities for working women are jewellery, provident fund investments, bank and post office savings. Working women don't like to put a lot of their savings into one type of investment. So, it can be said that a person's risk tolerance is influenced by their age, experience, income, and investments.

A.SyedBeer (2017) concluded that Investors risk in selecting a particular avenue is dependent on the age of that investor. For a variety of reasons, many women are less willing than males to accept risks. This includes taking investment risks. Women investors continue to favour financial product that offer risk-free returns. Even though they have high incomes, are highly educated, are highly employed, and are independent, Indian investors are conservative and prefer to choose the safe route.

According to Barber and Odean (2001), men are more capable and self-assured than women when making financial judgments. While making financial decisions, women consider their

fathers' and spouses' opinions. We can infer that men will typically feel more self-assured and superior about their capacity to make financial judgments than women.

According to B. Thulsipriya (2015), government employees prioritize different investment opportunities. Workers also frequently invest their money in low-risk financial products.

RejeshwariJain (2014) analyzed that on the basis of survey conducted in Ahmedabad City that the 95% of women were involved in financial decision-making in their households, and one-fourth was the primary decision makers. Additionally, it may be said that married women take investing more seriously than single lady because they feel a sense of duty to their families and kids.

According to Maheswari's (2016) research, the majority of respondents are less likely to benefit from her findings, and even if they did, they only saved a little portion of their pay. Although a huge number of people have made investments in financial assets, their entire sum is extremely small. Only people from rural areas responded to the survey, and they were low-income, less educated, unemployed, and more likely to have committed to life insurance, post office savings, and bank deposits rather than to mutual funds, stocks, shares, debentures, or bonds. They were also less aware of new financial schemes and asset prospects, which led to a lower level of investment in higher-risk financial assets.

Varsha Virani (2013), analyzes the trend of investments. This shows how the level of money earned during by salaried women employees has a substantial impact on investment. Instead of wasting money on an extravagant, heavy lifestyle, they choose to stick to the norm. For security against an unforeseeable future, the majority of respondents invest money as a bank deposit. Principal assets are deposits in banks. Thus, women's investments are mostly focused on preparing for marriage, having children, and finishing their education.

Sonali Patil, Dr. Kalpana Nandawar (2014) conducted a questionnaire study in Pune, India, using a sample size of 40 salaried workers to explore the various investment options and the consideration to take into account when picking an investment. The study's primary data were gathered using persona interviews and a standardized questionnaire. The gathered primary data were assessed using the percentage, chi-square test, and individual correlation coefficient. The study examines how protection and ROI are factors that working people take into account.

Dr. R. Sellappan, Ms. S. Jamuna, and Ms. Tnr. Kavitha (2013) discover that married women have greater interest in investing than unmarried women. The preference for real estate

investing is among those in their middle years. In order to raise more money, the government, banks, and financial institution might implement a number of investment strategies based on investment criteria such as age segmentation and marital status.

According to Prakash and Sundar's (2013) study on "Women Understanding and Preference Analysis: Investment Paths," most women consult their family and friends before making investment decisions and prefer bank deposits.

According to Prof. Priya Vasagadekar's (2014) research, women currently receive the best job offers with generous benefits packages. Working women in India today have a higher need to increase their wealth. Typically, women are less financially literate than males, which makes it difficult for them to handle their portfolios on their own. Working women are not very good at taking risks. This is due to a lack of basic financial knowledge.

G.Shanti and R. Murugesan (2016) examined the investment preferences of salaried women employees with a variety of avenues for investments as well as the criteria while picking the investment. They discovered that working women frequently take into account safety and a high return on investment.

B.N.Panda & J.K.Panda (2013) made a comparative study on the relevance of demographic factors in investment decision with respondents from education sector. According to the study's analysis, there is a strong correlation between demographics factors including gender, age, occupation, annual income and savings, as well as sources of awareness and investment outlet analysis, such as savings and investment opportunities.

Dr. G. Rekha & R. Visnupriya (2019) concludes that as a woman and an investor, they play a variety of roles in life, and creating their financial destiny is no different. Women today have greater earning potential and financial decision-making power than ever before. Nearly half of the workforce is made up of women, and many companies are run or controlled by women. The majority of consumer decisions are influenced or made by a large number of women.

Dr. Sindhu K. P and Dr. S. Rajitha Kumar (2014) concludes that investors in mutual funds are prudent with money. They are aware of the adage "greater the risk, higher the return," but they also recognize that a diversified portfolio will lower risk.

Dr. S. Premalatha concludes that the investment became the financial weapon which helps go to the women investors to meet the emergency needs of the family.

According to Samir S. Manek's research from 2017, fixed deposits and mutual funds are both considered to be secure investments, but mutual funds are more attractive to the majority of investors due to their high returns and increased liquidity.

According to Deepak Sood and Dr. Navdeep Kaur's (2015) study, there are correlations between annual saving and factors like age, earnings and people's education. Here, it was claimed that bank savings and LICs were the best investment options, with high yields, tax advantages, and protection making up the majority of the factors influencing choice of investment. The survey came to the conclusion that most people save money for their children's education, their own marriages, and other life aspirations. Employees in the salaried class are probably going to save more money and spending less.

Drs. S. Mathivannan and M. Selvakumar (2011) conducted research on "Saving and Investment Trend of Working Women-a Study with Reference to Tamilnadu's Sivakasi Taluka." The results of the survey demonstrate that the current generation of working women recognizes the importance and value of money. They are urged to make a budget for the suggested expenses and contrast it with their actual expenses, in order to prevent other fashionable expenses from influencing them.

Amsaveni M. & Nithyadevi M. (2018) studied 100 working women in the Trippur district to determine their investment patterns and attitudes towards various avenues for investing. They discovered that profitability and safety had the greatest influence, followed by liquidity, prestige, stability, transferability, and speculation.

Jisha V. G. (2017) investigated the perception of investing behaviour among urban working women in Coimbatore city and identified the elements influencing saves and investment behaviour. The findings showed a link between benefit influencing factors and awareness level. When making investments, investors prioritised the protection of their money.

Kaur J & Arora N, (2018) analyzed 150 investor responses to determine how investors in Punjab felt about mutual funds as an investment option. Due to growth fund schemes' higher returns, it was discovered that investors favoured mutual fund investments. Also, it was discovered that every investor had a different investment objective for mutual funds.

Venkatesh G C & Surya Prakash Rao B K, (2018) in order to analyze the decisions made by 120 investors regarding their investment portfolios, a study was conducted in Vijayawada to determine how investors perceive their investment portfolios. The results of an analysis

utilizing different statistical approaches showed that both men and women make the same choices when making investments.

According to Lalit Mohan Kathuria and Kanika Singhanian (2012), only 40% of respondents had a high level of awareness about different investment avenues, and private sector banking employees invested a larger portion of their savings into safe and risk-free investment avenues, such as employee provident fund, public provident fund, and life insurance policy.

Purnima D. and Lalitha N. (2021) have investigated the investment practises of salaried people using Visakhapatnam as a case study. The main objective of the study was to evaluate salaried workers' preferred investment strategies. 100 replies in all were gathered. The data are examined using the Chi-Square test. According to research, salaried employees place a high emphasis on safety and return on investment.

Sanket L. and Jagdeesh L. (2018) examined a research study on the savings and investment behaviour of persons in the salaried class with particular emphasis on Pune (India). The primary goal of the study was to assess the variables that influence investment choices, as well as to examine different investment paths. Structured questionnaires and survey methods were used to obtain the data. 60 replies in all were gathered. Using the Chi-Square test, data were evaluated. Researchers found that investors in India preferred safety and a high rate of return on their investments. They also found that men had higher levels of awareness than women did.

A study of the Warangal District's teacher savings and investment patterns was given by (Usha S, 2017). The study's major objective was to assess how teachers invested and saved their money. Surveys were used to get the data. A total of 100 replies were gathered. Chi-Square test is used to examine the data. The researcher came to the conclusion that there was a substantial association between the factors influencing savings and the pattern of saves and investment. Due to their ignorance of risk return portfolios, researchers also found that the majority of instructors favour low risk and poor return investing paths.

(Jeet S. and Preeti Y., 2016) carried a research on the variables affecting investors' decisions to buy equity shares in Jaipur and Moradabad, paying particular attention to the gender of the investors. The primary goal of the study was to assess how investors felt and acted towards different investment options. Data were gathered using the survey approach. There were 100 answers total, of which 40 were female and 60 were male. Data were examined using the T

test and Mean Score. The researcher came to the conclusion that investors do fundamental, technical, and financial analyses before to investing.

Research Methodology:

Research Problem:

The process of conducting research begins with problem formulation. It's done to pinpoint the topics that need more investigation. A problem shouldn't be described too broadly or too narrowly. So, the following is the research problem: An examination of the working women's income and investment behaviour in Rajkot.

Objective of the Study:

The current study's goals are to;

1. To analyze the investment pattern of working women.
2. To determine the frequency of investment.
3. To determine the investment strategies that working women prefer.
4. To ascertain who influences or aids respondents in selecting investing tools.
5. To analyze the awareness level and main preferred tools of investment by working women.

Research Design:

The research stage is initially exploratory because the research statement was created using a variety of reviews of the literature that was accessible via the internet and journals. After defining the research question, the research design changes from being analytical to being descriptive because it now defines the traits of a subset of the population used as a sample for overall investment preference.

Sample Design:

A sample design is a clear strategy for selecting a sample from a certain population. This phrase refers to the method used to choose the objects for sampling designs.

The Sample Size and Collection Process:

A convenience sample of 102 working women in Rajkot served as the study's population. The participants were given 102 self-administered questionnaire, informed about the study's goals, and given enough time to complete the questions.

Sampling Method:

Non-probability sampling method: Convenience Sampling

Data Collection:

Working women are asked a series of questions in order to gather the primary data. An open-ended and a closed-ended question are both parts of a structured questionnaire.

Collection Technique:

1. Primary Data
 - Questionnaire Method
2. Secondary Data
 - Existing reports
 - Books
 - Journals and magazines
 - Websites
 - Research Papers

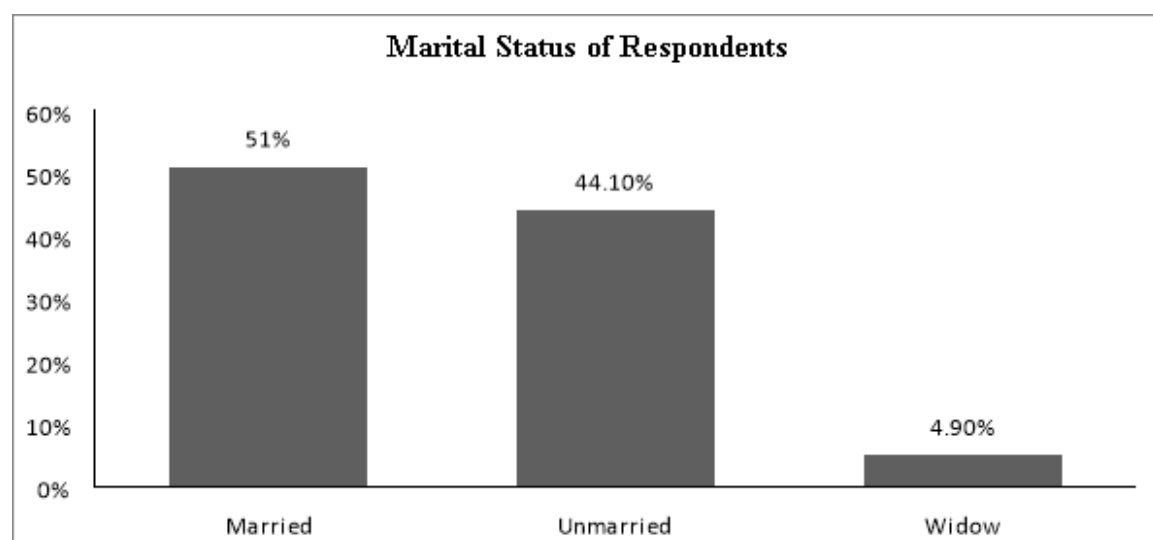
Limitation of Study:

- Some people felt it was too personal to discuss information about their income and investing choices.
- To draw a conclusion, the sample size for Indian working women may not accurately reflect the overall population.

Analysis:

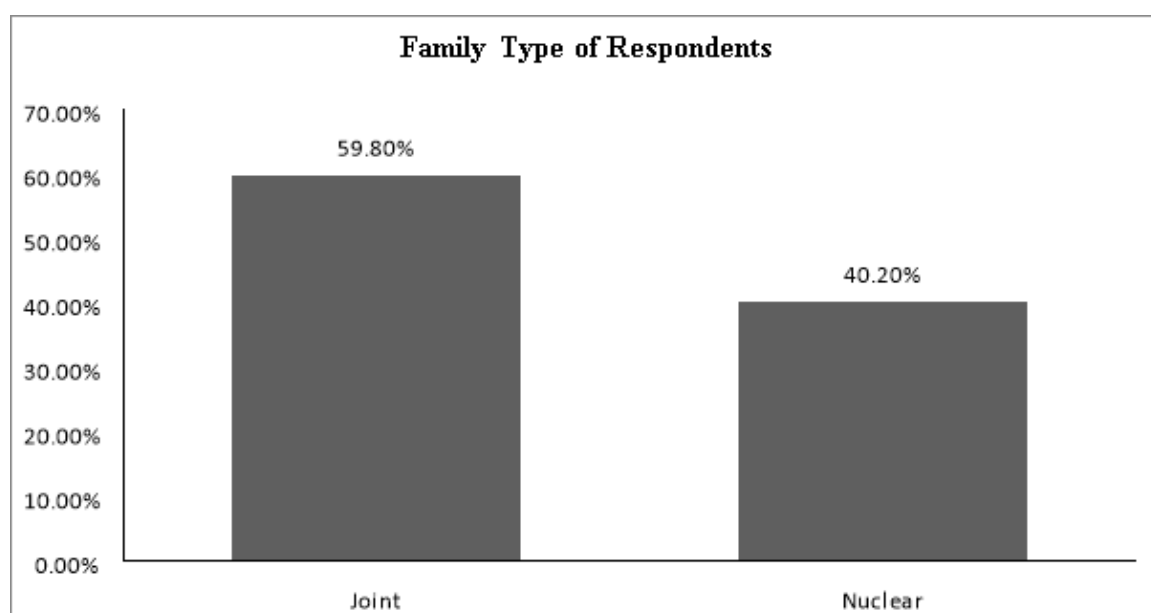
1.DEMOGRAPHIC PROFILE:

Figure 1: Marital Status of Respondents



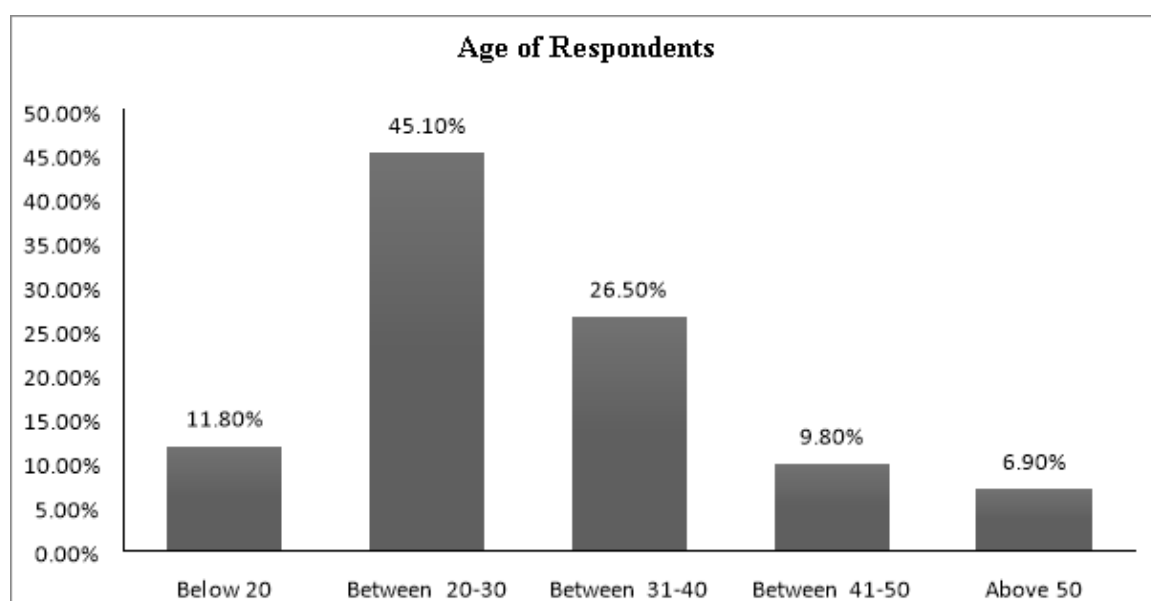
Source: Primary Information

According to Figure 1, out of the 102 respondents, 51% of the working women are married, compared to 44% and 5% of single women and widows, respectively.

Figure 2: Family Type of Respondents

Source: Primary Information

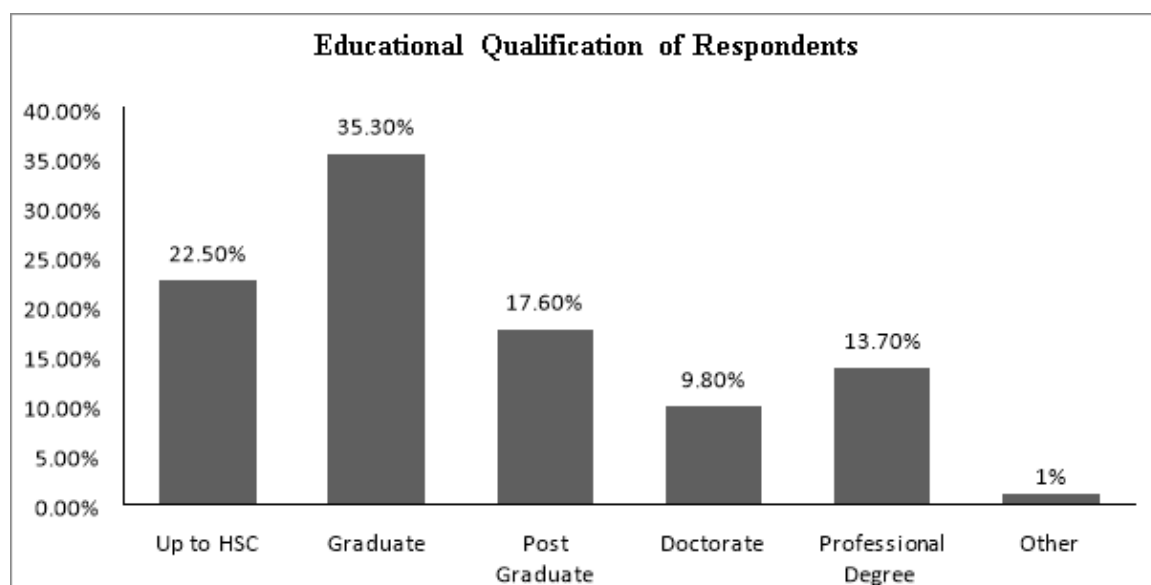
Out of the 102 respondents, Figure 2 demonstrates that 60% of the working women live in joint families and 40% live in nuclear families.

Figure 3: Age of Respondents (In Years)

Source: Primary Information

Out of 102 respondents, Figure 3 reveals that 12% of the working women are under the age of 20, 45% are between the ages of 20 and 30, and 27% are between the ages of 31 and 40. Just 10% of working women are in the 41-50 age range, and the remaining 7% are beyond 50.

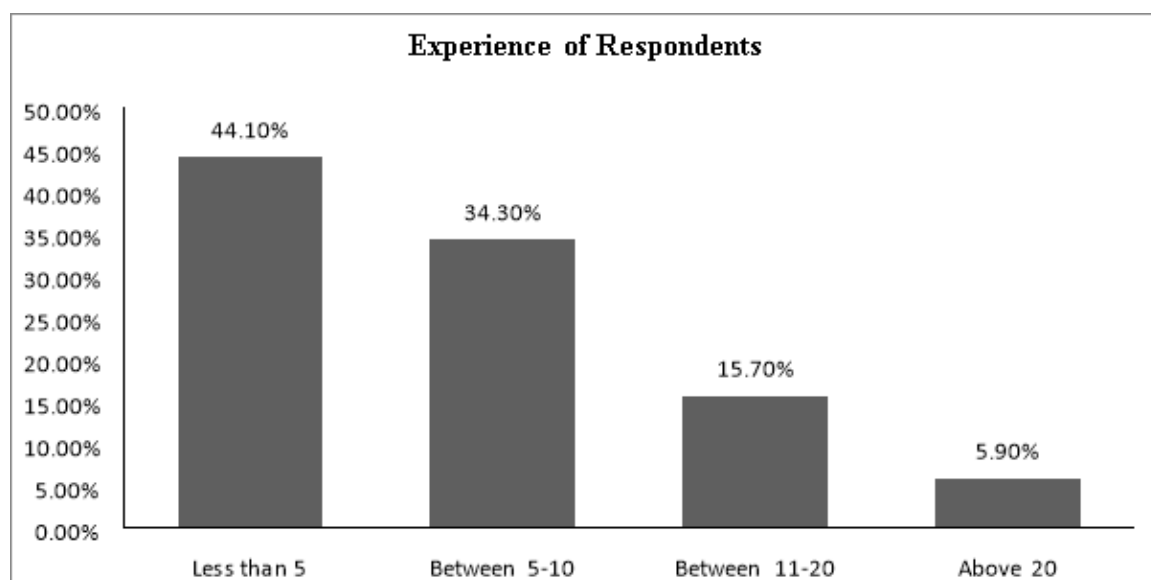
Figure 4: Educational Qualification of Respondents



Source: Primary Information

Figure 4 shows information on respondents' educational backgrounds. In a survey of 102 respondents, 35% of working women reported having a graduate degree, and 18% had a postgraduate degree. 14% of people have professional degrees, compared to 23% who have only completed their high school education. Only 10% of working women have a doctorate degree, and only 1% of them have any other qualifications.

Figure 5: Total Experience of Respondents (In Years)

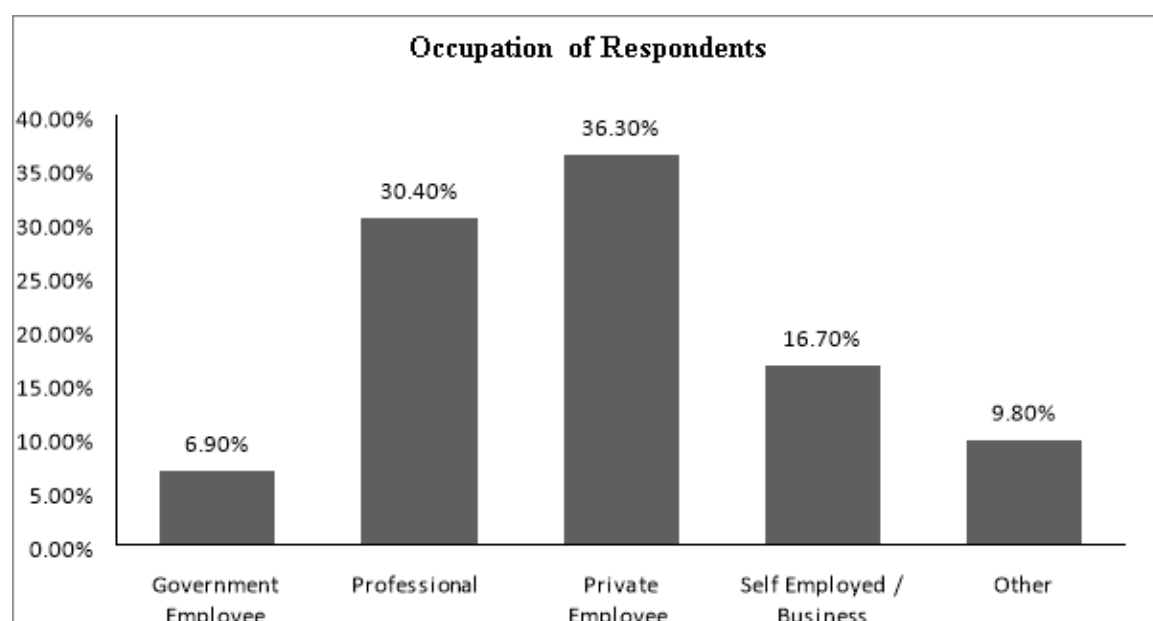


Source: Primary Information

The overall experience of respondents is shown in Figure 5. While 34% of working women have experience of five to ten years, 44% of them have less than five years. Only 6% of

people have experience of more than 20 years, compared to 16% who have experience between 11 and 20 years.

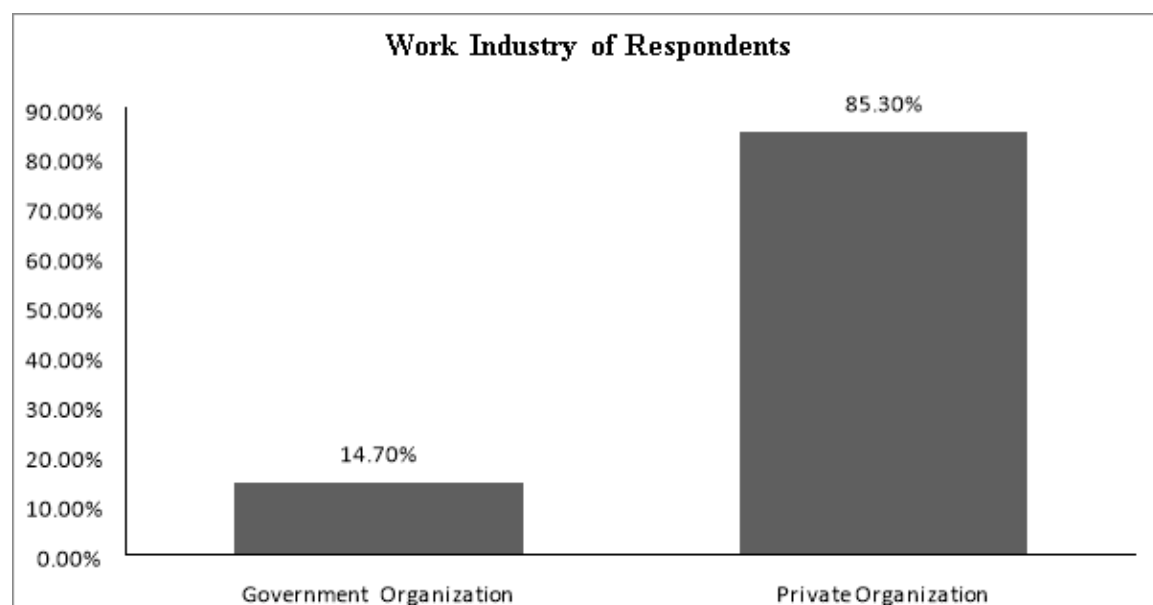
Figure 6: Occupation of Respondents



Source: Primary Information

Figure 6 shows that the majority of working women respondents are employed by private companies (36%), while the remaining 30%, 17%, 10%, and 7% work as independent professional, are self-employed, work for the government, or have other occupations.

Figure 7: Work Industry of Respondents

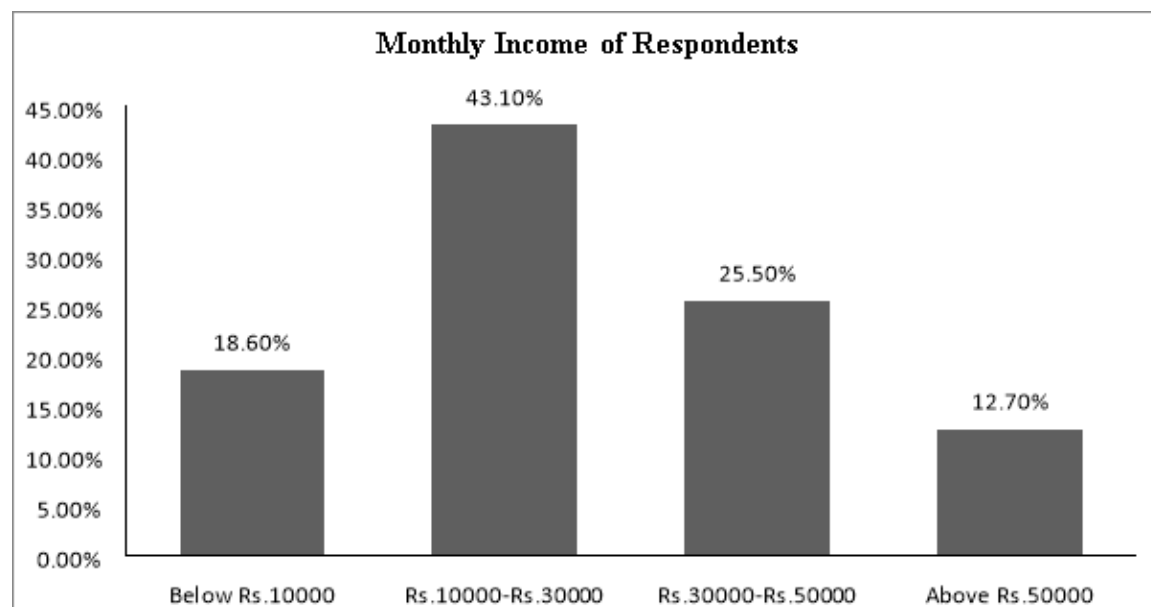


Source: Primary Information

Figure 7 shows that just 15% of working women are employed by the government, compared to 85% of working women who work in private organizations.

II. INCOME, INVESTMENT AND SAVINGS ATTRIBUTES:

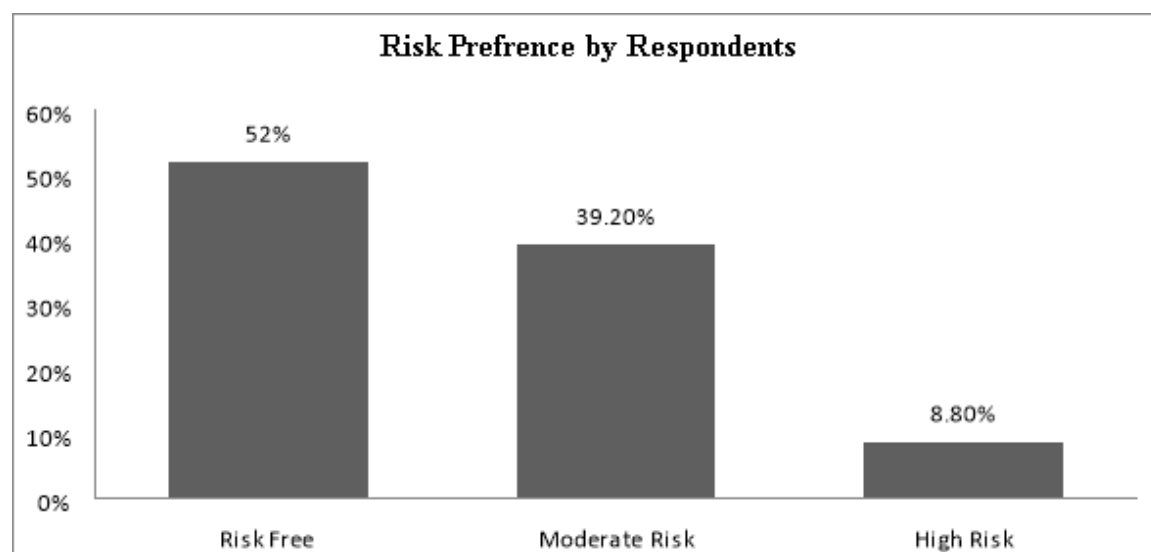
Figure 8: Monthly Income of Respondents (In Rs.)



Source: Primary Information

Figure 8 shows the statistics about the respondents' monthly income. 43% of working women have monthly incomes between Rs.10000 and Rs.30000, compared to 26% of working women who earn between Rs.30000 and Rs.50000. Incomes less Rs.10000 and beyond Rs.50000 are made up of 19% and 13%, respectively.

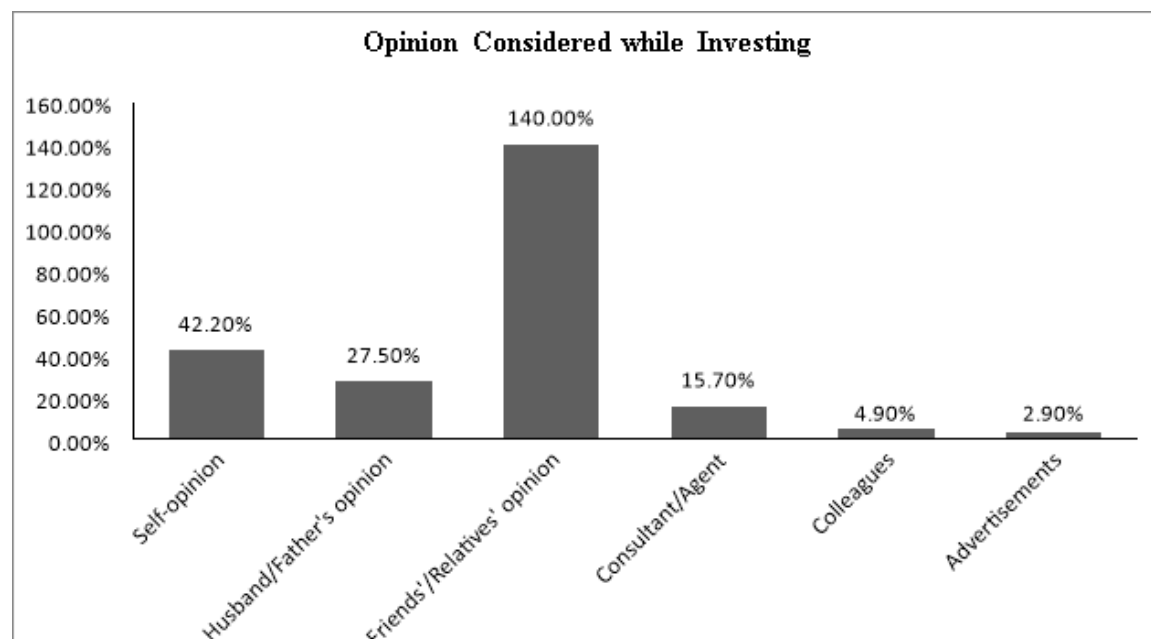
Figure 9: Risk Preference by Respondents



Source: Primary Information

Information about respondents' preferences for risk is shown in Figure 9. Only 9% of investors preferred high risk, while 39% liked moderate risk and 52% selected risk-free investing avenues.

Figure 10: Opinion considered by Respondents while Investing



Source: Primary Information

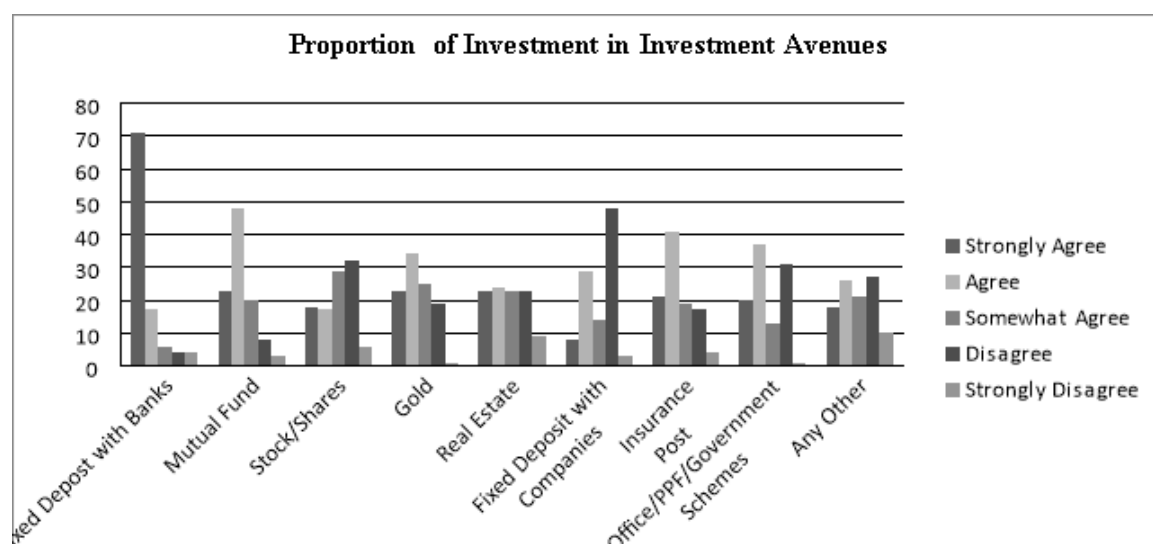
Figure 10 makes it very clear that the majority of working women (140%) consulted their friends and family before making an investment. Working women make their own decisions in 42% of cases. Working women regard their husbands'/fathers', consultants'/agents', coworkers', and advertisers' opinions to varying degrees (28%, 16%, 5%, 3%, and so forth).

Figure 11: Proportion of Investment in Various Investment Avenue

On being asked what their main preferred tool for investment was, the responses were as follows:

No. of Respondents					
Options	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree
Fixed Deposit with Banks	71	17	6	4	4

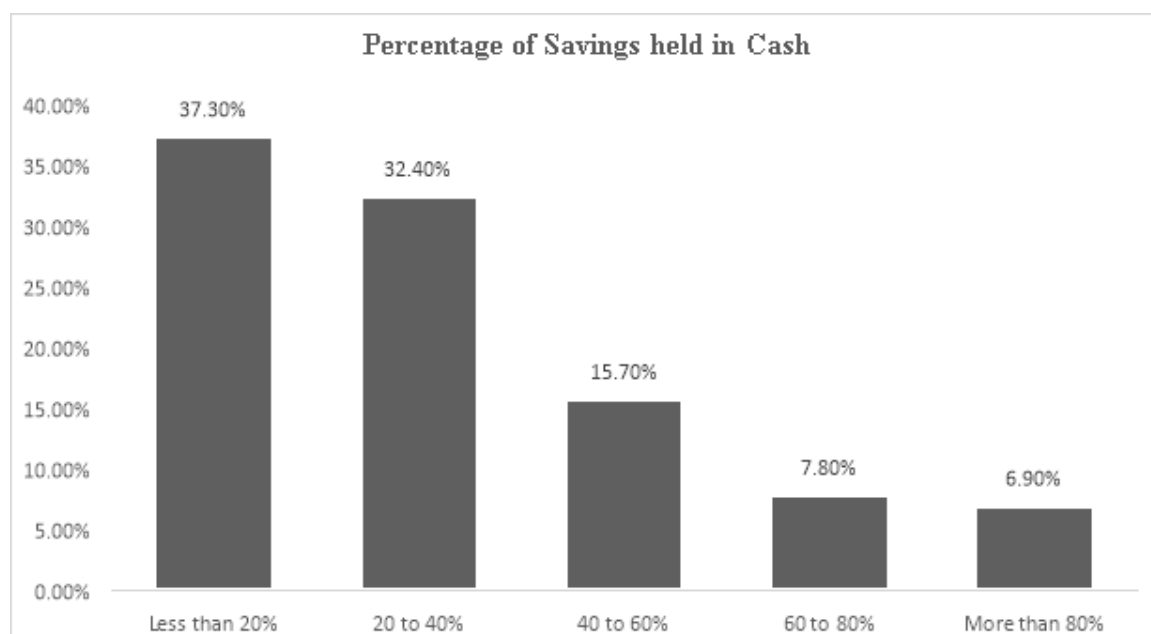
Mutual Fund	23	48	20	8	3
Stock/Shares	18	17	29	32	6
Gold	23	34	25	19	1
Real Estate	23	24	23	23	9
Fixed Deposits with Companies	8	29	14	48	3
Insurance	21	41	19	17	4
Post Office/PPF/Government Scheme	20	37	13	31	1
Any Other	18	26	21	27	10

Table 1: Respondents Preference in Various Investment Avenues

Source: Primary Information

A fixed deposit with a company is the least favoured option, as shown by the above table and figure. Their wealth was best kept in fixed deposits with banks. In the second slot, there was a tough competition between gold, mutual funds and real estate. The third preferred option was insuranceschemes. The respondents do not like to put a significant amount of their savings into one type of investment.

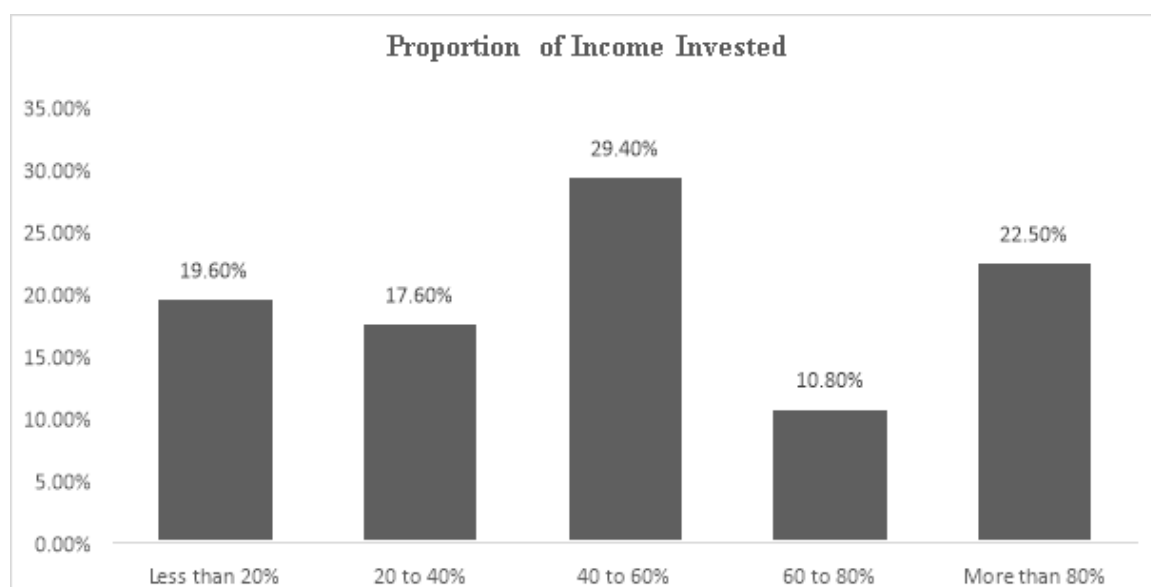
Figure 12: Percentage of Overall Savings held in Cash



Source: Primary Information

Figure 12 displays the percentage of total savings held in cash. 37.3% of working women prefer to maintain less than 20% in cash, which means they invest almost 80% of their savings. Working women save between 20 and 40 percent and 40 to 60 percent of their savings in cash, respectively, in 32.4% and 15.7% of cases. Working women in 7.8% and 6.9% of the population hold more than 60% of their savings in cash; this high percentage of cash savings demonstrates that the women do not take risks.

Figure 13: Proportion of Income Invested



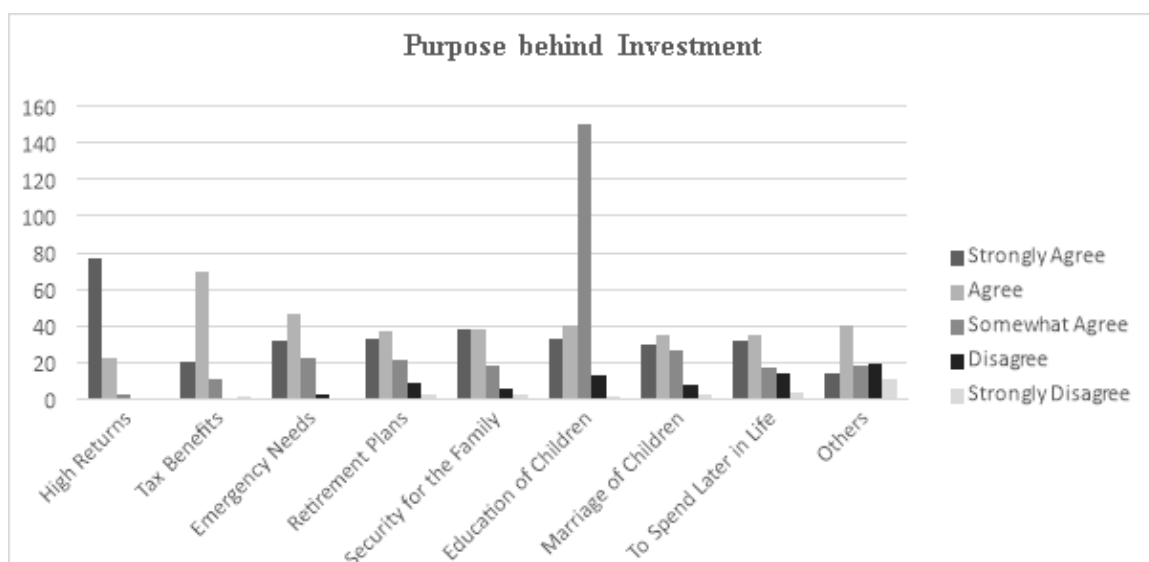
Source: Primary Information

Figure 13 shows the percentage of working women's income that is invested. Working women make investments of less than 20%, between 20% and 40%, between 40% and 60%, between 60 to 80%, and more than 80%, respectively, according to 19.6%, 17.6%, 29.4%, 10.8%, and 22.5% of them. Working women choose to invest their money 19.6% less. Whereas working women invest between 17.6% and 29.4% of their income. However, only 10.8% of working women invest between 60 and 80 percent of their income. Working women make up 22.5% of the population and invest more than 80% of their income, indicating a high level of investment knowledge and a preference for investing money to generate returns.

Figure 14: Purpose behind Investment

Table-2: Main Reason for Investment

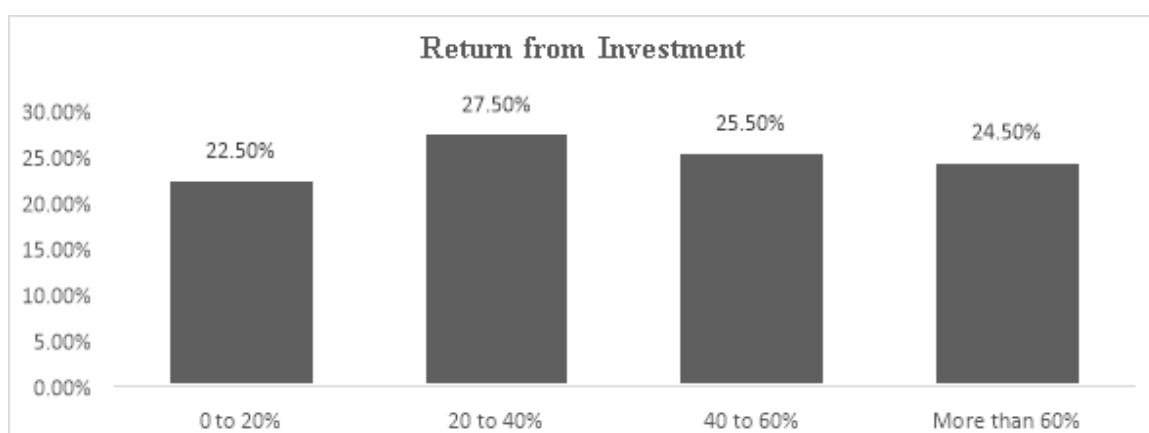
No. of Respondents					
Purpose	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree
High Returns	77	22	3	0	0
Tax Benefits	20	70	11	0	1
Emergency Needs	32	46	22	2	0
Retirement Plans	33	37	21	9	2
Security for the family	38	38	18	6	2
Education of children	33	40	15	13	1
Marriage of children	30	35	27	8	2
To spend later in life	32	35	17	14	4
Others	14	40	18	19	11



Source: Primary Information

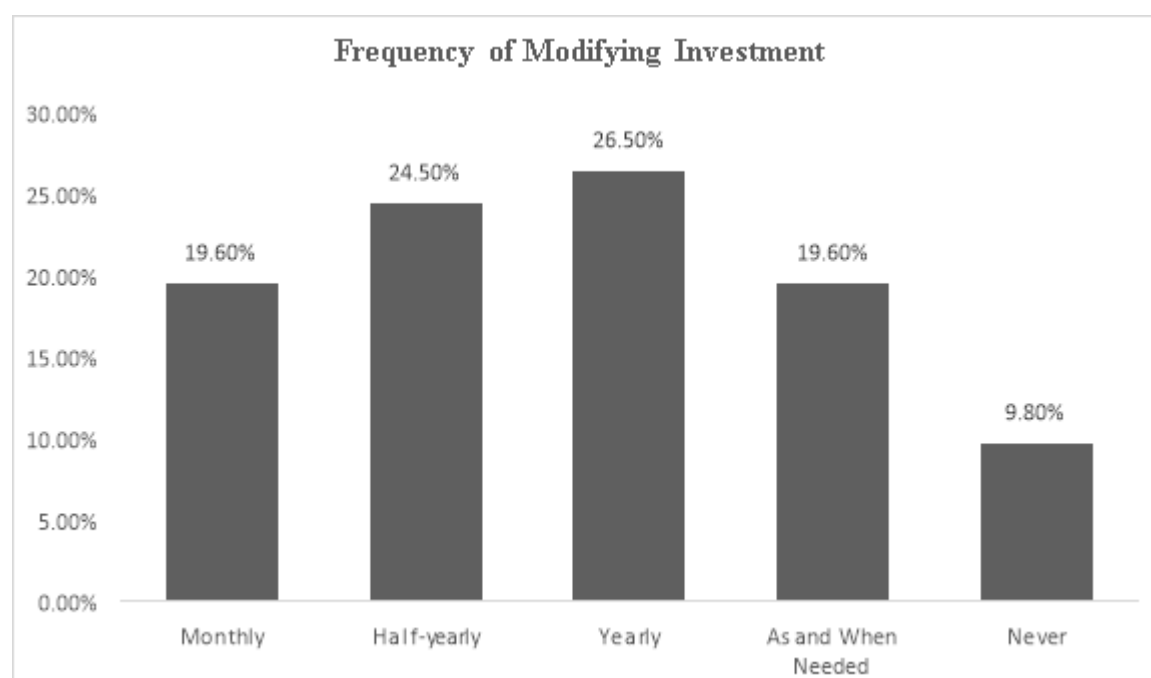
Figure 14 indicates the purpose of investors behind investment. The main reason voiced by the investment in various tools were high returns. It is also observed from the above analysis that security for the family is the second one reason for investment. Working women are more conscious for their family security.

Figure 15: Return from Investment



Source: Primary Information

A rough return on investment is shown in Figure 15. Almost 0 to 20% returns on their investments are earned by the 22.5% of working women. While working women make up 27.5% and 25% of the population, respectively, they earn between 20 and 40 and 40 to 60 percent, demonstrating that they are more effective investors. An investment return of more than 60% was achieved by 24.5% of working women, indicating that they are risk-takers who like to invest the highest percentage of their income and are willing to do so in riskier stocks in order to increase their returns.

Figure 16: Frequency of Modifying Investment Plans

Source: Primary Information

Figure 16 illustrates how frequently working women monitor and alter their financial intentions. Working women review and change their investing intentions on a monthly, half-yearly, and annual basis, respectively, 19.6%, 24.5%, and 26.5%. 19.6% of working women keep an eye on it and adjust it as necessary. 9.8% of working women never check on or alter their financial goals.

Findings:

The main goal of the study was to identify the investment strategies that women preferred to use to meet their future needs. The study's findings demonstrate the importance of the investment tool for meeting long-term needs. It demonstrates the successful outcomes achieved by female investors who use finance as a powerful instrument to uphold their social position. For female investors, it will be more beneficial. Investment opportunities are advantageous to female investors. For all of today's female investors, investing is practical and a key instrument for saving money.

The degree of income and knowledge of the various investment options are shown to be directly correlated, it has been discovered. A person with a high income tends to be more knowledgeable about the many sources and investment opportunities available in the market. A person with more income will logically seek out larger investments, and as a result, they will be more aware of them.

The respondents in Rajkot also favour bank deposits and mutual funds as their primary sources of investment. Every responder believes that the investments made have a significant level of risk. As a result, it is clear that everyone earning a salary who invests money must assume some risk.

It may be claimed that working women favour safe investment options like fixed deposits with banks, mutual funds, gold, and real estate over all other choices. The majority of respondents don't like to put all of their savings into one type of investment.

The "Precautionary" motive is the main motivation for a woman to conserve money. Respondents listed three main justifications for placing their income in bank fixed deposits.

i) Safety:

One of the safest investment options is fixed deposits from reputable banks and other financial organizations that are governed by the Reserve Bank of India (RBI).

ii) Regular income:

For the duration of its term, fixed deposits earn fixed interest rates, which are typically compounded quarterly. Therefore, those who want a consistent source of income might invest in fixed deposits and use the interest rate as their source of income. This makes fixed deposits a particularly well-liked method of investing money for retirees.

iii) Saves tax:

Tax savings and good investment returns are provided by fixed deposits.

The report showed 140% of working women consulted their friends and family before making an investment. 42% of the time, working women make their own decisions. Working women have varied levels of regard for the opinions of their husbands/fathers, consultants/agents, coworkers, and advertisements (28%, 16%, 5%, 3%, and so on).

The research study found that working women monitor and alter their investing goals on a monthly, semi-annual, and annual basis, respectively, in amounts of 19.6%, 24.5%, and 26.5%. 19.6% of working women monitor it and make adjustments as needed. 9.8% of working women never review or make changes to their financial objectives.

Women investors are drawn to diverse investing opportunities since it is too convenient for them. The ability to invest bears fruit in real time to meet needs for the family home, children's education, future needs, senior needs, etc. The life of the investor was drastically altered. Due to the fact that investing is a very practical instrument and can assist female

investors in assisting their families in times of crisis, it has become a more potent financial weapon.

Conclusion:

In the twenty-first century, women's roles have been expanded to the greatest number of fields across all industries. Women's entrepreneurship has also seen good success, but very few of them are making decisions about investments in the stock market, such as which type of investment instrument to choose and which industries and companies to invest in.

According to the report, working women make analytical investing selections. Most demographic determinants seem to be unrelated to the investment pattern. From the available data collected it is revealed that out of the given options of investment avenues, investors are expected to earn high return but with the safer side. It has also been discovered that working women tend to invest more in risk-free products like bank accounts and mutual funds. In the present time, it is found that Mutual Funds are more attractive investment for the majority of the people because it has high return and more liquidity therefore it is found more expected. While the conservative investors who expect more safety of their investment are expected to go for fixed deposits too. Their overall investment was discovered to be dispersed throughout a number of investment opportunities, demonstrating their independence and sound judgment in making financial decisions. This demonstrates that Indian investors, although having high incomes, high levels of education, secure jobs, and independence, are conservative and prefer to choose the safe route.

Suggestions:

1. Fixed Deposits with Banks and Gold were identified to be the most popular investment instruments. There are other other options, including mutual fund, debentures, stock or shares, post office and real estate. Women ought to be made aware of these and their potential.
2. It was seen that investors preferred low-risk investments since they knew their money would be protected. They must be encouraged to make investments in high-risk ventures with the potential for greater rewards.
3. Self-managed investing are preferred by most women. It would be preferable to manage investments through organizations like banks, stock exchanges, etc. who offer a variety of services and also give us guidance on where and how to invest.

4. For the government to increase investment in many areas, particularly among the salaried class, more tax breaks must be implemented.
5. It is necessary to raise awareness of different investing options and their relative benefits and drawbacks.
6. Stock broking companies should run awareness campaigns because the majority of respondents, or investors, believe that these outlets are losing money and offer little to no return.
7. Investors should regularly read newspapers, journals and articles related to stock market, if they want to invest in them.
8. There shouldn't be a pay gap between men and women; instead, women's salaries should increase.
9. It is necessary to establish investment brokers and offices with government guarantees.
10. There should be an opportunity for investment activity in every office, business, or corporate setting, such as an insurance policy, checks, deposits for higher interest, etc.
11. Government should create additional programmes like the Pradhan Mantri Jan Dhan Yojana, which supports women by giving them small amounts of money.
12. Women ought to be able to produce things as investments in their own welfare.
13. It is important to establish the government-promised chits and deposits platform so that women can invest without feeling as nervous about the risk.

Future Applications:

The income and investment pattern of working women are likely to have significant future applications. Here are some potential applications:

1. Increasing financial independence:

As more women join the workforce and earn their own income, they can become more financially independent. This independence can lead to better decision-making and increased control over their financial future.

2. Boosting the Economy:

When working women invest their income in the economy, it can lead to economic growth. Women tend to invest in education, healthcare, and social services, which are crucial for the development of a healthy and prosperous society.

3. Promoting gender equality:

By increasing the income and investment opportunities for women, we can promote gender equality. This can lead to a more equitable distribution of wealth and a reduction in the gender pay gap.

4. Driving innovation:

Working women bring diverse perspectives and experiences to the workplace, which can drive innovation and create new business opportunities. When women are given the resources and opportunities to invest in their own ideas and businesses, they can make significant contributions to society.

5. Supporting retirement planning:

As women live longer than men, they often require more savings for retirement. By increasing their income and investment opportunities, women can better plan for their retirement and ensure financial security in their later years.

Overall, the income and investment pattern of working women has significant implications for the future, including economic growth, gender equality, and innovation. By supporting women in their financial pursuits, we can create a better future for all.

Scope for Further Research:

1. In the future, it may be possible to compare the investment practices of working women in India and women working abroad.
2. The mentality, views, and attitudes of working women who invest both domestically and internationally offer plenty of opportunity for comparative research.
3. In order to raise more money, a comparative analysis of the numerous programmes launched by the government, banks, and financial institutions can be done based on segmenting characteristics such as age, occupation, and marital status.
4. A study on the specifics of the types of mutual funds held by working women could further help to categorize the portfolios.
5. The retirement planning of women could be the subject of research.
6. A comparison of semi-urban and urban women investing patterns could be implemented.
7. It is possible to conduct research to examine the investment style of male and female mutual fund managers based in India.
8. The types of mutual fund schemes that employed women own can be determined through research.

9. It is possible to do research on women's life stage investment behaviour.

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The Role of Product Placement In Youth Generation: An Examination Of Social Media And OTT Platforms

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Abstract

Product placement is a strategy used by companies to promote their products through appearances in various forms of media, such as television shows, web series, videos, and social media posts. It is becoming an increasingly popular way for brands to reach a large audience and influence them to purchase their products. This study aimed to understand the influence of product placement on the youth generation in relation to social media and OTT platforms, specifically focusing on web series, videos, and posts on platforms like YouTube, Instagram, Facebook, Netflix, Amazon Prime Video, and Disney Hotstar. A survey was conducted among a sample of 50 respondents to gather data on how product placement affects their purchasing decisions and brand recall. The results of the study showed that product placement has a positive impact on young consumers, as they tend to notice and recall the brands being promoted when making purchasing decisions. Additionally, the study found that consumers feel that the choice of celebrity endorser can also play a role in the effectiveness of product placement, with companies encouraged to choose endorsers with a large following and viewership.

Keywords: Social Media Platform, OTT Platform, Daily Soap, Web-Series.

Introduction:

Product placement, also known as "embedded marketing," refers to the practice of incorporating a product or brand signage into movies, TV shows, video games, and other forms of media. Historically, product placement has been utilized in films and television, but it has recently been adapted to social media as well. With the increasing amount of time people spend online, creators and celebrities have embraced this new trend and are showcasing products in innovative ways on popular social media and OTT platforms. This offers a unique opportunity for brands to reach a wider audience and increase their exposure.

Companies are shifting their focus from traditional TV soap operas to more realistic and less melodramatic web series on digital platforms, as the preferences and tastes of viewers are changing with the trends. (Eagle, 2018) With the increasing shift towards online streaming platforms such as Netflix, Amazon Prime, and YouTube, the young generation is becoming increasingly influenced by online series. This is why product placement series are becoming more youth-oriented, as this demographic is more inclined towards social media and streaming OTT platforms. In India, the entertainment industry is adapting to these changes by streaming more realistic web series and movies on social media and OTT platforms, which appeals to the youth and reflects their changing tastes and preferences. (Gaoshinde, 2020)

Product placement combines advertising and publicity by inserting a brand name, product package, signage, or other trademark merchandise into a media vehicle such as a movie or television show for commercial purposes. (Williams, 2011) An example of this is Chevrolet Camaro appearing as the vehicle mode of the Autobot Bumblebee in the first Transformers movie directed by Michael Bay. Today, product placement can be seen on various online and offline platforms, but with the growth of online content, there has been a shift towards online product placement. This is evident in recent web series like Squid Games, where several products were placed, including Dominos, Honeycomb candy, Gillette, Marigold HL Milk, and Budweiser, etc.

The growth of product placement on social media, video games, and OTT platforms has drawn more attention and has a greater impact on consumer purchasing decisions. With the increasing use of the internet, people are turning to online platforms to view various content, and companies are following suit by moving from traditional television to online platforms to reach consumers. (Patel, 2015) Web series, which are a series of scripted or unscripted videos released on the internet and considered part of the web television medium, have become

increasingly popular. Each episode of a web series is commonly referred to as a "webisode." This shift towards online content and product placement offers a unique opportunity for brands to increase their visibility and reach a wider audience.

The most popular social media platforms are Facebook, YouTube, WhatsApp, and Instagram, while the leading OTT platforms are Netflix, Amazon Prime, and Disney Hotstar. These platforms play a major role in the online world and have greatly impacted the entertainment industry. Netflix's first original content series, House of Cards, was released in 2013 and set the standard for OTT content. In India, the first web series were launched on YouTube by TVF, AIB, and Y Films. (McDonnell, 2010) YouTube is especially known for its vlog videos. The first Indian web series, "Permanent Roommates," was streamed on YouTube in 2014 and became popular among the youth due to its unique story. In the second season of "Permanent Roommates," Ola sponsored the series and showed that traveling is better with their services instead of taking a bus.

Product placement on social media platforms such as Facebook, Instagram, Twitter, WhatsApp, and LinkedIn is a form of hidden advertising where products are incorporated into posts, videos, or stories in the accounts of influencers. Influencers aim to present products as suggestions or informative content in order to sell or recommend them to their followers. The impact of an influencer's product placement can be positive or negative, so companies carefully select the celebrity with the most liked followers. New trends like Tiktok and Instagram Reels are influencing a wide range of people with product placement and providing an opportunity for companies to reach new customers.

The use of product placement as an advertising strategy has been prevalent for several decades and continues to be a popular tool for brands to reach consumers. Brands aim to make their target market aware of their products by promoting them through various platforms, including online. Online platforms like social media and Over-the-Top (OTT) services have gained significant popularity in recent years and have become a key focus for marketers to reach a large audience.

The recall value of a brand is crucial for marketers, as it determines whether the brand should be fully displayed or simply mentioned in the advertisement. Research has shown that product placement on social media can have a positive impact on consumer perception and purchasing intention. The first Academy Award-winning film to feature product placement was "Wings" in 1927, which featured Hershey's chocolate bars. (McDonnell, 2010)

In India, the most popular categories for product placement are Fast Moving Consumer Goods (FMCG), consumer durables, automobiles, cosmetics, and tele-services. Celebrity endorsements and brand names play a significant role in product placement and can influence consumers to buy the product. In 2021, social media had 1.39 billion active users, with the largest penetration being recorded on YouTube, Facebook, WhatsApp, and Instagram. The number of OTT platform users has increased significantly post-Covid-19, with Disney Hotstar being the most watched platform in India, followed by Amazon Prime and Netflix. (Karisik, 2014)

Objectives:

- To study the product placement influence on Youth Generation with reference to social media and OTT platform.
- To study role of Celebrity Endorsement in product placement and their impact on target audience purchase perception.
- To study the different social media and OTT platforms for product placement.
- To find how product placement helps in brand recall & consumer memorize while purchasing the same product.
- To find the effectiveness of product placement on new media as compare with traditional media of Television

Hypothesis:

- **H₀:** There is no significant influence of product placement on Youth Generation with reference to social media and OTT platform

H₁: There is significant influence of product placement on Youth Generation with reference to social media and OTT platform

- **H₀:** There is no significant impact of celebrity endorsement on brand perception of Youth Generation.

H₁: There is significant impact of celebrity endorsement on brand perception of Youth Generation.

- **H₀:** There is no significant impact of product placement brand recall

H₁: There is significant impact of product placement on brand recall

- **H₀:** There is no significant impact of new media usage for product placement on youth as compared to traditional media usage

H₁: There is significant impact of new media usage for product placement on youth as compared to traditional media usage

Research Methodology

Research Design:

A quantitative method used to collect the data from multiple platforms so that I could collect relevant data information related to social media & OTT platform and its influence on young consumers to purchase the products. I surveyed to collect the data from many social media platforms like Facebook, WhatsApp, Instagram & LinkedIn, the sample comprised of 50 various individuals. Due to short span of time, I could take the small sample size but tried my best to collect genuine information from those individuals.

The questionnaire was distributed online among the respondents via Google Form. This form consisted of variety of questions with closed-ended, short answer or multiple questions. Some demographic questions were also included which asked general questions like age, gender and occupation. The survey uses descriptive method to determine the current situation about the impact of product placement towards purchase intention and brand recall.

Population:

Out of 70 sample sizes get response from 50 respondents with age group of 22-35yrs who have certain knowledge of web series, movies & videos streamed in social media & OTT platforms. Most of the respondents are students & professional who have knowledge about brand promotions and active users of online platforms.

Primary Data collection:

The process of data collection will be undertaken by collecting responses through Google forms online. The tool used for data collection for the research was a questionnaire.

The questions that were asking during the survey are:

1. What is the name, age, gender and occupation of the respondent?
2. Which Social media app do you use the most for posting & watching pictures, videos, blogs etc.?
3. Do you watch Web series?
4. On which streaming platform do you watch web series the most?
5. Are you familiar with the concept of “ Product Placement”?
6. Have you ever noticed product placement in web series or influenced to buy the product?

7. How much time do you spend on web series in a week?
8. On which gadgets do you prefer to watch the shows?
9. Do you watch advertisement while coming between the show?
10. Do you enjoy when your favourite celebrity does the brand promotion in the show?
11. Which latest web series do you noticed with product placement?
12. Do you watch social media status who promote brands on that or recommend to use the same product?
13. Do you buy the product that are promoted in web series?
14. What do you think product placement in web series is more useful than commercial advertisement?
15. Which advertisement do you prefer most for the product placement i.e., Traditional advertisement or New Media advertisement?
16. Do you think product placement helps in purchasing better product?
17. Do you think Product placement in web series, status, Videos helps in Brand recalling?

Data Analysis Interpretation:

The respondents of the survey were of age group from 22-35 years old. Out of them 46 % female and 54% were male respondents. Majority of the respondents were students and professionals. Most of the respondents are active on social media & OTT platform to watch web series, videos and posts and familiar with product placement. Most of the respondents noticed the product placement in the web series and influenced to buy the product also. On an average respondents spend around 10-15 hours per week on watching web series. Most of the respondents think new media advertisement is more effective than traditional advertisement of Television. So, moving of product placement from television to new media is new opportunity for the companies. Very less respondents watch advertisement while coming between the web series. Most of the respondents enjoy when their favourite celebrity does brand promotion in the shows and buy products by watching them.

Many active users of social media platform notice brand promotion in status and videos posted by people to recommend the products means posted status, videos attract the young consumers. Respondents also think that product placement helps in purchasing the better products and recall while purchasing product. According to the survey, most of the respondents prefer YouTube for watching web series.

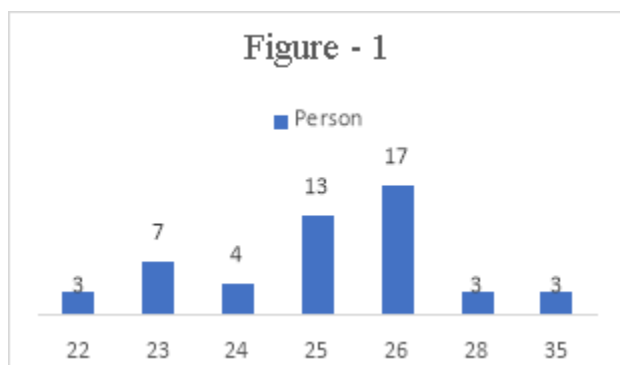


Fig 1: The respondents of the survey were of age group from 22-35 years old.

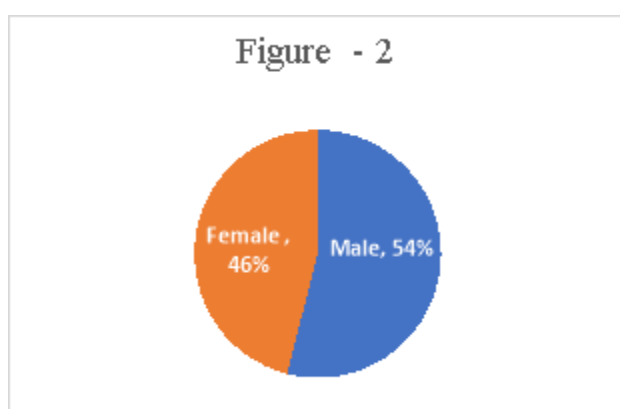


Fig 2: Survey were taken from more than 70 people out of which we get 50 responses, out of them 54 % are Male and 46% are female.

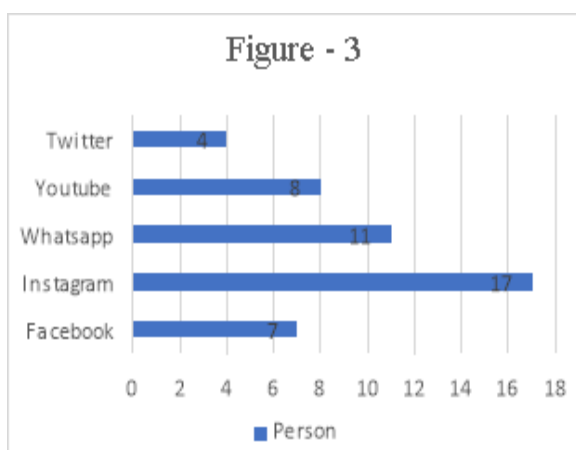


Fig 3: Social media app users for postings & watching pictures, videos, blogs etc.

According to Fig3 we can illustrate that 34 % of the respondents uses Instagram, 22% uses

WhatsApp, 16% used YouTube, 14% uses Facebook, 8% uses twitter and 6% uses others as well.

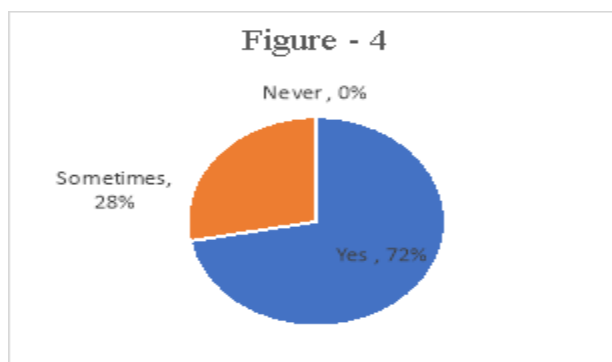


Fig 4: Respondents watch web series

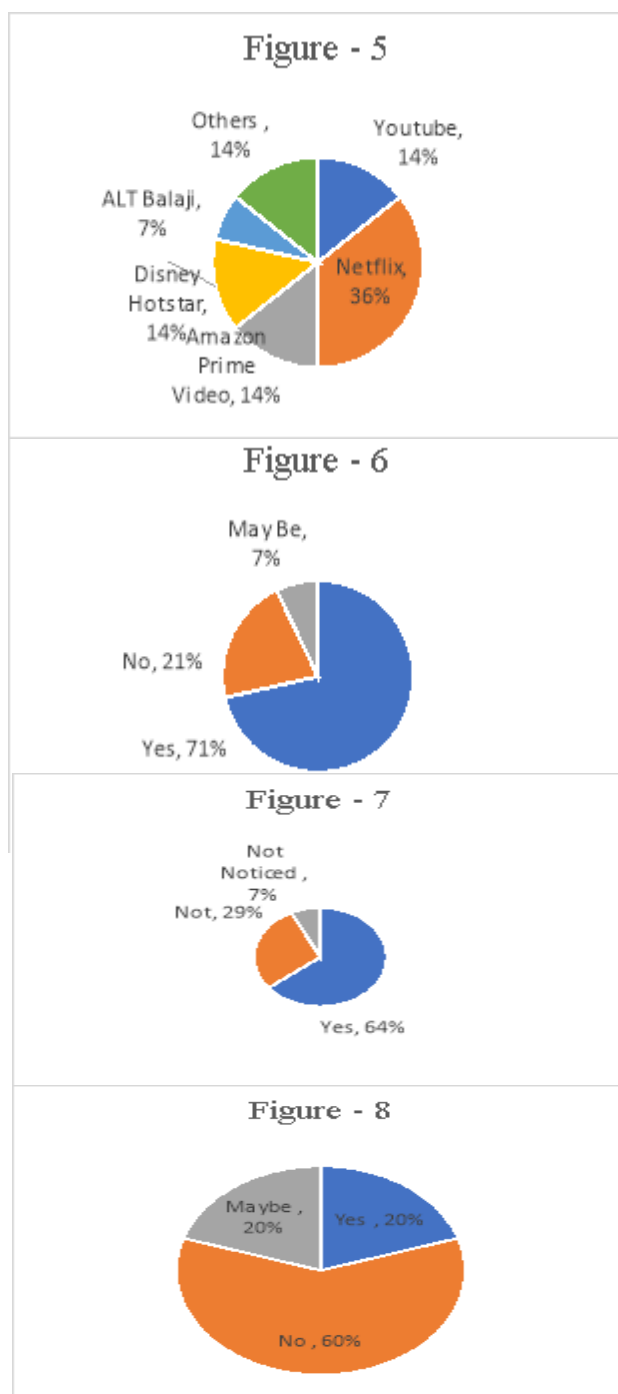


Fig 5: Platform on which web series watch by the respondents

According to the Fig 5 we can illustrate that 42.9% respondents prefer Netflix for watching web series, 21.4% Disney Hotstar, 14.3% Amazon prime video, 14.3% YouTube and 7% ALT Balaji.

Fig 6: Respondents familiar with the concept of —Product Placement

According to the fig 6 71.4% of the respondents familiar with the concept of Product placement, 21.4% deny and 7.1% may be known or unknown with this concept.

Fig 7: Product placement noticed in web series or influence to buy the product

According to fig 7, 64% of the respondents noticed the product placement in web series and influenced also to buy the product and also 29% respondents deny that they didn't notice.

Fig 8: Watching advertisement while coming between the shows

According to the fig 8 we can illustrate that

60% of the respondents do not like to watch advertisement while watching the shows, 20% can watch and only 20% respondents enjoy watching advertisement.

Figure - 9

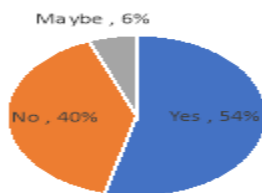


Fig 9: Favourite Celebrity do the brand promotion in the show

According to fig 9 we can illustrate that 53.3% respondents enjoy when their

favourite celebrity does the brand promotion in the show but on the other hand 40% respondents do not enjoy.

Figure - 10

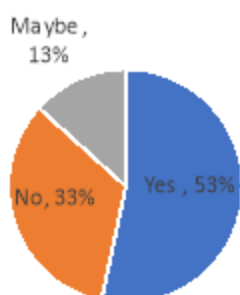


Fig 10: Watching preference of social media status which promotes brands or recommend to use the same product

According to fig 10 we can illustrate that 53.3% respondents watch social media status of brand promotion and use same product by influenced with that and 33.3% totally deny on the other hand 13.3% says

they are not sure.

Figure - 11

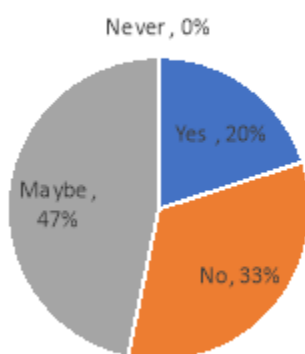


Fig11: Consumer buy products promoted in web series

According to fig 11 we can illustrate that 46.7% of the respondents are not sure about buying decision of the product after watching the web series, 33.3% of the respondents buy the product and 20% of the respondents totally deny with buying decision.

Figure - 12



Fig 12: Product placement in web series is more useful than commercial advertisement

According to fig 12 we can illustrate that 60% of the respondents agrees that product placement in web series is more useful than commercial advertisement, 26.7% are not sure and 13.3% do not agree with it.

Figure - 13

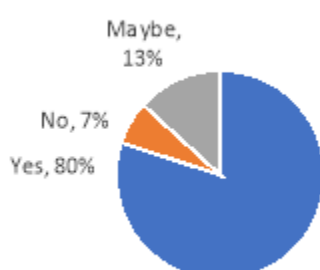


Fig 13: Product placement helps in purchasing better products

According to fig 13 we can illustrate that 80% of the respondents agrees that product placement helps in purchasing better products, 13% are not sure and remaining very less respondents do not agree.

Figure - 14

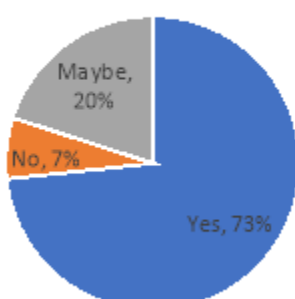


Fig 14: Product placement in web series, status, videos help in brand recalling

According to fig14 we can illustrate that 73.3% of the respondents agrees that product placement in web series, status, videos help in brand recalling, 20% are saying maybe it can help and only 6.7% are not agree with this statement.

Findings:

Based on the detailed analysis of both primary and secondary data the researcher has been successful in achieving following objectives.

- To study the product placement influence on Youth Generation with reference to social media and OTT platform.
- To study role of Celebrity Endorsement in product placement and their impact on target audience purchase perception.
- To study the different social media and OTT platforms for product placement.
- To find how product placement helps in brand recall & consumer memorize while purchasing the same product.
- To find the effectiveness of product placement on new media as compare with traditional media of Television

Restatement of the Hypothesis:

H₀: There is no significant influence of product placement on Youth Generation with reference to social media and OTT platform

H₁: There is significant influence of product placement on Youth Generation with reference to social media and OTT platform

Based on the data analysis, its been proven that there is significant influence of product placement on Youth Generation with reference to social media and OTT platform. Around 71.4% familiar with product placement concept, 60% of the respondents noticed product placement in web series streaming on social media & OTT platform, 46.7% respondents sometimes buy product and 20% surely buy product after watching brand promotion in web series, 60% respondents agrees that product placement in web series are more useful than commercial advertisements and 80% agrees that product placement helps in buying better products.

H₀: There is no significant impact of celebrity endorsement on brand perception of Youth Generation.

H₁: There is significant impact of celebrity endorsement on brand perception of Youth Generation.

In this based-on data analysis this hypothesis proven right that there is significant impact of celebrity endorsement on brand perception of Youth Generation. 53.3% respondent says that they enjoy watching their favorite actors doing brand promotion.

H₀: There is no significant impact of product placement on brand recall

H₁: There is significant impact of product placement on brand recall

Based on analysis it has been proven that there is significant impact of product placement on brand recall & helps them in purchasing better product. 73.3 % respondents agrees that web series, status and videos help in brand recalling.

H₀: There is no significant impact of new media usage for product placement on youth as compared to traditional media usage

H₁: There is significant impact of new media usage for product placement on youth as compared to traditional media usage

Based on analysis it has been observed that new media usage has more impact on youth as compared to traditional media like product placement in Television. New generation is more shifting towards social media & OTT platforms. YouTube, Netflix, Amazon prime, Disney Hotstar are showing all the latest movies before Television or cinema. So, Youth mostly spend online and watch web series, movies, videos on social media & OTT platform.

Conclusion:

The study states that product placement in new media like social media and OTT platform are more influencing among Young Consumers as compared to the traditional way of product placement on Television. Generation Y is shifting more towards the online platform regularly and in the near future everything will be online. Technology changes so preferences automatically get changed and marketing promotion should also incline towards the trends.

According to research and data analysis, product placement helps the consumer to buy the better product. Most of the world has become active users of social media and product promotion on that attracts them more with their favorite celebrity. So, companies coming with celebrity endorsement should know people preference and whom they like to watch online. Likes & dislikes can majorly impact on their brand promotion and purchase intension of consumers because they don't only watch the celebrity instead trust on them and same purchase product for themselves.

It's also been observed that product placement helps in brand recall which is major part of psychological marketing which helps consumer to buy the product when they need. After long time if consumer wants to buy the product and remember the product placed in web series then it's been good deal for the sponsors for doing brand promotion.

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Analysis of Corporate Social Responsibility and Financial Performance – A Review of Literature

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Abstract

The business idea of "corporate social responsibility" is broad. It often refers to a business's commitment to doing itself in an ethical manner. Corporate social responsibility can help to improve business performance, increase competitive advantage, and build trust with stakeholders. Almost all the companies perform corporate social responsibility as a part of their responsibility. This study's purpose is to determine how corporate social responsibility affects companies' financial performance of business and. I have studied various research papers, articles and projects related with corporate social responsibility. We will examine how corporate social responsibility and business financial performance are related.

KEYWORDS: corporate social responsibility, financial performance

Introduction:

The concept of corporate social responsibility is pervasive in business. To do business ethically is how it is typically described. This entails managing their commercial operations while making improvements to social, economic, and environmental development, as well as considering human rights. The goal of the company is to benefit society as well as make a profit. While some studies have found a link between CSR and financial performance that is good, others have found a link that is negative. Depending on several variables like organizational culture, size, or stakeholder's demand, each company implements CSR in a unique way.

Positive relationship- CSR controls reputation by cultivating a positive image in the minds of clients, suppliers, etc. Stakeholders' trust in the company will increase because they will question how the corporation can engage in unethical behavior with them if it is fulfilling its social obligation. The success and profitability of a corporation are directly impacted by stakeholder trust. As a result, we can draw the conclusion that corporate social responsibility has a favorable effect on a company's financial performance.

Negative relationship- When compared to companies that responsibly carry out social activities, those that do not pay attention to CSR activities perform financially poorly. On the other side, increased costs associated with engaging in social activities can cause a company's earnings to decline. When businesses fail to consider how their operations may affect the environment or society, it damages their reputation with customers and lowers sales. CSR initiatives, such as charitable giving, work to improve employee and societal conditions, etc., improve the company's reputation with customers and guard against a drop in sales. The corporation demonstrates its CSR towards lenders by repaying their loans and towards stakeholders by allocating an equal part of the company's profits to each group. By taking such measures, more lenders and investors will be drawn to the company and continue to invest in it, which would enhance the firm's financial situation.

Advantages of CSR

- **Greater employee satisfaction:** A company's treatment of its community reflects heavily on how it treats its employees. People are frequently more productive and contented at work when they feel respected and supported in their positions. Giving your employees the chance to volunteer, particularly during work hours, fosters a sense of belonging within your company and a link to the neighborhood. Through these possibilities for personal growth, workers will become more motivated and

proud of their work. Their level of commitment to your company and the larger community will determine how productive they are. In fact, businesses in highly engaged firms had a 21% increase in profitability.

- **A better reputation:** This is essential since customers consider your reputation when determining whether to buy from you. Simple things like staff employees giving an hour a week to a charity demonstrate your company's commitment to doing good. As a result, customers will view you considerably more favorably.
- **Enhanced customer loyalty:** CSR boosts customers' perceptions of the business. A customer will purchase more goods or services from a business if they like it, and they will be less likely to switch to a different one. According to several studies, CSR has a proven track record of boosting client loyalty.
- **Enhanced brand recognition and awareness:** If you're devoted to moral behavior, word will get out. As a result, your brand will become more well-known, raising brand awareness.

Literature Review

- Hayam Wahba , Khaled Elsayed analyzed that the connection between institutional investors and social responsibility since it implicitly suggests that there is a direct connection. An alternate viewpoint, which has gotten less attention in the literature, is that other contextual factors, such financial performance, can mitigate this link.
- MARLY MENTOR's Results indicate that Positive correlations exist between CSR and accounting measures of financial performance. Negative correlations exist between CSR and market-based measures of financial performance. This implies that CSR has a favorable impact on a company's earnings and a negative impact on future stock returns.
- Bushra Khan and Rabia Tariq reviewed that the study's findings indicate a generally favorable and strong correlation between corporate social responsibility and financial success. And in this study, we look at how customers play a part in the practices of banks as well as how much money banks pay for CSR. Because CSR and financial performance are mutually supportive of one another, the study's findings confirm this.
- Abdelkbir Elouidani and Faiçal Zoubir analysed that the analysis of the impact of corporate social responsibility (CSR) on the financial performance as assessed by various indicators will be supported by the econometrics of panel data. from a sample of 20 companies that were listed between 2007 and 2010 on the Casablanca stock

exchange. According to our research, the CSR has a considerable negative impact on financial performance. Large businesses value the negative influence, making it a mediating factor.

- Anna Linnea Helena Bråtenius and Emelie Josefin Melin showed that Engagement in CSR does not directly increase a company's financial value. On the other side, it has been demonstrated that a subpar CSR engagement has a detrimental effect on the company's financial value. Companies with high CSR rating did not get rewards or penalties, whereas those with low rankings did. This is primarily explained by underperforming corporations failing to meet investors' expectations. No significant results were observed for the top-performing sector, although the overall effect seemed to be rather negative.
- Mrs. Abilasha and Prof.Madhu Tyagi reveals that When compared to financial ratios like PBT, ROC, ROE, and ROA, the influence of CSR on a company's total financial performance is notably positive, though individually minor. Financial performance of the organisation also improves when CSR participation does, and vice versa.
- Yew Sin Yi1, Yap Voon Choong, Saravanan Muthaiyah, results of this research show that Corporate social responsibility influences return on equity (ROE) and earnings per share. (EPS). As a result, ROE and EPS have a strong connection to CSR. However, the findings indicate that corporate social responsibility has little effect on return on assets (ROA) or net profit margin. (NPM). The results show that ROA and NPM don't significantly influence CSR.
- Marcia Millon Cornetta, Otgontsetseg Erhemjamtsa, Hassan Tehranianb finds that the fact that industry adjusted ROA and ROE are positively and significantly correlated with CSR scores suggests that the biggest banks are rewarded for their social responsibility.
- Grigoris Giannarakis, George Konteos, Eleni Zafeiriou, Xanthi Partalidou suggest that Participating in socially responsible projects greatly improves financial performance. Also statistically significant to financial performance are the control variables, such as total remuneration paid to directors, CEO dual role, and the representation of women on the board. A longer time frame must be used to confirm the beneficial association between CSR and financial performance.
- Stephen A. Adamu, The study's findings imply, at the very least, that CSR has no detrimental effects on the pharmaceutical industry's corporate financial success. The

findings of this study do not support criticisms of charitable giving and product donations.

- Samira Islam Resmi¹, Noor Nahar Begum, Md. Masudul Hassan revealed that In contrast to return on assets (ROA) and profits per share (EPS), which have no discernible effect on financial performance, return on equity (ROE) and net income have a considerable impact on financial performance, favoring those businesses who practice corporate social responsibility. There were some suggestions made for any future researchers in this fictitious field.
- NITHIN REDDY, AMANTRIKA PANSARI, PREKSHA JAIN documented that CSR has a significant impact on businesses' financial performance. Additionally, this study demonstrates that whereas Nestle Indian Ltd. did not demonstrate a significant link, ITC Ltd. did. Therefore, it may be inferred from this article that there may not be a significant relationship between corporate social responsibility spending and companies' profit after tax.
- Jintae Kim , Kangho Cho and Cheong K. Park find that There is a significant impact of CSR assurance service on the relationship between CSR performance and firms' financial success, and the CSR performance is generally favorably correlated with the firms' financial performance. This suggests that businesses with external experts certifying their CSR reports perform significantly better financially than those without such a service.
- Stephen A. Adamu suggest at the minimum, that the pharmaceutical industry's financial performance is unaffected by CSR. This study's finding that there is no evidence of a link between CSR and company financial performance in the pharmaceutical business is an important finding in and of itself.
- Nana Liu ¹ , Chuanzhe Liu , Quan Guo , Bowen Da , Linna Guan and Huiying Chen find that Financial restrictions are badly impacted by CSR disclosure. According to the quantile regression results, the affects become more pronounced when a company is under more severe financial pressure. Additionally, CSR disclosure has a detrimental impact on financial restrictions in financially opaque organizations, and the relationship's impact is amplified when the company is under severe financial pressure.
- Jacob Cherian , Muhammad Umar , Phung Anh Thu , Thao Nguyen-Trang, Muhammad Safdar Sial and Nguyen Vinh Khuong found demonstrates that company

governance and product have positive benefits on ROE while board size, customer relationships, and employee headcount all have negative consequences. Corporate governance and product have a beneficial impact on return on capital employed (ROCE), yet there is a negative relationship between customer and employee count. Education has a beneficial effect on profit before tax (PBT) and profit after tax (PAT), even though PAT connections between settings are unfavorable.

- Sang Jun Cho , Chune Young Chung, and Jason Young analyzed that Only social contribution produces a statistically favorable association between CSR performance and profitability. The growth rate of total assets and corporate soundness and social contribution are positively correlated with one another, according to an analysis of the association between CSR performance and financial performance indicators.
- Robert Fabaca, Marina Klacmer Calopaa, Tanja Sestanj-Perica revealed that CSR is becoming more and more important since it gives a firm the chance to stand out from its rivals and so produces organizational value. All globally successful businesses understand the value of CSR, but not all of them are equally effective in putting it into practice. There is still a lot of disagreement in the findings of prior research, mostly because of the factors influencing this association, despite the fact that numerous empirical studies revealed a connection between the quality of CSR and the firm performance evaluated by financial indicators.

Conclusion

It is clear from a review of the different study papers, publications, and project reports that CSR has a beneficial effect on businesses' financial success. Companies that actively engage in CSR activities have an advantage over rival businesses in terms of finances, accepting tax laws, rankings and ratings, brand reputation, and finally, shareholder and consumer loyalty. Thus, all businesses who want to gain a competitive advantage over rival enterprises in the long run should adhere closely to the CSR activities.

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Factors Affecting Customer Satisfaction for Automated Teller Machines (ATM) Services in Kathmandu Valley

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Abstract

Banks are the financial institutions which accept the deposit of the customers and provide the loans. Today, information and technology play very important role in the world of banking sector. The objective of the research is to identify the factors affecting customer satisfaction and to know the level of satisfaction in the ATM services of Kathmandu valley. There are 100 relevant responses have been taken for the completion of the study. The tools used in the study involve F-tests, correlation, regression, descriptive statistics, and frequency tables. Firstly, the demographic characteristics of ATM users were presented, then the highest and the lowest gaps for each statement were determined. Lastly it was compared if there was a significant difference between the moderating variable with customer satisfaction. The conclusion revealed that convenience and system availability of ATM in banks plays big role in order to satisfy customers in today's competitive environment. There are altogether 6 independent variables and 1 dependent variable. Security and privacy, convenience, system availability, speed of ATM services, responsiveness and reliability are the selected as independent variable and customer satisfaction are the dependent variable. There is significant relationship between conveniences and customer satisfaction. There is also significant relationship between convenience and customer satisfaction. It means that these two variables are most important variable which affects the customer satisfaction for ATM services. The reliability of variables was examined on the basis of the number of questions under different variables and its Cronbach's Alphas value. The Cronbach alpha shows that all the selected variables were reliable for the further study. There are five variables as security and privacy, convenience, system availability, speed of ATM services and reliability has positive and statistically significant relationship with customer satisfaction shown the correlation analysis of this particular report. The descriptive research design has been

used and both the primary and the secondary sources of information are analysed for the purpose of the study.

Keywords: Automated Teller Machine, Customer satisfaction, Digital banking, Personal Identification Number

Introduction

Customer satisfaction is described as a measure on how product or services supplied by organization meet customer's expectation and this is one of the important keys to ensure business is successful because customers' satisfaction will determine the market growth of the organization in the future.

Customer satisfaction and Services offered has always been a hot topic for the researchers to do their research work. With the advent of technology in banking system, it is expected that the customers would not face any hassle during the financial transaction. Coming to ATMs, there are working burden of ATM machines and routinely there are issues looked by customers while utilizing the ATM machines, for example, not providing the money, charge exchange when money isn't apportioned, card stuck in the ATM, unfit to pull back money with found ATM and so on (Sohail Imran Khan, 2019).

Technology has been one of the most important factors for the development of mankind. Information and communication technology is the major advent in the field of technology which is used for access, process, storage and dissemination of information electronically. Banking industry is fast growing with the use of technology (Kumar Jha & Sureka, 2014).

(Tadesse & Bakala, 2021) explained that people enjoy and find ATM services more convenient because the digital world is completely computerized and they can be accessed from anywhere. Withdrawals, deposits, balance inquiries, and a variety of other services are handled quickly using ATMs, which were developed by the telecommunications industry to be a more effective way to send computer data over a single network.

ATM technology has been widely available in recent years. Each bank maintains its own ATM network, which is located in bank branches, shopping malls, colleges, hospitals, service stations, and other strategic locations to provide customers with convenient and timely access to banking products and services (Lwin Scholar, 2019).

ATMs are configured to perform the most important functions of banks, such as cash withdrawals, store transactions, and print smaller-than-expected explanations and bill settlements. It accomplishes this by the use of a personal identification number (PIN) and a plastic with a magnetic chip that allows the consumer to be identified (Malik & Bansal, 2015).

The impact of technology on bank product innovation is enormous. Electronic banking services offer banks a competitive advantage over their competitors because they lower operational costs, eliminate regional barriers, provide 24 hour banking, expanded business hours, and improve productivity in everyday banking processes (Hong, 2010).

In the growth of the banking industry, technology plays a significant role. Information and Communication Technology (ICT) is a significant advancement in the field of technology that allows for the electronic access, processing, storage, and distribution of data. An ATM is one of the banking facilities that are currently available to customers to help those complete transactions (Automated Teller Machine). The ATM provides a 24- hour customer service for a wide variety of banking transactions to certain customers (Malav Vineshkumar & Bhatt, 2018).

ATM service is becoming a mean of transaction which is essential for banks to increase their competitiveness in the market. Together with the race of providing diversified services of transaction. Thus, assessing the quality of ATM service and researching the relationship between service quality and customer satisfaction for ATM service are meaningful to improve the quality of ATM services of banks in the future (Phan & Nham, 2015).

The active ATM in banking sectors will cause decrease in cash circulation which will increase the efficiency of banking sector leading to decrease in service provider costs and bank costs. There is belief that the lack of enough information on e-banking in country may cause less efficiency of commercial banks (Adhikari et al., 2016).

Banks and financial institutions in Nepal provide a variety of services to their customers, as the banking sector is primarily a service-oriented industry. One of the most useful facilities for banking customers is ATM service. They look for a secure and convenient venue, a sufficient number of ATMs, a user-friendly system, and ATM features before deciding to use this service (Shrestha, 2020).

(Alexis & Chen, 2019) explained that if the company achieves customer loyalty, it profits from the retention of happy customers who make repeat purchases and word-of-mouth reviews, which leads to improved revenue and profitability.

Today, the use of ATM in banking transactions is increasing worldwide. The practice of ATM cards brought up dramatic changes in withdrawing money in the Nepalese financial sector also. Nepalese commercial banks are increasing their technology-based services day by day. As the banking sector is totally a service-oriented industry, the banks and financial institutions are also offering different services to their customers in Nepal. ATM service is one of the important services that enhance value to banking customers. Before adopting this service, they consider many factors such as a safe and convenient location, a sufficient number of ATMs, a user-friendly system and ATM functionality (Prakash, 2019).

In the modern business environment, wants, needs and expectations of customers are quickly and rapidly changed. Banks cannot provide superior service to the customers in the absence of knowledge of customers' expectations. The customer expectation can be identified through the knowledge of level of satisfaction of customers (Khan, 2009).

The banking industry is a commoditized space. With everyone offering nearly the same products and services without much room to compete on price, the experience customers have with their banks is what gives one bank a competitive advantage over another.

There are two areas where banks can really look to stand out by delivering an incredible customer experience (Vaslow, 2018).

The customer's overall assessment of the excellence of the provision of services via electronic networks such as the internet, Automated Teller Machine (ATM), and telephone banking is described as automated service quality (Santos 2003). The Automated Teller Machine (ATM) is one form of innovation that can mechanically accept money, according to research on ATM service quality (Kumbhar, 2011).

According to (Pitambar, 2017), Customer satisfaction is critical in attracting consumers who are willing to express their good feelings in order to buy goods. Customer satisfaction is vital to a company's long-term success because it allows them to assess if the goods and services they offer fulfill their needs. Customer satisfaction is critical to the sustainability of company operations and economic development. Customers of Nepalese banks believe that customer loyalty in the banking sector is determined by reliability, assurance, observable, empathy, and responsiveness. Finally, the study's regression findings indicate that all service quality indicators, such as efficiency, assurance, observable, empathy, and responsiveness, have a substantial effect on customer satisfaction. These factors have a major impact on the service quality.

The banking sector is regarded as a vital component of the economy's growth. The banking sector has undergone major changes as a result of technological advances. As a result, banks have been using technology such as Automated Teller Machines (ATMs), internet banking, and mobile banking to cut costs while also improving performance, productivity, and customer convenience/satisfaction. Satisfaction is determined by the quality of the product and service. Customers are provided with a variety of services by the banking industry in order to increase customer loyalty. Service quality has been identified as an analytical predictor of success for businesses, allowing them to develop their competitive edge and improve their capabilities (Joshi, 2019).

It has been discovered that there is a large gap in respondents' opinions. Since the population is increasing, the banking industry has a lot of potential in the future. The banking industry must win the confidence of the public by offering safer transactions; make improvements after conducting a pilot survey and soliciting feedback from the public (Sohail & Nabaz, 2019).

In most countries around the world, the service sector has grown in importance. Banks play an important role in delivering support to their customers in the service sector. Banks can catch the attention of customers by offering a wide range of modern and marketing services. In today's world, ATMs are one of the most important services offered to customers (Premlatha & Sharma, 2012).

Automated ATM monitoring systems have become an important part of every financial institution's day-to-day operations in today's competitive environment. These tools assist banks in gaining a competitive advantage over competitors by providing near real-time status, results, and analytical reports on their ATM fleet. According to (Rao & Mane, 2017), It allows the financial institution to recognize which locations have a high demand for cash and which locations may have their supply reduced in order to maintain the cash level across the fleet of ATMs. It allows a monitoring application provider to provide cash management as part of their monitoring application suite.

Customers' attitudes decide the success and sustainability of commercial banks because banking is predominantly a service-oriented industry. Customers' optimistic attitudes and loyalty can be enhanced by improving service quality. As a result, Nepalese commercial banks will build satisfied customers by providing high-quality ATM services (Shrestha, 2020).

According to (Mwatsika, 2016), Customers' happiness and ATM banking characteristics (independent variables) (dependent variable) identifies ATM fees paid, ATMs not out of operation, ATM cleanliness, ATM accuracy, ease of access to ATMs, readable slips, convenient location, employee accessibility to solve ATM problems, privacy at ATM stations, employee speed in solving ATM issues, ease of application process for ATM cards, and cash availability in ATMs as key factors that affect customers' satisfaction. The study also found that service responsiveness and reliability are important service quality dimensions to which managers should pay attention in order to achieve customer satisfaction.

The majority of people in the chosen region favoured ATM service to branch banking, indicating that there is a need to extend the ATM vendor machine's reach to include more regions. Younger generations and educated people are more comfortable using ATMs, while older generations are more hesitant to use ATMs and prefer conventional branch banking methods. As a result, it also paints a picture of how customers feel about using newer technologies like ATMs, including their perceived utility, dangers, and inconvenience (Dhungel et al., n.d.).

It has the potential to increase ATM awareness among a broader population. This might lead to a greater use of ATMs while also growing confidence in the banking system. According to (Alexis & Chen, 2019), Customers were pleased with ATM service quality because of empathy, tangibles, ease of use, and comfort, according to the report. As a result, bank managers should strive to boost the performance of those three rejected components in order to satisfy customers and provide a high level of service, which could give banks a competitive edge in terms of ATM service quality.

The ATM card is a thoughtful gift for bank customers. The modern banking system of ATM service is new and innovative in order to attract customers and simplify banking transactions. Those were the days when only a small percentage of traders transacted with banks. These are the days when everybody must deal with money and conduct bank transactions. As a result, ATM centers must be innovated and introduced as soon as possible. Because of its newness, the true advantages and goals of the ATM service can be known only when it is widely available, enabling anyone with a bank account to use it (Selvamuthu & Rameshkumar, 2018).

(Singh, 2013) Concluded customer satisfaction is positively impacted by ATM facilities. Some characteristics have extremely high levels of customer satisfaction, while others have lower levels of customer satisfaction, which is a significant source of concern for banks, and to which

banks must devote more attention. Infrastructure growth factors need further investigation and testing. The most critical factors, response to inquiries and availability of a check drop box, have overall lower satisfaction levels; these two factors require additional attention from these banks, and there is potential for more improvement in customer satisfaction levels.

We can say that many factors need to consider in order gaining competitive advantage in the world of ATM cards. A bank also needs to identify the major factors which really distract the customers while using ATM cards. (Adhikari et al., 2016), revealed that in Nepalese commercial banks, ATM service quality and its dimensions such as convenience, security, ease of use, reliability, and cost effectiveness have a positive relationship with customer satisfaction. Similarly, it has been discovered that dependability has a greater effect on consumer satisfaction. Similarly, cost effectiveness has a lower impact because there is a lower correlation between cost effectiveness and consumer satisfaction. Reliability is the most important factor influencing customer satisfaction with ATM services, followed by convenience, ease of use, cost effectiveness, and security.

According to (Phan & Nham, 2015), service quality has a direct impact on consumer loyalty, it plays an important role in sustaining and improving a company's long-term competitive advantage. It looked into the relationship between service quality and customer satisfaction in a private commercial bank's ATM service.

(Gümüş et al., 2015) concluded that the average ATM user's standards are higher than the perceived operation, and this satisfaction isn't always sustained. It is also concluded that typical ATM users' expectations for reliability are higher than their perceptions; their expectations for eagerness are higher than their perceptions; and their expectations for sensitivity are also higher than their perceptions.

(Tewodros & Debela, 2019) revealed that the majority of customers preferred ATM banking for cash withdrawals, with ATM banking for fund transfers coming in second. Customers, on the other hand, had a number of concerns with ATM systems. Unreliable ATM network, small amount of money that can be withdrawn every day, reduction in balance without cash payment, bank charges for ATM services, machine out of cash, card gets blocked or locked up, and waiting in line to use ATM machines were some of the issues that customers mentioned.

(Babar & Rehman, 2014) concluded that customer satisfaction contributes to customer loyalty, and customer satisfaction leads to customer loyalty. Banks can gain a competitive edge in today's competitive environment by offering better services to their customers.

(Phan & Nham, 2015) found that the Bank's ATM service quality is determined by two factors: assurance and tangibles, with assurance having the greatest effect on customer satisfaction. Since service quality has a direct impact on consumer loyalty, it plays an important role in sustaining and improving a bank's long-term competitive advantage.

Information and communication technology has made a significant contribution to the banking sector's development. In the banking industry, ATMs are the most popular and widely used e-banking services. The majority of respondents use ATM services to meet their cash needs, and they are satisfied with the number of ATMs in their area; however, the majority of respondents are dissatisfied with the transaction costs charged by banks for ATM services, as well as their mechanism for resolving ATM customer grievances (Malav Vineshkumar & Bhatt, 2018).

(Olusanya et al., 2015) concluded that the rapid growth of automated distribution platforms, as well as customers' preference for using ATMs for a variety of reasons, are putting pressure on banks to adapt quickly to meet their customers' needs. Banks can also use ATMs to supplement and diversify their offerings, as well as to establish a deep and long-term partnership with customers.

(Malik & Bansal, 2015) concluded that the ATMs will soon become a personalized and user friendly interface in complete success story, banks have been able to serve their customers outside their bank's premises because of the advent of the ATM's. The problems associated with ATM machines are: waiting in queues, machine out of order, machine out of cash, non- printing of statement of transaction, reduction in balance and also problem of shared networked ATM's. If the ATM service is consistent in terms of service and cash availability, customers will be happy. The main factors that contribute to gaining happy customers are fulfillment and ease of use. Consumers want to feel safe and private when making transactions; as a result, if the business offers reliable transaction services, it would be able to easily receive satisfied customers (Aslam et al., 2019).

Banks can also develop ATM features to better serve customers and use this tool to establish a good and long-term partnership with them. On a scale of understanding, the balance inquiry service is ranked second. Similarly, the majority of customers favor ATMs for cash withdrawals,

with mini statement facilities coming in second. The demographics of consumers have an effect on consumer understanding of ATM services (Kumar Jha & Sureka, 2014).

It shows that four factors, in order of importance, affect customer satisfaction with ATM service. These factors are Price, Network, Reliability, and Empathy. Then, in order to increase customer loyalty, certain administrative implications are suggested to management (Giao, 2019).

The importance of the factors described in the study can also serve as a guide for managers in terms of the most relevant factors to concentrate on in order to increase ATM service efficiency and use. As mentioned in the findings, banks should pay attention to all of the dimensions defined in this study in order to maintain a high level of ATM service quality and use. They should make sure that ATMs are always open, easy, and simple to use. The security of ATMs should be strengthened, customers should feel satisfied when using them, and customers' concerns should be addressed when issues arise (Ighomereho et al., 2019).

According to (Sahiti et al., 2020), bank's reputation/image, availability of a large branch network, reliability of the bank's information technology, ease of opening an account, security of the banking environment, quality of electronic banking products, financial strength of the bank, and trust in the bank's management are all important factors in the bank selection decision. By strategically concentrating on these regions, commercial banks will most likely increase their customer acquisition rates. Low bank charges and easy access to loans were found to be less important to respondents.

(Tirhas et al., 2017) concluded market the full spectrum of their services; banks must develop a diversified distribution strategy. The customer was highly pleased with the promptness of card delivery, the number of transactions, the accuracy of the notes, and the convenient location. It also suggests a lack of privacy in completing the transaction, a reduction in balance without cash payment, cards being blocked at ATMs, and customers' fears of protection.

While ATMs have many advantages, consumers who are drawn to them because of their convenience are unaware of all of them. These customers are now struggling with a number of issues that are directly related to ATMs. ATM users have found a number of issues, including difficulty, system failure, and low-quality notes. Some inconvenient features, such as safety-security, decoration, and so on, are not specifically linked to ATMs (Islam et al., 2007).

While ATMs have many advantages, consumers who are drawn to them because of their convenience are unaware of all of them. These customers are now struggling with a number of issues that are directly related to ATMs. ATM users have found a number of issues, including difficulty, system failure, and low-quality notes. Some inconvenient features, such as safety-security, decoration, and so on, are not specifically linked to ATMs (Prasad, 2018).

It illustrates that service quality attributes and customer satisfaction have a positive relationship. It was concluded that good service leads to happy customers, and happy customers contribute to customer loyalty. Banks can gain a competitive edge in today's competitive environment by offering better services to their customers (Babar & Rehman, 2014).

Respondents expressed satisfaction with the above ATM service qualities based on the findings of the descriptive study, which tests customer satisfaction with the qualities of tangibility, efficiency, responsiveness, assurance, and empathy. According to the findings, service quality is a predictor of customer satisfaction, and the higher the degree of service quality, the higher the level of satisfaction (Akpan, 2016).

The study concludes that all dimensions (convenience, reliability, responsiveness, protection, cost, and efficient operation) have a strong impact on customer satisfaction, with the exception of privacy, which has a negative impact on overall satisfaction. The explanation for this may be that as services become more private, some consumers become vulnerable, resulting in lower satisfaction with the service. Customers, who are unfamiliar with ATM services and who, for reasons of privacy, fail to disclose some of their problems to other customers may experience disappointment (Ochumbo & Matimbwa, 2018).

(Olusanya et al., 2015) concluded that the rapid growth of automated distribution platforms, as well as customers' preference for using ATMs for a variety of reasons, are putting pressure on banks to adapt quickly to meet their customers' needs. The study gives bank management the knowledge they need to enhance ATM service efficiency and increase customer loyalty. The emphasis should not be exclusively on the dimensions of ATM service efficiency. For customer satisfaction, this factor should be supplemented and integrated with other aspects of bank service efficiency.

Customers who wish to withdraw smaller denominations at any time should be able to do so at the ATM, which should be available in lower or lesser denominations. Customers should be able

to see their account balances by receiving receipts from the ATM following each transaction (Abasimi et al., 2018).

Nationalized banks and private banks are also very fast moving in the new banking market. To please their clients, they are implementing new banking concepts and innovations. The banking industry was unquestionably an early adopter of technology. Over the last ten years, the banking sector as a whole has changed dramatically. Most banks in Erode Town are now completely computerized, with services such as Tele Banking, Internet Banking, and ATM Services, among others (Selvamuthu & Rameshkumar, 2018).

(Tirhas et al., 2017), concluded that market the full spectrum of their services, banks must develop a diversified distribution strategy. The customer was extremely pleased with the promptness of card delivery, the number of transactions, the accuracy of the notes, and the convenient location, according to this report. The study also found that customers were worried about a lack of privacy while completing transactions, a reduction in balance without cash payment, cards being blocked at ATMs, and a fear of protection.

Technology has had a huge impact on the banking industry; the trend in banking has changed from cash to cheques, which has then been transformed to plastic cards. In the banking industry, ATMs are extremely important. It is one of the most common distribution channels because it allows customers to conduct banking from anywhere at any time. In general, ATMs support both banks and customers in a number of ways (Arun & Singh, 2019).

Customers receive high-quality service from ATMs, and demographic factors such as gender, age group, educational attainment, and occupation have an impact on ATM use. Customers are pleased with the service quality of ATMs, but there is a need to enhance the service quality of ATMs since all of the measurements of ATM service quality are rated as satisfied by customers (Prasad, 2018).

According to (Singh, 2013), in this market, fierce competition is pushing banks to become more customer-friendly and customer-oriented. As a result of the intensified competition, customer satisfaction has become increasingly relevant. In the last two decades, the banking sector has undergone a full transformation. The banking industry has implemented a number of measures to attract and retain customers.

The rapid growth of automated distribution platforms, as well as customers' preference for using ATMs for a variety of reasons, are putting pressure on banks to adapt quickly to meet their

customers' needs. The study gives bank management the information they need to improve ATM service efficiency and increase customer loyalty. The emphasis should not be solely on the dimensions of ATM service efficiency. For customer satisfaction, this factor should be supplemented and integrated with other aspects of bank service efficiency (Olusanya et al., 2015).

Banks have been forced to embrace technological changes in order to face the electronic age by fierce competition among banks and global powers. It's also known as E-banking, internet banking, or online banking, and it offers a variety of electronic platforms for accessing banking services, including internet banking, mobile banking, ATM services, electronic fund transfers, credit cards, debit cards, and electronic clearing services, among others. Due to its growing popularity, ATM is the key distribution channel to be explored among these services (Verma, 2014).

Customers are happy with an ATM service if it is consistent in terms of service and cash availability. Fulfillment and ease of use have also been identified as important factors in gaining happy customers. Consumers want to feel safe and private when conducting transactions; as a result, if the company offers reliable transaction services, it would be able to easily obtain satisfied customers (Aslam et al., 2019).

(Tadesse & Bakala, 2021) revealed that ATM service has been made available to all bank account holders. Though it is clear that all respondents are absolutely happy with the service of ATMs, the bank could maintain its existing customers while also gaining new ones if the suggestions made in this study are seriously considered.

(Hong, 2010) concluded that respondents really like the convenience and comfort of the city's ATM locations. The most important thing for the bank administration to focus on is a proper system for addressing grievances; additionally, as customer data increases by the day, the number of ATMs should rise in parallel, resulting in improved customer satisfaction.

(Malik & Bansal, 2015) revealed that ATMs have web features that allow for two-way contact with live specialists, biometric options, and the ability to view personalized promotions. It's easy to support web-enabled ATMs. These ATMs can be instantly connected to a vendor's focal observing arrangement. The ATM industry has experienced enormous growth over the last two decades. Those days are long gone when ATMs were only used to withdraw cash; now, ATMs can perform a wide range of tasks.

(Phan & Nham, 2015) concluded that to establish a loyal customer base, the bank must first establish customer trust and confidence in bank services, as well as ensure the bank's service quality. Furthermore, attitude, integrity, and the willingness to meet consumer expectations are critical considerations. Furthermore, believing that a discount or promotion campaign would be adequate to attract and maintain customers is wrong.

These strategies are only useful for a limited period of time and can only draw a small number of random customers. (Lee, 2011) concluded that the cost of ATM services, the ATM network, the security of ATM transactions, the location of ATM Centers, and the maximum withdrawal cap per day are the main determinants of ATM service efficiency, and these have a direct impact on overall customer satisfaction with bank ATM services.

The main purpose of the study is to understand the factors affecting customer satisfaction. Other specified purpose of this study is as:

- To identify the various factors affecting customer satisfaction of ATM services in Kathmandu valley.
- To know the level of customer satisfaction for the ATM services.

Research Hypothesis

The following are the hypothesis which is created through the literature review:

H₀1: There is no significant relationship between Security and privacy and Customer Satisfaction.

H₀2: There is no significant relationship between Convenience and Customer Satisfaction.

H₀3: There is no significant relationship between system availability and Customer satisfaction.

H₀4: There is no significant relationship between speed of ATMs services and Customer satisfaction.

H₀5: There is no significant relationship between responsiveness and Customer Satisfaction.

H₀6: There is no significant relationship between reliability and Customer Satisfaction.

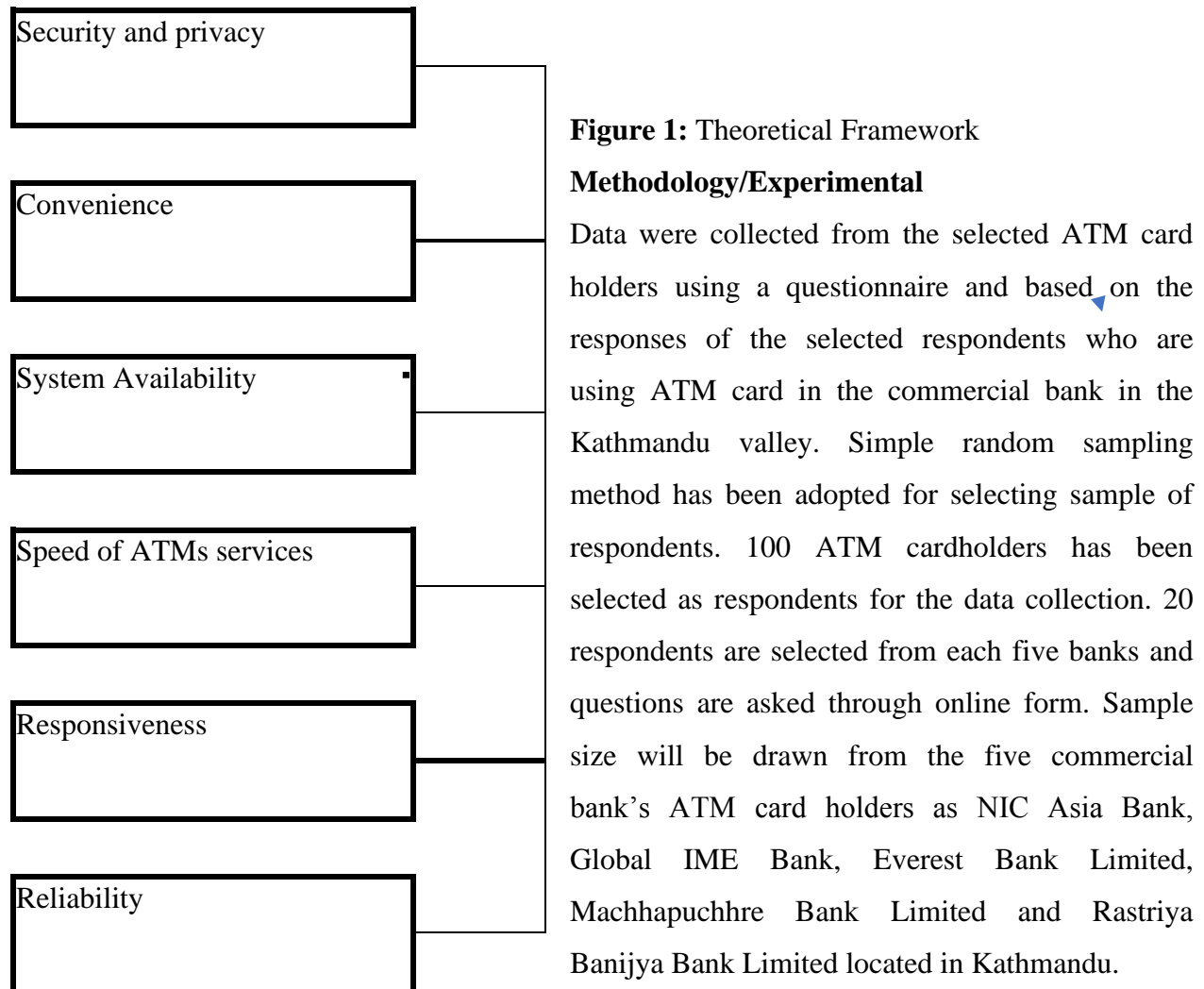
H₀7: There is no significant relationship between age and customer satisfaction.

H₀8: There is no significant relationship between annual income and Customer Satisfaction.

In this study there is 1 dependent variable and 6 independent variables in which this study is proceed. Dependent Variable is customer satisfaction and independent variables are security and

privacy, convenience, system availability, speed of ATMs services, responsiveness and reliability.

The theoretical framework of the study is given below:



The first part of the survey asked the respondents for demographic information like name, address, contact, occupation, gender, income level, qualification, age. The second part of the survey asked the respondents about the dimensional of service quality like security and privacy, convenience, system availability, speed of ATM services, responsiveness and reliability. And, the third part of the survey asked the dimensional of customer satisfaction for the ATM services in Kathmandu valley.

Data management and analysis are done using both descriptive and inferential statistical tools. For analysis of the data, MS Excel and SPSS software were used. The data collected was

analyzed through statistical tools and techniques, presented and interpreted in tabular forms. F-Test to compare the mean of two group like gender, income with customer satisfaction etc. It is also shown the multiple regressions to find the effects of many independent variables to dependent variables. There is also Pearson correlation coefficient for validity and reliability and validity of questionnaire has been checked with the help of Alpha.

Following are the regression model:

$$Y=AX1+BX2+CX3+DX4+EX5+FX6$$

Where,

Y= Customer Satisfaction

AX1= Security and privacy

BX2= Convenience

CX3= System availability

DX4= Speed of ATM services

EX5= Responsiveness

FX6= Reliability

Reliability and Validity

The degree to which the test is free of measurement errors is described as reliability. In this test, the reliability was tested through Cronbach's alpha. The reliability of variables was examined on the basis of the number of questions under different variables and its Cronbach's Alphas value. The following table shows the reliability levels for the category of questions asked to respondent.

Table 1: Test of reliability

Variable	Cronbach's Alpha	Number of Items
Security and Privacy	0.842	4
Convenience	0.837	4
System Availability	0.809	4
Speed of ATM Services	0.815	4
Responsiveness	0.870	4
Reliability	0.835	4
Customer Satisfaction	0.824	3

The above table shows the values of Cronbach's Alphas for each field of the questionnaire and the entire questionnaire. It is found that Cronbach's Alphas were in the range from 0.809 to 0.870. This range is considered high and the result ensures the reliability of each field of the questionnaire.

The Cronbach's alpha of security and privacy is 0.842 for a total of 4 statements. The Cronbach's alpha of Convenience is 0.837 for a total of 4 statements. The Cronbach's alpha of system availability is 0.809 for a total of 4 statements. The Cronbach's alpha of speed of ATM services is 0.815 for a total of 4 statements. The Cronbach's alpha of responsiveness is 0.70 for a total of 4 statements. The Cronbach's alpha of reliability is 0.835 for a total of 4 statements. The Cronbach's alpha of customer satisfaction is 0.824 for a total of 3 statements. Cronbach alpha coefficient value more than 0.6 is considered as the reliable and all the variables in the table have a Cronbach Alpha coefficient value more than 0.6. So, it indicates that the data is reliable for further analysis.

Summary of hypothesis

As there are total 8 hypotheses tested in this particular study. Out of 8 hypotheses, 3 of them give a significant result from a series of tests conducted. The significant p-value at 5% level of significance is below or equal at 0.05.

Table 2: Summary of hypothesis

Hypothesis	Statement	Status
H ₀₁	There is no significant relationship between Security and privacy and Customer satisfaction.	Accept
H ₀₂	There is no significant relationship between convenience and Customer satisfaction.	Reject
H ₀₃	There is no significant relationship between system availability and Customer satisfaction.	Reject
H ₀₄	There is no significant relationship between speed of ATM services and Customer satisfaction.	Accept

H ₀₅	There is no significant relationship between responsiveness and Customer satisfaction.	Accept
H ₀₆	There is no significant relationship between reliability and Customer satisfaction. ■ ■	Accept
H ₀₇	There is no significant relationship between age and customer satisfaction.	Accept
H ₀₈	There is no significant relationship between annual income and customer satisfaction	Reject

Discussion of analysis

Gender of the Respondents

Table 2 : Distribution by gender

Gender	Frequency (n)	Percentage (%)
Male	54	54
Female	46	46
Total	100	100

Marital Status

Table 3: Marital Status of the Respondents

Gender	Frequency (n)	Percentage (%)
Unmarried	77	77
Married	23	23
Total	100	100

Occupation of the Respondents

Table 4: Occupation of the Respondents

Gender	Frequency (n)	Percentage (%)
Employee	27	27

Businessmen	8	8
Student	63	63
Farmer	2	2
Total	100	100

Annual Income of the Respondents

Table 5: Annual Income of the Respondents

Income	Frequency (n)	Percentage (%)
Dependents	53	53
Below 2 Lakhs	13	13
2 Lakhs to 5 Lakhs	16	16
6 lakhs to 10 Lakhs	13	13
Above 10 Lakhs	5	5
Total	100	100

Qualification of the Respondents

Table 6: Qualification of the respondents

Gender	Frequency (n)	Percentage (%)
Below SLC/SEE	3	3
SLC/SEE	4	4
Plus 2	9	9
Bachelors	35	35
Masters and Above	48	48
Others (CA)		
Total		

Age of the Respondents

Table 7: Age profile of the respondents

Gender	Frequency (n)	Percentage (%)
Below 21	10	10
21-30	76	76

31-40	11	11
41-50	2	2
51 and Above	1	1
Total	100	100

Uses of ATM services

Table 8: Respondents using ATM services

Response	Frequency (n)	Percentage (%)
Yes	97	97
No	3	3
Total	100	100

How Often Use of ATM services

Table 9: Respondents how Often Use of ATM Services

Gender	Frequency (n)	Percentage (%)
Everyday	3	3
Four times in a week	34	34
Once a week	12	12
Twice a month	51	51
Total	100	100

Respondents having ATM Cards

Table 10: Respondents having ATM Cards

Gender	Frequency (n)	Percentage (%)
NIC Asia Bank	20	20
Global IME Bank	20	20
Machhapuchhre Bank	20	20
Rastriya Banjiya Bank	20	20
Everest bank Limited	20	20
Total	100	100

Number of ATM card Holding**Table 11:** Number of ATM Card Holding

Gender	Frequency (n)	Percentage (%)
One	46	46
Two	40	40
Three	8	8
More than three	6	6
Total	100	100

Purpose of Using ATM Cards**Table 12:** Purpose of Using ATM Cards

Gender	Frequency (n)	Percentage (%)
Cash Withdrawal	47	47
Balance Enquiry	1	1
Shopping	0	0
All of the Above	52	52
Total	100	100

Reasons to Preference of ATM Cards**Table 13:** Purpose of Using ATM Cards

Gender	Frequency (n)	Percentage (%)
Easy Banking anytime any where	13	13
Faster Transactions	5	5
Time Saving	11	11
All of the Above	71	71
Total	100	100

Level of Satisfaction

Table 14: Level of satisfaction

Level	Frequency (n)	Percentage (%)
Very satisfied	25	25
Satisfied	47	47
Neither satisfied nor	19	19
Dissatisfied		
Dissatisfied	7	7
Very Dissatisfied	2	2
Total	100	100

Descriptive Statistics of Variable

Descriptive Statistics of Security and Privacy

The mean scores and the standard deviation of the scores of each of the statements are shown in the table below. The variable security and privacy consist of 4 statements. They rated statements from 1 to 5. (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Table 15: Descriptive Statistics of security and privacy

Statements	Minimum	Maximum	Mean	Std. Deviation
X1	1	5	3.570	1.0941
X2	1	5	3.700	1.1055
X3	1	5	3.530	1.0391
X4	1	5	3.470	0.9687
Average	1	5	3.5675	1.0518

Where,

X1= It is necessary for a guard to be present at ATM posts.

X2= I trust that bank ATM will not misuse my personal information.

X3= I feel safe during my ATM transactions.

X4= I can rely and have belief in the security of the ATM banking.

Table 15 explains the descriptive analysis for the independent variable security and privacy. The average mean score is greater than 3 which show that security and privacy affects the customer's satisfaction for ATM services in Kathmandu valley.

Descriptive Statistics of convenience

The mean scores and the standard deviation of the scores of each of the statements are shown in the table below. The variable convenience consists of 4 statements.

Table 16: Descriptive Statistics of convenience

Statements	Minimum	Maximum	Mean	Std. Deviation
X1	1	5	3.390	1.0814
X2	1	5	3.460	1.1670
X3	1	5	2.890	1.1449
X4	1	5	3.440	0.9354
Average	1	5	3.2950	1.0821

Where,

X1= ATMs are conveniently located in Kathmandu Valley.

X2= ATMs of my banks are easily found at all important places of valley like mall, airport, hospitals etc.

X3= ATM operates for 24 hours/7 days without errors.

X4= ATM operates even when electricity is cut off.

The above table shows the responses given by the ATM users regarding convenience. They rated statements from 1 to 5. (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Table 16 explains the descriptive analysis for the independent variable convenience. The average mean score is greater than 3 which show that security and privacy affects the customer's satisfaction for ATM services in Kathmandu valley.

Descriptive Statistics of System availability

The mean scores and the standard deviation of the scores of each of the statements are shown in the table below. The variable system availability consists of 4 statements.

Table 17: Descriptive Statistics of system availability

Statements	Minimum	Maximum	Mean	Std. Deviation
X1	1	5	2.840	1.0514

X2	1	5	3.080	1.0794
X3	1	5	3.420	1.0841
X4	1	5	3.430	1.0754
Average	1	5	3.1925	1.0727

Where,

X1= There is always availability of cash in my ATM posts.

X2= There is availability of power backup/Generator/Inverter.

X3= Keypad of ATM machines are working properly

X4= Overall system of my ATM like slips shows my updated balance and processing time also shows properly

The above table shows the responses given by the ATM users regarding system availability. They rated statements from 1 to 5. (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Table explains the descriptive analysis for the independent variable system availability. The average mean score is greater than 3 which show system availability affects the customer's satisfaction for ATM services in Kathmandu valley.

Descriptive Statistics of speed of ATM services

The mean scores and the standard deviation of the scores of each of the statements are shown in the table below. The variable speed of ATM services consists of 4 statements.

Table 18: Descriptive Statistics of speed of ATM services

Statements	Minimum	Maximum	Mean	Std. Deviation
X1	1	5	3.3600	1.0779
X2	1	5	4.000	1.0730
X3	1	5	4.100	1.020
X4	1	5	3.540	1.2178
Average	1	5	3.7500	1.0971

Where,

X1= ATM serves as per my expected time.

X2= Transactions process is much faster than visiting a branch.

X3= ATM provides fast services as it saves both time and effort.

X4= Speed of delivery of ATM cards are fast.

The above table shows the responses given by the ATM users regarding speed of ATM services. They rated statements from 1 to 5. (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Table explains the descriptive analysis for the independent variable speed of ATM services. The average mean score is greater than 3 which show that speed of ATM services affects the customer's satisfaction for ATM services in Kathmandu valley.

Descriptive Statistics of responsiveness

The mean scores and the standard deviation of the scores of each of the statements are shown in the table below. The variable responsiveness consists of 4 statements.

Table 19: Descriptive Statistics of responsiveness

Statements	Minimum	Maximum	Mean	Std. Deviation
X1	1	5	2.680	1.0038
X2	1	5	2.840	0.9504
X3	1	5	3.310	1.0317
X4	1	5	3.120	1.1658
Average	1	5	2.9875	1.0379

Where,

X1= Bank staff is not willing to help me to solve my problems regarding ATM issues.

X2= ATM broken-down are promptly fixed.

X3= ATM is used to check and print account and mini statements easily.

X4= Bank staff does not heartily serves you in peak hours.

The above table shows the responses given by the ATM users regarding responsiveness. They rated statements from 1 to 5. (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Table explains the descriptive analysis for the independent variable responsiveness. The average mean score is less than 3 which show that responsiveness does not affect the customer's satisfaction for ATM services in Kathmandu valley.

Descriptive Statistics of reliability

The mean scores and the standard deviation of the scores of each of the statements are shown in the table below. The variable reliability consists of 4 statements.

Table 20: Descriptive Statistics of reliability

Statements	Minimum	Maximum	Mean	Std. Deviation
X1	1	5	2.330	1.0055
X2	1	5	3.850	1.0952
X3	1	5	3.320	1.2133
X4	1	5	2.990	1.0588
Average	1	5	3.1225	1.0932

Where,

X1= Balance in my account reduced without withdrawal of my cash.

X2= I don't find fake currency notes from my ATM.

X3= Maximum withdrawal limit per day is reliable I.e. (1 Lakhs).

X4= I always get mini statement.

The above table shows the responses given by the ATM users regarding reliability. They rated statements from 1 to 5. (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Table explains the descriptive analysis for the independent variable reliability. The average mean score is greater than 3 which show that reliability affects the customer's satisfaction for ATM services in Kathmandu valley.

Types of statistical tests performed

Analysis of customer satisfaction across Age profile of the respondents

Table 21: Analysis of customer satisfaction across Age Group

	Age group	Mean	Std. Deviation	F-value	Sig.
Customer satisfaction	Below 21	3.2333	1.25757	.228	.922
	21-30	3.2675	.94754		
	31-40	3.4848	1.1191		
	41-50	3.6667	.47140		
	Above 50	3.6667	-		

*.Coefficient is significant at the 0.05 level

From the table it displays the analysis of the customer satisfaction across age group of the respondents. It shows that there is no significant difference in customer satisfaction across group of the people. The p-value (0.922) of the F-test is greater than 0.05 which describes that we have to accept the null hypothesis H_0 7 respectively. Therefore, there is a not significant relationship between age group of respondent and customer satisfaction.

Analysis of customer satisfaction across the annual income of the respondents

Table 22: Analysis of customer satisfaction Across annual income

	Income in lakhs	Mean	Std. Deviation	F-value	Sig.
Customer satisfaction	Dependents	3.2201	0.94268	3.534	.010
	Below 2	2.8205	.98710		
	2 to 5	3.4167	0.90676		
	6 to 10	3.4615	.96745		
	Above 10	4.600	0.59628		

*.Coefficient is significant at the 0.05 level

The above table displays the customer satisfaction across annual income of the respondents. There is a significant difference in customer satisfaction and annual income. The p-value (0.010) of the independent sample F-test is less than 0.05 which describes that we have to reject the null hypothesis H_0 8 respectively. Therefore, there is a significant relationship between annual income of the respondents and customer satisfaction.

Correlation Analysis across variables

Table 23: Correlation Analysis of Variables

	X1	X2	X3	X4	X5	X6	X7
X1	1	0.461**	0.612**	0.685**	0.599**	0.182**	0.428**
		.000	.000	.000	.000	.070	.000
X2		1	0.335**	0.467**	0.493**	0.278**	0.513**
			.000	.000	0.000	0.05	0.000
X3			1	0.665**	0.456	0.131**	0.390**
				.000	.000	.195	.000

X4	1	0.718**	0.238**	0.526**
		.000	.017	.000
X5		1	0.342**	0.585**
			.001	.000
X6			1	0.353**
				.000
X7				1

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

Where,

X1= Customer Satisfaction

X2 = Security and Privacy

X3= Convenience

X4= System availability

X5= Speed of ATM services

X6= Responsiveness

X7= Reliability

The above table displays the correlation analysis of variables. Correlation coefficient between security and privacy and customer satisfaction is 0.461. The corresponding p- value is 0.000 which is lower than the level of significance (α) = 0.05, security and privacy has positive and statistically significant relationship with customer satisfaction. Therefore, it shows that security and privacy leads to increase the customer satisfaction.

Also the correlation coefficient of the convenience and customer satisfaction is 0.612, the corresponding p-value is 0.000 which is lower than the level of significance (α) = 0.05, there is positive and statistically significant relationship between convenience and customer satisfaction. Therefore, it shows that increase in the convenience leads to increase in the customer satisfaction of the respondents.

It also shows the correlation coefficient system availability is 0.685, as the corresponding p-value is 0.000 which is lower than the level of significance (α) = 0.05, it means that system availability has positive and statistically significant relationship with customer satisfaction.

Therefore, it shows the increase in the system availability leads to increase in the customer satisfaction.

Correlation coefficient between speed of ATM services is 0.599, it also shows the corresponding p-value is 0.000 which is lower than the level of significance (α) = 0.05, so there is positive and statistically significant relationship between speed of ATM services and customer satisfaction. Therefore, increase in the speed of ATM services leads to increase in the customer satisfaction of the ATM services.

From the above table, it clearly shows the correlation coefficient between responsiveness and customer satisfaction is 0.182, the corresponding p-value is 0.070 which is higher than the level of significance (α) = 0.05, so responsiveness has negative and statistically does not significant relationship with customer satisfaction for the ATM services.

Therefore, it shows that increase in the responsiveness does not lead to increase in customer satisfaction for ATM services.

From the above table, it also clearly shows the correlation coefficient between reliability and customer satisfaction is 0.428, the corresponding p-value is 0.00 which is less than the level of significance (α) = 0.05, so reliability has positive and statistically significant relationship with customer satisfaction for the ATM services. Therefore, it shows that increase in the reliability leads to increase in customer satisfaction for ATM services.

Regression Analysis

Table 24: Regression Analysis of Variables

	Beta	T-value	Sig.	VIF
(Constant)	-0.92	-.216	.829	
Security and Privacy	0.173	1.697	.093	1.509
Convenience	0.338	3.030	.003	1.816
System Availability	0.339	2.501	.014	3.011
Speed of ATM Services	0.218	1.913	.059	2.477
Responsiveness	-0.40	-.377	.707	1.194
Reliability	-0.38	-.284	.777	1.790
R-square	0.554			

F	19.251
Sig	0.000

On the basis of above findings, the following regression has been developed.

$$CS = 0.92 + 0.173X_1 + 0.338X_2 + 0.339X_3 + 0.218X_4 - 0.40X_5 - 0.38X_6$$

Where,

CS: Customer Satisfaction

X1 = Security and privacy

X2= Convenience

X3= System Availability

X4= Speed of ATM Services

X5= Responsiveness

X6= Reliability

The above table displays the regression analysis across variables as regression analysis is considered as powerful statistical tools which help to examine the relationship between two or more variables. Here the beta coefficients are positive and significant for the variable security and privacy. It means that security and privacy of an ATM services just goes up by 1 unit then customer satisfaction is predicted to go up by 0.173 units. The corresponding p-value is 0.093 which is greater than the level of significance (α) = 0.05, thus H_{01} is not rejected. It means that security and privacy does not provide any significant contribution to customer satisfaction.

It is also shown that the beta coefficients are positive and significant for the variable convenience. It means that convenience of an ATM services just goes up by 1 unit then customer satisfaction is predicted to go up by 0.338 units. The corresponding p-value is 0.003 which is less than the level of significance (α) = 0.05, thus H_{02} is rejected. It means that convenience provides significant contribution to customer satisfaction. There is significant relationship between convenience and customer satisfaction for ATM services.

It is also shown that the beta coefficients are positive and significant for the variable system availability. It means that system availability of an ATM services just goes up by 1 unit then customer satisfaction is predicted to go up by 0.339 units. The corresponding p-value is 0.014 which is less than the level of significance (α) = 0.05, thus H_{03} is rejected. It means that system

availability provides significant contribution to customer satisfaction. There is significant relationship between system availability and customer satisfaction for ATM services.

Here the beta coefficients are positive and significant for the variable speed of ATM services. It means that speed of ATM services just goes up by 1 unit then customer satisfaction is predicted to go up by 0.218 units. The corresponding p-value is 0.059 which is greater than the level of significance (α) = 0.05, thus H_{04} is not rejected. It means that speed of ATM services does not provide any significant contribution to customer satisfaction. There is not significant relationship between speed of ATM services and customer satisfaction.

Also, the beta coefficients are negative and significant for the variable responsiveness. If responsiveness goes up by 1 unit, then customer satisfaction for ATM services is predicted to go down by 0.40 units. Responsiveness does not provide any significant contribution to customer satisfaction as corresponding p-value is 0.707 which is greater than the level of significance (α) = 0.05, thus H_{05} is not rejected. It is therefore concluded that responsiveness has no significant relationship between customer satisfactions.

The beta coefficients are negative and significant for the variable reliability. If reliability goes up by 1 unit, then customer satisfaction for ATM services is predicted to go down by 0.38 units. Reliability does not provide any significant contribution to customer satisfaction as corresponding p-value is 0.777 which is greater than the level of significance (α) = 0.05, thus H_{06} is not rejected. It is therefore concluded that reliability has no significant relationship between customer satisfactions.

Conclusion

It is considered that ATM card is a gracious gift for the bank customers in the world of banking sector. The modern banking system of ATM service is new and innovated which helps to attract the more customers and easy the banking transaction of the customers.

It is also concluded that annual income of the customers affects the satisfaction. The study also revealed that male respondents are more active on transaction with ATM cards than female. Another objective of the study was to know the level of satisfaction. Therefore, it is concluded that the majority of customers are satisfied with their ATM services. It is found that 25% of the respondents are very satisfied and 47% of the respondents are satisfied as per the services provided by the banks. It means that the level of customer satisfaction for the ATM services in

the valley is in the satisfied category. It is also concluded that variable responsiveness has not relationship with the ATM services even though it is relevant for this particular study. Security and privacy of the ATM are also one of the major factors which determine the attitude towards the ATM services since the regression analysis also shown that it has also significant relationship with the customer satisfaction up to some extent then responsiveness and reliability factors is considered. It can be also concluded that the majority of the customers use the ATM cards just for withdraw the money and has more than one ATM cards.

It is found that the majority of the customers are frequently using the ATM services and customer satisfaction has positive impacted most of the independent variables. The ATM services have positive impact on the customer satisfaction. Some characteristics have very high customer satisfaction whereas some characteristics have the lower customer satisfaction level which is major concern area for the banks and there is need to pay more attention of the banks. The major limitations of the research are that the research has been conducted only in commercial bank's ATM cardholders and limited to Kathmandu valley with 100 sample respondents only.

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A Study on Effectiveness of Online Tools and Technologies in Recruitment and Selection Process

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Abstract

With the advent of technology and maximum use of internet various tool and techniques have been developed to make the recruitment and selection process online. Many research have been made to prove its effectiveness but the implementation is still less. There is as huge scope for companies to shift their recruitment and selection process online over traditional recruitment. This study majorly aims to find the effectiveness of online tools and technologies in recruitment and selection over traditional one. Also the study will give insights on which online tools and technologies are effective and which are not. In all 28 papers were reviewed in order to get the insight of the effectiveness of various online tools and technologies in recruitment and selection process.

Keywords: Recruitment, Selection, Online Tools and technologies, Effectiveness

Introduction and Meaning

Talent attraction is one of the major challenges for HR managers. With the rise of online recruitment channels, the number of applicants for a given job vacancy have increased substantially. In addition, the time taken in finding the right talent from the huge pool of applications has increased significantly, adding up to the hiring cycle. In today's competitive labour market, employers need to highlight their brand image to prospective job-seekers, so that there is higher chance of recruiting the best talent that fits their manpower requirement. Various attempts is made in investigating that to what extent web 2.0 technologies such as podcasts, blogs and online employee testimonials may enhance the employer's brand value in the eyes of employed professionals.

By definition, we can say that recruitment tools help in automating and streamlining the process of hiring. This can be done in four stages of recruitment and selection that is 1st: Attracting candidates, 2nd: screening candidates, 3rd: sorting candidates and conducting interviews, and 4th: closing the deal.

Research Methodology

Research Topic

“A Study on effectiveness of online tools and technologies in Recruitment and Selection”

Research Objective

The main objective of the study is

- To identify various online tools and technologies used in recruitment and selection process.
- To identify the key challenges and advantages faced by recruiter and candidates during e-recruitment.
- To identify scope of implementing e-recruitment and selection over traditional recruitment in future.

Data Interpretation and Analysis

The interpretations are listed here along with tables and write-up in the following sequence:

- Research on online recruitment and selection process in companies
- Overall analysis
- Analysis about different tools and technologies used and its effectiveness in online recruitment and selection of any company.

Data Collection Instrument: Total 29 Research Paper consists of different factors which gives different view on online recruitment and selection process.

Literature Review

1. Blacksmith N. (2014) in her research on Three Ways Social Media and Technology have changed the world concluded that 83% of the organizations are using social media as a part of the recruitment process. She also concluded that LinkedIn is the top choice for most recruiters but Facebook and Twitter are used as well.
2. Khillare P. and Shirsale S.(2017) in their research on A Conceptual Framework of E-Recruitment in Current Business Scenario concluded that a very little research has been done on the entire field of e-recruitment due to vast amount of gap to apply the current knowledge. The research mainly focused on applicant's desirability, reflection and awareness of organizations' corporate career websites.
3. Alghamdi B. and Alhardy F. (2019) in their research on An Intelligent Model for Online Recruitment Fraud Detection used two data mining algorithms Support Vector Machine for feature selections and Random Forest for classification. The research concluded that major online recruitment frauds consist of email spam phishing and Cyber Bullying.

4. Faliagka E., Ramantas K. and Tsakalidis A. (2012) in their research on Application of Machine Learning Algorithms to an online Recruitment system developed an algorithm which extracted information from Candidate's LinkedIn Profile and also their social media presence and scores were assigned based on their personality traits. The approach was effective in online recruitment system application.
5. Ramkumar A. (2018) in his paper A Conceptual Study on How Electronic Recruitment Tools Simplify the Hiring Process concluded that automated tools increases the effectiveness of recruitment process and also shortens time taken for candidate sourcing, applicant tracking and selection and onboarding.
6. Vetrakova M. and Hitka M.(2018) in their research on Corporate Sustainability in the process of Employee Recruitment through Social Networks in conditions of Solvak SMEs concluded that traditional recruitment is tedious and less flexible. The candidates in Slovakia mainly use Facebook and YouTube as recruiting tool unlike foreign countries that use MySpace and Google+. The benefits of involving social media in recruiting are their availability, attractiveness, addressing the target group, rapid exchange of information and also time and cost savings in finding new employees.
7. Derous E. and Fruyt F. (2016) in their article Developments in Recruitment and Selection Research said that technological advancements reshape the recruitment and selection practices with the help of multimedia tools (like mobile testing, video resume, use of LinkedIn etc.) and the use of online applicant tracking systems (as part of human resource information systems) that might increase the efficiency of the recruitment and assessment process to both recruiters and applicants. Although some multimedia applications like social networking websites, unproctored/mobile testing, and video resumes are increasingly used by applicants and practitioners, research is somewhat lagging behind as still not that much is known about the properties and efficacy of several technology- enhanced assessments compared to the more traditional recruitment and assessment tools.
8. Frampton G., Shepherd J., Pickett K., Giffiths G. (2020) in their research Digital Tools for the recruitment and retention of participants in randomized controlled trials: a systematic map concluded that digital techniques like social networking, data mining, email, and text messaging may enhance recruitment, but there isn't a comprehensive review of the evidence. The most often researched digital recruiting

tools are social media, websites, email, and radio and television. The majority of research looked at effectiveness (cost per recruited participant), but few looked at how people felt about using digital tools.

9. Rosoiu O. and Popescu C. (2016) in their research E-recruiting platforms: Features that Influence the Efficiency of Online Recruitment Systems took 20 active e-recruitment platforms for their study and narrowed down to 5 most impressive ones for their outstanding features and tool efficiency namely: e-jobs, hipo, bestjobs, LinkedIn, Freelancer. The most efficient and highly used is LinkedIn. Some of the features preferences that were analyzed were User Interface, Exposure, Free features and notifications.
10. Barber L. (2006) in her research e-recruitment developments concluded that organizations mostly focus at the front end of the recruitment process rather than use of internet as an intelligent device. Most of them use it for providing and promoting information about the company, advertise positions and receive CVs electronically, very few actually use it to search, screen or test candidates.
11. Boscai B. (2017) in his research The evolution of E-Recruitment: The introduction of online recruiter concluded that virtual recruitment environment includes company website that can be used in recruitment process, social networks and professional recruitment sites. Online recruiters are required to have certain qualifications that traditional recruiters didn't have such as database management, skills and web designer abilities, qualifications and skills to use and select the appropriate software in order to solve specific recruitment problems, etc. Also he studied that analytical methods should be used for online recruitment tools to get most talented people with minimal resources.
12. Berg A., Giest S., Groeneveld S. and Kraaij W. (2020) in their research Inclusivity in Online Platforms: Recruitment strategies for improving participation of Diverse Sociodemographic Groups concluded that there is no difference between men and women in an online participation platform, age is predictor of online participation; younger and older age group tend less to use online platforms, carefully crafted communication messages can influence the inclusivity of participants and behavioral experiments can be used to find out which messages are effective for particular subgroups of the population.

13. Hamilton R. and Bowers B. (2006) in their research Internet recruitment and E-mail interviews in Qualitative studies concluded that compared to traditional interviews such as face to face or phone interviews, e-mail interviews are not that successful. Personality questionnaires either filled web based or pen and paper there is no difference in terms of mean scores or scale reliability. He also suggested that participants in e-mail interview are more likely to wander off the topic than in real time interviews.
14. Hada B. and Gairola S. (2015) in their paper Opportunities and Challenges of E-recruitment listed out some of the important Opportunities as Employers perspective: wider scope, time saving, cost saving, advertising benefits, keywords make search easier, better match of candidates; Job Seekers perspective: easy to apply, specific search of jobs, large number of opportunities, wider geographic search, quick responses whereas Challenges were Employers perspective: fake profiles, high fees for access, casual attitudes of job seekers, lack of personal touch, use of internet may not be priority for all job seekers; Job Seekers perspective: impersonal, privacy issues, outdated job posting, no response from company, not suitable for all types of jobs.
15. Dalessandro C. (2018) in his article Recruitment tools for Reaching Millennial: The Digital difference studied that electronic advertisements would be more effective over physical advertisement to attract millennials due to usage of internet.
16. Ibrahim W. and Hassan R. (2019) in their research Recruitment Trends in the Era of Industry 4.0 using Artificial Intelligence: Pro and Cons suggested that AI is expected to replace 16% of HR jobs in next 10 years. AI trend in recruitment is yet emerging as job seekers are mainly millennial and they are into Internet of Things where social media are part of their life. Also Applicants with tertiary education is very common nowadays compared to 80s so to select a right candidate technology would be of a great help.
17. Aggerholm H. and Andersen S. (2018) in their paper Social Media Recruitment 3.0 distinguished recruitment strategy between Web 1.0, Web 2.0 and Web 3.0. They concluded that there was paradigm shift in all of the 3. Web 1.0 mainly focused on distributing recruitment messages and new ways of reaching potential employees. Web 2.0 usage focused on employer to reach potential employees and create basic forms of meaningful interactions. Web 3.0 the recruitment communication focused on job competencies, potential employee outside employment related context,

employment messages merged into private and social communities and values and relations of an online community.

18. Nikolaou I. (2021) in his research What is the Role of Technology in Recruitment and Selection studied four stages of recruitment and selection process and usage of online tools in it. 1st stage: Attraction Stage- Social Networking Sites attract candidates; 2nd Stage: Screening- Cybervetting and Applicant Tracking System; 3rd Stage: Employee Selection- Asynchronous/Digital Interview and Gamification/ Games- based Assessment; 4th Stage: Technological Developments in on-boarding and socialization- Specialized company apps, online training, e-monitoring, intranet resembling social media sites.
19. Hirsch L., Thompson K. and Every D. (2012) in their research from computer to commuter: Considerations for the use of social networking sites for participant recruitment. They mentioned some of the major challenges of recruitment such as computer literacy, Authenticity of research participant, trust, engaging lurkers, researcher safety.
20. Chitra C. and Kalaiselvi K. (2019) in their paper current scenario of e-recruitment in India described various online tools and platforms used for online recruitment such as Career Websites: Naukri, Indeed, Timesjobs, Monster etc.; Job Boards: Monster and Career Builder; Social Media: LinkedIn and Facebook; Use of Search Engines: databases of resumes, online communities and social networks.
21. Unadkat P. (2012) in her paper Need of E-recruitment strategies in emerging scenario interpreted that total recruitment cost per employee is least through internet followed by campus recruitment, job fair, newspaper and head hunters. 2 of the major e-recruitment involves: use of job portals and online career option in organization's website. Currently e-recruitment strategies used are blogs, online testing, broadband and social networking.
22. Shukla M. and Chandiok S. (2011) in their study of E-recruitment in India with special reference to Infosys analyzed that e-recruitment rank first in Infosys recruitment methods followed by campus recruitment, Internal Reference, Placement Agency and Newspaper. They also analyzed that e-recruitment is highly effective for posting jobs and getting qualified candidates as it will also draw passive job seekers.
23. Jain A. and Goyal A. (2014) in their paper e-recruitment and e-HRM challenges in the flat world: A case of Indian Banking Industry (with special reference to ICICI bank,

jaipur) concluded that 40% of job seekers in India found their jobs through Online data, 22% through recruiter, 13% through word of mouth and 9% through newspaper and remaining through other ways. E-recruitment depends on many factors such as quality people, quick response time and database management. ICICI also highly promotes e-recruitment.

24. Ganesan S. and Selvaraj P. (2011) in their paper a study on e-recruitment practices of HRM in organizations at Chennai, India suggested that e-recruitment can only be effective only with standardized format, global access facility and cycle time reduction. They also concluded that e-recruitment is considered as a very good to reach global target. Also they concluded that other than language barriers there is no boundaries for online recruitment.
25. Sayyad S. and Bhingardive S. (2019) in their research Resume extractor and candidate recruitment system using online test and SMTP studied that automated keyword extraction method can be used to develop algorithms. They have used Naïve Bayes Classifier which is based on Bayes Theorem to develop classification algorithms.
26. Lad D. and Das S. (2107) in their paper E-recruitment process with use of business process modeling concluded that online recruitment is effective in terms of saving recruitment cost, reducing time to hire and helping companies develop competitive edge, market image and attracting skilled candidates.
27. Ali S. and Foreman J. (2020) in their paper Social media as recruitment platform for a nationwide online survey of Covid-19 in the US studied that Facebook, social media is an effective tool for recruitment in Covid-19. Facebook based recruitment was effective due to reduced costs, shortening recruitment periods and enhancing representativeness of target populations.
28. [Simone A. Bernstein, MD](#) ; [Alex Gu, MD](#) ; [Katherine C. Chretien, MD](#) ; [Jessica A. Gold](#) (2020) in their research Graduate Medical Education Virtual Interviews and Recruitment in the Era of COVID-19 concluded that with the COVID-19 pandemic it is necessary to have a transition to virtual interviews, virtual recruitment which may lead to new practices and opportunities that last beyond the pandemic. The interview season will be most successful by ensuring known benefits of in person interviews through innovative interview and recruitment strategies. There is also requirement to improve program websites, create virtual video tours, and increase the use of social media by programs.

29. Pun, Monika (2018) in her thesis Assessing the Significance of Social Media in Recruitment among Indian IT Firms found that Social media is used for building professional networks, in getting high quality candidates, LinkedIn is the most valued social networking website, present different innovations like patents and publications.

Analysis of the Papers Reviewed

Paper	Problem Statement	Findings
Nikki Blacksmith (2014)	Three Ways Social Media and Technology have changed the world	Eight-three percent of organizations are now using social media as part of their recruitment process. Although LinkedIn is the network of choice for recruiters, Facebook and Twitter are used as well. This article discusses three ways social media and technology has begun to evolve the recruitment process and the role of the recruiter, followed by some potential research avenues to better understand the transformation.
Prakash Yadao, Khillare and Smita Kashinath Shirsale (2017)	A Conceptual Framework of E-Recruitment in Current Business Scenario	Recruitment is the method of searching and hiring the best-qualified aspirant from inside or outer side of a business for a job opening, in a timely and cost effective manner. The recruitment method includes analyzing the necessities of a work, attracting employees to that job, screening and selecting applicants, hiring, and integrating the new employee to the organization. So far since its opening online recruitment has come a long way and has become the latest inclination in HR processes. Human resource is the most important resource for any organization in any sector. The use of internet has altered the overall process of recruitment. Many

		<p>organizations have already employed e-recruitment processes for posting jobs and accepting resumes on internet and corresponding with applicants through e-mails. This paper aims to discuss the concept, nature, problems, benefits, methods and trends and conditions for good electronic recruitment.</p>
<p>Bandar Alghamdi and Fahad Alhardy (2019)</p>	<p>An Intelligent Model for Online Recruitment Fraud Detection</p>	<p>This study research attempts to prohibit privacy and loss of money for individuals and organization by creating a reliable model which can detect the fraud exposure in the online recruitment environments. This research presents a major contribution represented in a reliable detection model using ensemble approach based on Random forest classifier to detect Online Recruitment Fraud (ORF). The detection of Online Recruitment Fraud is characterized by other types of electronic fraud detection by its modern and the scarcity of studies on this concept. The researcher proposed the detection model to achieve the objectives of this study. For feature selection, support vector machine method is used and for classification and detection, ensemble classifier using Random Forest is employed. A freely available dataset called Employment Scam Aegean Dataset (EMSCAD) is used to apply the model. Pre-processing step had been applied before the selection and classification</p>

		adoptions. The results showed an obtained accuracy of 97.41%. Further, the findings presented the main features and important factors in detection purpose include having a company profile feature, having a company logo feature and an industry feature.
Evanthia Faliagka, Kostas Ramantas, Anthanasios Tsakalidis (2012)	Application of Machine Learning Algorithms to an online Recruitment system	In this work, a novel approach is presented for evaluating job applicants in online recruitment systems, leveraging machine learning algorithms to solve the candidate ranking problem. An application of our approach is implemented in the form of a prototype system, whose functionality is showcased and evaluated in a real-world recruitment scenario. The proposed system extracts a set of objective criteria from the applicants' LinkedIn profile, and infers their personality characteristics using linguistic analysis on their blog posts. Our system was found to perform consistently compared to human recruiters; thus, it can be trusted for the automation of applicant ranking and personality mining.
Ramkumar (2018)	A. A Conceptual Study on How Electronic Recruitment Tools Simplify the Hiring Process	In this paper its been said that using automated tools not only helps in making the recruitment process effective, but it also shortens the time taken to complete candidate sourcing, applicant tracking, and selection and on boarding. ⁵ The recruitment is a costly process as it includes the salaries of recruiters, time spent by the management, cost of advertisement, cost of

		selection, a price paid for the overtime and outsourcing in case the vacancy remains unfilled. Thus, a firm is required to gather all these relevant information to evaluate the performance of a recruitment process effectively.
Ramkumar (2018)	A.E-Recruitment through Job Portals and Social Media Network: Challenges and Opportunities	In this paper its been noted that E-recruitment is about cultural and behavioral change, both within HR and at line management level. From their evidence, they suggest that for e-recruitment to deliver, it is about developing the capability of HR to facilitate the system and to view the staffing process as an end-to-end process, similar to that of a supply chain.
Milota Vetkova, Milos Hitka (2018)	Corporate Sustainability in the process of Employee Recruitment through Social Networks in conditions of Solvaks SMEs	The results of social networking research in SMEs in Slovakia and especially their use in the process of recruiting employees. A total of 324 enterprises with domestic and foreign capital share participated in the sociological questionnaire. The results have shown that enterprises with foreign capital share are more progressive in using the Internet to offer jobs and in gaining information on jobseekers through social networks.
Eva Derous and Filip De Fruyt (2016)	Developments in Recruitment and Selection Research	The key message here is that the area of R&S is rapidly evolving, affecting a broad range of topics in searching, attracting, and assessing talented workers, that warrants close monitoring and examination. The ENESER network aims to address, discuss, and study such developments among

		scholars and practitioners. More work has yet to be done and will be done, for instance, at the fourth ENESER meeting in Amsterdam (Spring 2016), which will also be held under the auspices of EAWOP.
Geoff K Frampton, Jonathan Shepherd, Karen Pickett, Gareth Giffiths (2020)	Digital Tools for the recruitment and retention of participants in randomized controlled trials: a systematic map	In the last ten years, there have been twice as many studies published on digital tools, yet most of them focused on recruitment rather than retention. The primary areas of health that were examined were cancer, circulatory system illnesses, mental health, and health promotion. The majority of studies were observational, and only few of them focused on minorities or underserved communities. Social media, websites, email, and television/radio for recruiting, and email and text messaging for retention, were the digital technologies that were most commonly investigated. Only a small number of research have examined people's attitudes regarding the use of digital tools, although one-fourth of studies analysed efficiency (cost per recruited or retained participant).
Ondina Rosoiu and Cristain Popescu (2016)	E-recruiting platforms: Features that Influence the Efficiency of Online Recruitment Systems	The users that use online recruiting platforms due to the fact that 95% of the respondents have used the e-recruiting manner at least once. The youth is more attracted by the online recruitment and uses it more often than the elder people. This is due to the fact that young people are looking for new jobs and because they are in constant changes to find the best job for

		them. Opus young people, older people already have steady employment and seniority in the respective field.
Linda Barber (2006)	E-recruitment developments	Seven key messages who wants to adopt online recruitment: consult with stakeholders, consider the value of investing in integrated HR and recruitment systems, making application easier, improve selection, evaluate and measure, gather candidate feedback and make effective sourcing decisions.
Beniamin G Boscai (2017)	The evolution of E-Recruitment: The introduction of online recruiter	The shaping of new jobs as "online recruiter," which besides the fact that he has new tasks and responsibilities, he must possess certain qualifications that traditional recruiter does not have. These qualifications might be for database management, skills and web designer abilities, qualifications and skills to use and select the appropriate softwear in order to solve specific recruitment problems, etc. It is necessary to built analytical methods for online recruitment tools, so that online recruiter can choose the tools that attract the most talented people with minimal resources. Online recruitment methods can be improved by increasing the corporate career site traffic, by using a back-office system, creating a talent pool and an employer branding with a lot of specific information available to future job candidates.
Annelieke Berg,	Inclusivity in Online	Governments are increasingly

Sarah Giest, Sandra Groeneveld and Wessel Kraaij (2020)	Platforms: Recruitment strategies for improving participation of Diverse Sociodemographic Groups	implementing smart and digital approaches to promoting citizen participation. However, whether online participation platforms are tools that improve inclusivity of citizen participation remains underexplored. To address this gap, this article focuses on the role of recruitment messages and their effect on participation in an online participation platform by gender and age. A field experiment with a neighborhood census sample (N = 6,066) shows that online participation dips for younger and older citizens and is equal among women and men. For the age groups between 60 and 75, differences in the control and intervention recruitment messages significantly impacted participation. These findings can help public managers tailor recruitment strategies to facilitate inclusive participation and represent a first step toward learning what types of messages are effective for whom.
Rebekah Hamilton and Barbara Bowers (2006)	Internet recruitment and E-mail interviews in Qualitative studies	The author discusses appropriateness, adequacy, representativeness, sample bias, data fraud, timing, eliminating the need for transcription, oral versus written communication, reliability and validity, and ethical considerations. They also discuss flexibility and consistency in interviewing. They also offer some useful recommendations for a research plan for a qualitative study that uses email interviews

		in addition to Internet recruitment.
Hada B. and Gairola S. (2015)	Opportunities and Challenges of E-recruitment	E-Recruitment helps organizations to be equipped with competent staff and thus it is linked with many HR activities of organization. E-Recruitment has proved to be important part of the recruitment strategy. It can be used to keep track and maintain candidate applications, mostly among larger organizations. Opportunities as Employers perspective: wider scope, time saving, cost saving, advertising benefits, keywords make search easier, better match of candidates; Job Seekers perspective: easy to apply, specific search of jobs, large number of opportunities, wider geographic search, quick responses whereas Challenges were Employers perspective: fake profiles, high fees for access, casual attitudes of job seekers, lack of personal touch, use of internet may not be priority for all job seekers; Job Seekers perspective: impersonal, privacy issues, outdated job posting, no response from company, not suitable for all types of jobs.
Dalessandro (2018)	C. Recruitment tools for Reaching Millennial: The Digital difference	Because of U.S. millennials' social worlds are increasingly intertwined with digital technologies, this group of young people search for a range of opportunities and experiences primarily using digital means. Therefore, in order to recruit millennial participants in the United States most

		successfully, social researchers should consider using digital technologies.
Ibrahim W. and Hassan R. (2019)	Recruitment Trends in the Era of Industry 4.0 using Artificial Intelligence: Pro and Cons	Undercover Recruiter, a recruiting and talent acquisition blog suggest that AI is expected to replace 16% of HR jobs within the next 10 years. One of the emerging use of AI is in the recruitment process. AI can helps HR managers to perform recruitment more efficient especially when selecting the best talent available for their organization. In Industry 4.0, the concept of Internet of Things (IoT) is very popular. Currently, submitting hardcopy forms and resumes were replaced by application of online forms or via job portals. HR Managers may also do headhunting of talents using online portals such as LinkedIn, a business and employment-oriented service that operates via websites and mobile apps. This way of recruitment process will be much smoother with the help of AI technology.
Aggerholm H. and Andersen S. (2018)	Social Media Recruitment 3.0	The study points toward a fundamental new approach to recruitment communication. The application of a Web 3.0 strategy entails what we term an open source recruitment strategy and a redirection of employee focus from work life to private life. These insights point toward ontologically challenging the basic assumptions of employees, work life and the employing organization.
Nikolaou I. (2021)	What is the Role of Technology in	Author discussed examples of technological developments across the four

	Recruitment and Selection	stages of the recruitment and selection process. In the attraction stage we discuss how on-line/internet recruitment and especially social networking websites have changed dramatically the focus of attracting candidates effectively. In the next stage of screening, we discuss how cybervetting and applicant tracking systems offer opportunities but also threats for recruiters and candidates. In the third stage of employee selection, we focus especially on two new selection methods; the asynchronous/digital interview and gamification/games-based assessment, along with the critical role and impact applicant reactions have on the selection process. Finally, we briefly discuss the main technological developments in on-boarding and socialization, and we conclude with a few suggestions for future research in this field.
Tyagi A (2012)	Effective talent Acquisition through e-recruitment	Current Trends in e-recruitment are online ads, speedy communication, candidate's preference, e-mail job alerts, RSS feed, Web 2.0 social networking.
Hirsch L., Thompson K. and Every D. (2014)	Computer to commuter: Considerations for the use of social networking sites for participant recruitment.	Benefits of e-recruitment are engaging hard to reach populations, high rate of participation, limited of pseudo names, researcher and participant safety; Whereas Limitations of e-recruitment are overuse of website for research, limited access to lower socio-economic participants, power

		imbalance, different values.
Chitra C. and Kalaiselvi K. (2019)	Current scenario of e-recruitment in India	Current Recruiting tools and technologies are Career Websites, Job Boards, Social Media, Use of search engines.
Unadkat P. (2012)	Need of recruitment strategies in emerging scenario	New age recruitment strategies are blogs, online testing, broadband and social networking
Shukla M. and Chandiok S. (2011)	E-recruitment in India with special reference to Infosys	Using the power of Internet to achieve HR goals not only increases productivity but also saves time and money to give a competitive advantage. The plus point are posting jobs online can cost less than half as much as Sunday newspaper postings and far less than employment agency fees. Online ads can be longer, more descriptive, written any time of the day or night, and posted almost immediately. For employers, online recruiting allows far better targeting of candidates than does advertising in general newspapers, resulting in a greater percentage of qualified applicants. In addition, because 24/7 online job hunting is private and convenient, your company's Internet presence is more likely to draw in "passive job seekers" high-quality candidates who may be curious to know what's out there but who have not launched all -out campaigns. As online recruitment sites continue to multiply in numbers these 'value -added' services may well prove crucial to their long time survival.
Jain A. and Goyal A.	E-recruitment and e-	Sources of e-recruitment: Job portals;

(2014)	HRM challenges in the flat world: A case of Indian Banking Industry (with special reference to ICICI bank, Jaipur)	relevance of profile is main factor in selecting a job portal; they have a clearly defined recruitment policy, quality of e-recruitment is based on their database management; ICICI majorly promotes e-recruitment
Ganesan S. and Selvaraj P. (2011)	E-recruitment practices of HRM in organizations at Chennai, India	The ranking factors of e-recruitment as per HR executive are: Cost saving, reduction of time, standardized format, remote candidate access any time, without any intermediaries; Non Hr executive are: Saving expenses, cycle time reduction, global access opportunity, standardized format, no intermediaries
Sayyad S. and Bhingardive S. (2019)	Resume extractor and candidate recruitment system using online test and SMTP	Here they are providing a unique system which is robust enough to automatically extract the resume content and store it in a structure form within the Data Base. This system will make the task of both candidate and HR Manager easier and faster. This system avoids the hectic form filling procedure of the candidates by directly asking the user to upload only the resume. The HR Manager also just needs to fill his/her criteria instead of manually going through all the resumes.
Lad D. and Das S. (2107)	E-recruitment process with use of business process modeling	It has been investigated that internet recruitment and selection are effective in terms of saving recruitment cost, reducing time to hire and helping companies in developing competitive edge, market image and attracting right skilled candidates.

		Online recruitment is also effective in terms of managing talent process that is also considered effective. It has been investigated that e-recruitment will likely to grow in coming years.
Ali S. and Foreman J. (2020)	Social media as recruitment platform for a nationwide online survey of Covid-19 in the US	The advertisements cumulatively reached 236,017 individuals and resulted in 9609 clicks (4.07% reach). Total cost of the advertisement was \$906, resulting in costs of \$0.09 per click and \$0.18 per full response (completed surveys). Implementation of the male-only advertisement improved the cumulative percentage of male respondents from approximately 20 to 40%.
Simone A. Bernstein, MD ; Alex Gu, MD ; Katherine C. Chretien, MD ; Jessica A. Gold (2020)	Graduate Medical Education Virtual Interviews and Recruitment in the Era of COVID-19	Virtual Recruitment strategies: Social media, webinar, websites and recruitment boxes
Punn, Monika	Assessing the Significance of Social Media in Recruitment among Indian IT Firms	Social media is used for building professional networks, in getting high quality candidates, LinkedIn is the most valued social networking website, present different innovations like patents and publications

SCOPE OF THE STUDY

Study will be helpful to HR managers, Branch managers, and officers at a large. The organisation and HR Managers will be able to know that which are the different online tools

and technologies used in recruitment and selection process and are they effective enough in implementing them in the organization.

Research Limitations

The limitations of the study are as follow:

- Taken and cover only 29 research papers and 29 literature reviews.
- Research Papers which were used as source of data those are vary from each other in terms of many geographical contexts.
- Majority of the researches worked on different online tools and technologies used in recruitment and selection process only.

Conclusion

Empirical results and analysis lead to give more in-depth insight in which are the different online tools and technologies used for recruitment and selection and are they effective enough. Many researches has been done on e-recruitment and is considered effective compared to traditional one but implementation of it is very less so which are the different challenges in implementation, research is not much done. E-recruitment and selection is majorly used in 1st and 2nd stages majorly that is attracting and screening candidates but still later stages of recruitment that is taking tests and sorting out candidates with online tools, research is very rare. Again we may also say that many companies have implemented online recruitment but online selection process is yet not much in the companies. There is much scope for developing algorithms and making the recruitment and selection process fully online but research on that is not much done.

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Role of HR Analytics in Improving Employer Branding Strategies: A Theoretical Paper

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Abstract

Purpose: The purpose of this theoretical paper is to understand the role of HR analytics in improving the employer branding strategies in order to attract and retain the best talents. An organised and systematic collection and application of talent data and its study can be turned into employer branding strategies which can be helpful in improving the business outcomes.

Design/methodology: The approach taken involves reviewing academic journals and books from different subjects. The insights from different authors have been referred to in order to add meaning to this theoretical paper thereby proposing a systematic approach of HR analytics to improve the employer branding strategies.

Research implication: To gain competitive advantage, small and medium scale organisations can get some aid to improve their employer branding strategies using different HR analytics.

Originality/value: The originality of the paper is that it shows a systematic approach of using HR analytics to improve employer branding strategies. The paper can be useful to different HR practitioners to organise their talent data and find out a way to improve their employer branding strategies.

Paper type: Theoretical paper

Keywords: HR analytics, employer branding, organisational attractiveness, talent retention

Introduction

Being a 'desirable employer' in this competitive era is a challenging task for all the organisations. Creating an attractive logo and a fancy brand name does not work today. Different strategies have to be worked upon in order to become a desirable employer. One of those strategies is HR analytics which includes statistics, research design, identifying meaningful questions, using appropriate data to answer those questions, applying scientific standards to evaluate the results and translating the results into a meaningful language that is useful for the organization [1]. Analytics is mental framework, it is a logical progression supported by a set of statistical tools. HR analytics is a communication tool that brings together the data from disparate sources such as surveys and operations from different levels, to build a cohesive, actionable picture of present conditions and a likely future [2].

Today, managing the HR data has become quite easy due to HR analytics. To forecast the future requirements of the business and also to understand the current roles and responsibilities of the workforce, HR analytics act as an assisting tool.

Meaning of the terms

HR Analytics: The collection and application of talent data to improve critical talent and business outcomes is known as HR analytics or also known as people analytics [3]. To evaluate employees' qualitative as well quantitative data, HR analytics turns out to be very helpful. Data driven decision making is more accurate than just merely deciding on the gut feelings. HR analytics is a link between the HR department and the business goals.

Using different software and methods with the help of HR metrics, the business can align their goals with the human capital and its outcomes. HR analytics provides reliable and justifiable results that can be then linked with the business goals to get better outcomes in future. HR analytics is very helpful to the business as it helps in predicting the future requirements of human resources, helps the HR department to align the human resources optimally to the business goals, helps to improve the overall organisational performance and thus adds to the successful growth of the business [4].

Employer Branding: First introduced by Tim Ambler and Simon Barrow [5], the term 'Employer Brand' was defined as 'the package of functional, economic and psychological benefits provided by employment and identified with the employing company'. Ambler and Barrow carried out an exploratory research testing the application of brand management

techniques to human resource management thereby defining the concept of 'Employer Brand' bringing a close alignment between marketing and HR practices.

Employer branding involves identifying the unique 'employment experience' by considering the totality of both tangible and intangible reward features that the organisation offers to its employees [6]. Employer branding has a strong influence on the profitability of the company. Employees' positive perception about their employer would turn out to be beneficial for creating stronger employer brand.

Organisational attractiveness: Organisational attractiveness or also called employer attractiveness can be defined as a set of benefits an individual experiences while working in a particular organisation. Traditionally, different job and company attributes have been considered as the major determinants of organisational attractiveness viz. salary, location, size and type of organisation. An applicant's perception of what is expected in a particular work role is regarded as job attributes whereas a broader category of attributes such as company policies, working conditions and work practices are considered company attributes [7].

Another author says that organisational attractiveness is the degree to which an individual would personally wish to seek a company as his/her employer. It the degree to which an individual would recommend the company as an employer to others [8].

Objectives

The objectives of this theoretical paper are as mentioned:

- To understand the role of HR analytics in improving the employer branding strategies in order to attract and retain the best talents
- To propose a systematic approach of HR analytics to improve employer branding strategies through the reviewed literature
- To suggest few ways how HR analytics can improve employer branding strategies based on the reviewed literature

Types of Human Resource Analytics (HRA)

Studies about HR analytics is yet in its infancy stage [9]. Yet a lot of practical approach is needed to study more about HR analytics in organisation. Following are the types of HRA:

Descriptive analytics: Gaining insight into the past to gather raw historical data with the help of different statistical tools is basically descriptive analytics. It focuses on the past data to understand 'what' happened and does not predict the future. Descriptive analytics can help

the organisations to form a strategic pattern keeping in mind the past records for future decision making. Understanding mainly what already happened in the organisation, it helps to find the business insights behind the procured data and the reports can help to find the underlying reasons behind the occurrence of those events in the past [10].

Diagnostic analytics: Diagnostic analytics takes the descriptive analytics a step ahead as it provides detailed explanation for what has happened in the past. Basically, diagnostic analytics provides a more summarised picture in understandable terms. It is about asking ‘why’ behind different data trends, correlations and abnormalities [11].

Predictive analytics: Using different statistical methods and quantitative analysis techniques, prediction can be done based on the people related information in the organisation. Using these methods, we can predict things such as what might drive high performance or what are the reasons for higher turnover rate. At given certain conditions, when appropriate, we can also use these predictive models to make tangible predictions about certain results or outcomes [12].

Prescriptive analytics: Related to causal analysis, prescriptive analytics uses optimisation and stimulation to identify the best alternative to maximise or minimise some objective [13].

Methodology

In this theoretical paper, a comprehensive literature review has been carried out in order to understand the unfolding of the concept of HR analytics and its adaptation in the firms in the recent years. 13 out of the 15 mentioned reviews here are from the years 2015 – 2022. With the help of Google Scholar, review of different scholarly journal articles have been done as shown in Table 1 below. While majority of the journals mentioned here are from Emerald publishing, the remaining journals are from Elsevier, Taylor and Francis, Science Press and Springer. Articles from these quality journals were referred to for this comprehensive literature review. Thereafter, discussions and a systematic approach of HR analytics to improve employer branding strategies have been mentioned.

Title of the study	Authors/ Year	Main discussion	Journal name

Harnessing the power of HR analytics	[1] (Levenson, 2005)	The authors outline two tasks: (i) building HR analytics centre of expertise (HR-ACE) (ii) building foundation of skills for HR leaders, generalists and non-analytical functional experts to better understand and utilise the skills of HR analytical leaders. Harnessing these two tasks are important to add strategic value to the organisation.	Strategic HR Review
Maximizing the Impact and Effectiveness of HR Analytics to Drive Business Outcomes	[14] (Mondore et al., n.d.)	Reconsidering talent can help the organization to avoid missing opportunities of missing out some talents that were overlooked. Improving the employee engagement score or increasing the participation rates on their initiatives can be helpful.	People and Strategy
Learning from practice: how HR analytics avoids being a management fad	[15] (Rasmussen & Ulrich, 2015)	HR analytics is becoming a management fad. In any organization, the best starting point of HR analytics is about focusing on the major 3 to 5 big challenges the organization might face in the coming years. HR analytics provide inputs while discussing about management decisions which can elevate the decision quality but there are only rare chances that these data and analyses turns into action. Hence more practical approach is needed.	Organizational Dynamics
HR Analytics as a Strategic Workforce Planning	[16] (Momin & Mishra, n.d.)	HR analytics plays a crucial role in designing a sound HR policy. HR analytics is a vital part in strategic planning of an organization. A proper	International Journal of Applied Research

		strategic plan with the help of HR analytics will reduce attrition rates, mitigate risks and build a value added training culture for the organisation.	
HR and analytics: why HR is set to fail the big data challenge	[17] (Angrave et al., 2016)	The HR function is yet lagging behind the other functional areas of the organization. Many in the HR team does not understand analytics while the ones in the analytics team does not understand HR. Due to this, the costly analytics capabilities provided by the HRIS fails to deliver strategic HR analytics results.	Human Resource Management Journal
‘HR Analytics’ - An Effective Evidence Based HRM Tool	[18] (Keerthi, 2016)	The decision making in HR related issues mostly depend on trust and relationships unlike the decisions taken in other departments. The concept of evidence based HRM with its effective HR analytical tools strengthens the accurate decision making power in the organisation.	International Journal of Business and Management Invention
An evidence-based review of HR Analytics	[9] (Marler & Boudreau, 2017)	Integrative synthesis of published peer reviewed literature on HR analysis was conducted where it was found that evidence about HR analytics is yet at its infancy stage. Out of the original sample of 60 articles chosen, 14 articles were taken for the study after calculative categorisation. Majority of the articles were non-quantitative empirical studies. Therefore, the authors suggest that additional research and knowledge needs to be added in the topic of HR analytics	The International Journal of Human Resource Management

The rise (and fall?) of HR analytics: a study into the future application, value, structure, and system support	[19] (van den Heuvel & Bondarouk, 2017)	By 2025, HR analytics will probably be driven by emphasis on integration. The integration of HR data with sales, marketing, IT, finance and social media is anticipated. A centralised analytics function may very well be established by 2025.	Journal of Organizational Effectiveness: People and Performance
Big data and HR analytics in the digital era	[20] (Dahlbom et al., 2019)	Data concerning workforce are numerous and hence it is challenging to make an impact on business related decision making. Access to appropriate and meaningful data is needed and for this HR analytics play a major role. The results indicate that both technical and human obstacles, operating with very basic HR processes and traditional information systems and poor data quality, hinder adoption of advanced HRA.	Baltic Journal of Management
HR analytics in Business: Role, Opportunities, and Challenges of Using It	[4] (Tomar & Gaur, 2020)	Through the paper, it was analysed that implementation and usage of HR analytics has been challenging as the HR professionals might lack the knowledge and the required skills to use HR analytics. Despite the challenges, if the proper utilisation of HR analytics is done, it can help the business to grow tremendously and it will help the HR department to change from traditional decision making to evidence based statistical decision making.	Journal of Xi'an University of Architecture & Technology

HR Analytics: A Literature Review and New Conceptual Model	[21] (Opatha, 2020)	To make sustainable decisions regarding HR issues, research designs and advanced statistical tools are required and HR analytics is the application of these tools and designs. Analytics ensure that the insights from HR data provides reliable foundations for intelligent human capital decisions.	International Journal of Scientific and Research Publications
Tackling the HR digitalization challenge: key factors and barriers to HR analytics adoption	[13] (Fernandez & Gallardo-Gallardo, 2021)	There is an emerging consensus on what is HR analytics. The authors identified 14 different barriers for HR analytics adoption which they grouped into 4 categories: data and models, software and technology, people and management. Based on these, they proposed set of 14 key factors to help successfully adopt HR analytics in companies.	Competitiveness Review: An International Business Journal
The HR analytics cycle: a seven-step process for building evidence-based and ethical HR analytics capabilities	[22] (Falletta & Combs, 2021)	HR analytics is such a discipline that has lot of definitions given by different people but it lacks emphasis on evidence based practice, ethical practice and the role of broader HR research and experimentation. There are no proper practical models/ frameworks to guide HR practitioners to work upon HR analytics.	Journal of Work-Applied Management
Towards a process-oriented understanding of HR analytics: implementation and application	[23] (Wirges & Neyer, 2022)	Majority of the firms today are in the early stages of using HR analytics. The interviewees in the study emphasised that they do not completely rely on HR analytics but they consider it supportive in decision making. Firms with weaker	Review of Managerial Science

		digitisation have to face challenges while using the HR analytics.	
Human resources analytics: systematization of research topics and directions for future research	[24] A (Margherita, 2022)	It is important for HR analytics projects that they are positioned strategically, focus on business impact with support by key roles and that the right attention is dedicated to effective change management. HR analytics have the potential to bring a great value to decision-making. However, it has often taken an “inside-out,” HR-centric, and academic approach. A shift towards actionable, high-impact analytics is needed, and technology can strongly accelerate such transition to drive organizational agility and operational performance.	Human Resource Management Review

Table 1: Comprehensive literature review**Discussions**

HR analytics is yet at its infancy stage. Majority of the studies done by different authors were qualitative and theory based approach. Practical approach in the study of HR analytics is still not in trend. One of the study mentioned HR analytics to be a management fad. But with the advances in technology, it is important to shift to modern and practical approaches from the traditional approaches. Employer branding can also be strengthened by appropriate use of HR analytics.

One of the most important aspect is to have strong digitisation in organisations for better HR analytics. Another important aspect is the training of the HR professionals to use the HR analytics. It is high time that the organisations start imparting training to the HR employees to use the HR analytics and its related aspects in a proper manner. Evidence based statistical decision making is highly important as talent hiring, retention and other costs related to

people in the organisation has to be managed in a better way for the organisation to function smoothly. A sound HR policy can also be implemented with proper utilisation of HR analytics. Initially, the organisations should focus on the major challenges the organisation faces and try to tackle it with the use of HR analytics. As the employees of HR department learn the use of HR analytics, they can later use it for the betterment of every aspect of the organisation related to the human resource.

Systematic approach of HR analytics to improve employer branding strategies

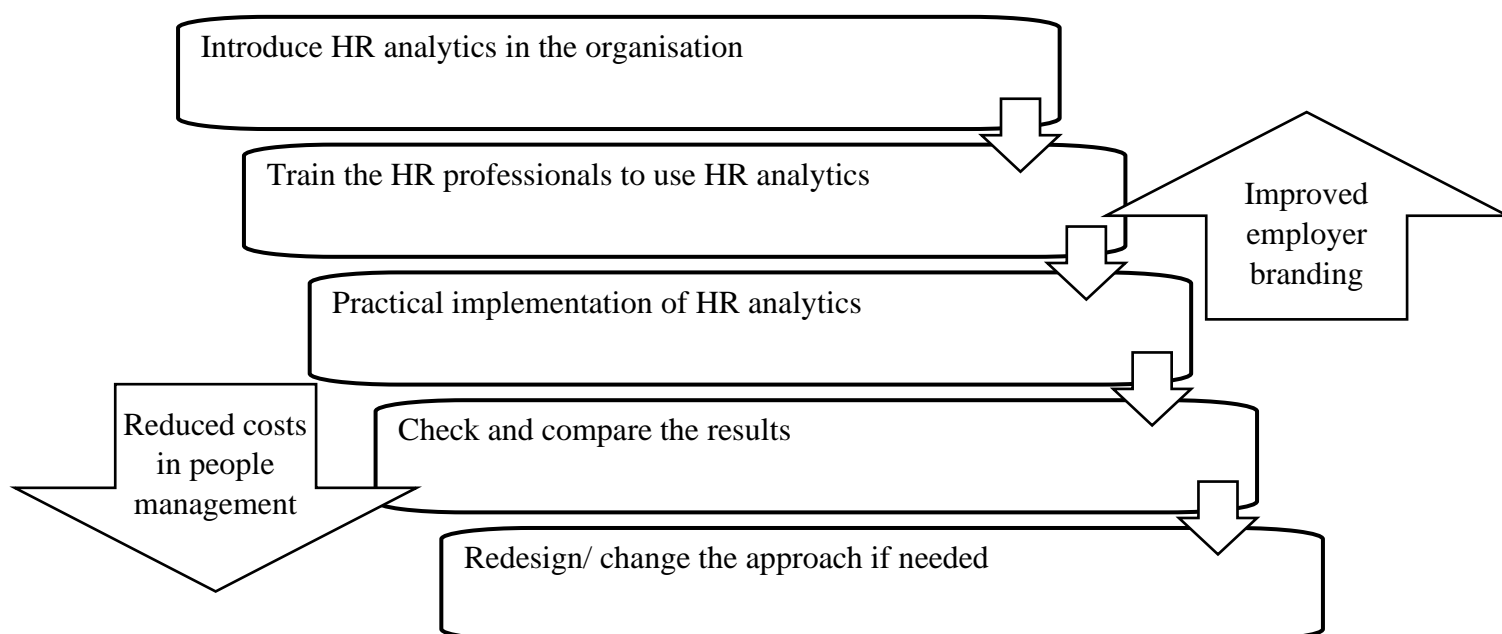


Figure 1: Systematic approach of HR analytics to improve employer branding strategies

1. **Introduce HR analytics in the organisation:** Whether small scale or large scale organisation, it is important to introduce HR analytics in order to improve the results of the organisation. Based on what technologies and digitised systems can be afforded by the organisation, it should start the usage of HR analytics.
2. **Train the HR professionals to use HR analytics:** Once HR analytics is introduced, there should be proper training imparted to the HR professionals of the organisation in order to use the HR analytics so that it can help in cutting the people management costs and help improve the employer branding of the organisation.
3. **Practical implementation of HR analytics:** Once the training is imparted, its implementation is also very important. Where and when to use HR analytics is a strategically important thing.

4. **Check and compare the results:** Once the HR analytics have been practically used, it should be checked for its results. The pre usage and post usage of HR analytics should be compared. If it is giving a positive result then it should be continued.
5. **Redesign/ Change the approach if needed:** If the results do not have much difference or if it is showing a negative result, the accordingly HR analytics should be redesigned and changed. Or else if it functions well, it should be upgraded periodically for the betterment of the organisation.

Different ways HR analytics can improve employer branding strategies on the basis of the reviewed papers are as mentioned:

- This approach can be a helpful strategy in improving the employer brand of the organisation. It will help reduce attrition rates, improve retention, reduce hiring costs and would turn out to be an overall better strategy to strengthen the employer brand of the organisation.
- HR analytics can help in better employee engagement which would help in improving the employer brand of the organisation.
- Investing in the current team's development is one of the key employer branding strategies. Value added training culture in the organisation to impart training of HR analytics to HR employees can uplift the value of the employees which adds to the value of the organisation ultimately uplifting the employer brand.
- To upgrade the HR analytics, better digitisation is needed. With improved digitisation, the employer brand is also upgraded.
- With the proper use of HR analytics, the EVP (Employee Value Proposition) of the organisation also would improve adding employer brand value.

Conclusion

HR analytics can help in strategically strengthening the employer brand of the organisation. It is necessary for the organisations today to optimally use the benefits of digitisation and technologies, not only for financial calculations and for production purposes, but also now to make it a part of managing people in the organisation. Statistical data in HR analytics can actually give a clear picture of the outcomes of people in the organisation. With that, the organisation can plan to manage the human resource of the organisation. HR analytics thus becomes a strategic step in strengthening the employer brand of the organisation.

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Evaluation of Cognitive Function among School Going Children: An Observational Study

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Abstract

Cardiorespiratory fitness is the most important part of healthy lifestyle. Body fat can be measured by BMI. CRF and body composition are related to health have been the focus of researchers in the field of health and physical education. Over the past four decades, there has been an increase in prevalence of overweight and physical fitness declination in adult across all genders. physical inactivity and sedentary lifestyle lead to accumulation of adipose tissue.

Aim: To evaluate cognitive function among school going children. **Method:** The present study assesses the IQ of children of age group 6 to 16 years. 100 subjects were taken according to inclusion criteria. Consent form and assessment form were taken from subjects and their parents. Wechsler Intelligence scale for children was used to evaluate cognitive functions. **Result:** Score suggests superior level of cognition in school going children.

Conclusion: This Present Study Concluded that Wechsler intelligence scale can use as an evaluation of cognitive function disorders among school going children.

Key words: Wechsler intelligence scale, cognition, school going children

Introduction:

Cognition is a term refer to the mental process which involved in gaining knowledge and comprehension. These are the cognitive processes which include thinking, knowing, remembering, judging and problem solving ^[1]. The study of cognitive development especially in school age children, has been one of the central focuses of the developmental research over the last 25 years ^[2]. Cognitive includes higher level functions of the brain which include languages, imagination, perception and planning. Cognitive psychology that investigates how people think and the process involved in cognition ^[3].

We need cognition to help us understand information about the world around us and interact safely with our environment. Cognitive abilities refer to the mental skills that are essential to everyday functioning, including work, play, and leisure activities, as well as daily self-care. These skills enable individuals to know, be aware, think, conceptualize, use abstractions, reason, criticize, and be creative, as well as acquire, interpret, organize, store, retrieve, and employ information ^[4].

Moreover, cognitive abilities are associated with an individual's capacity to adapt to environmental demands. These abilities develop in sequentially, meaning that as children grow their thinking processes continually advance ^[5'6]. Concept of psychological processing theory demonstrate that each children has different cognitive abilities to use information. These differences affect a child's learning and academic performance ^[7]. Not only does cognitive performance predict school readiness and success, but also some cognitive abilities (e.g. reading and mathematical skills) strengthen in school ^[4] Cognition has a physical basis in the brain with over 100 billion nerve cells in healthy human brain.

There are number of brain chemicals which play major roles in regulating cognitive processes including dopamine, noradrenaline, serotonin, acetylcholine, glutamate and GABA ^[3]. The WISC-V takes 45 to 65 minutes to apply. It gives IQ score which shows children's general intellectual ability. It includes five primary index scores, namely VCI, VSI, FRI, WRI, and PSI.

Need of Study:

Cognitive assessment is used to determine an individual's general thinking, reasoning, knowing, remembering, judging, problem solving ability of children. This study helps to learning more about how children think and process. Information not only helps researcher gain a deeper understanding of how the children brain work, but it allows psychologists to

develop new ways of helping children with psychological difficulties. It also helps to physiotherapist to deal with children with cognitive impairment.

Aim:

- To evaluate cognitive function among school going children.

Objective:

- The assesses the IQ of children between 6 to 16 years.
- Check Wechsler Intelligence scale in children between 6 to 16 years.

Hypothesis

NULL HYPOTHESIS (H₀):

There is no significant cognitive impairment in school going children.

ALTERNATIVE HYPOTHESIS(H_A): There is a significant cognitive impairment in school going children.

Methodology:

STUDY DESIGN: A observational study

STUDY SETTING: Rajkot

STUDY SAMPLE: 60 subjects

STUDY DURATION: 2 months

STUDY POPULATION: school going children

STUDY TECHNIQUE: An observational study

Criteria For Selection

INCLUSIVE CRITERIA:

- Age between 6-16 years
- Girls and boys
- Free from physical disability
- Able to understand simple command

EXCLUSIVE CRITERIA:

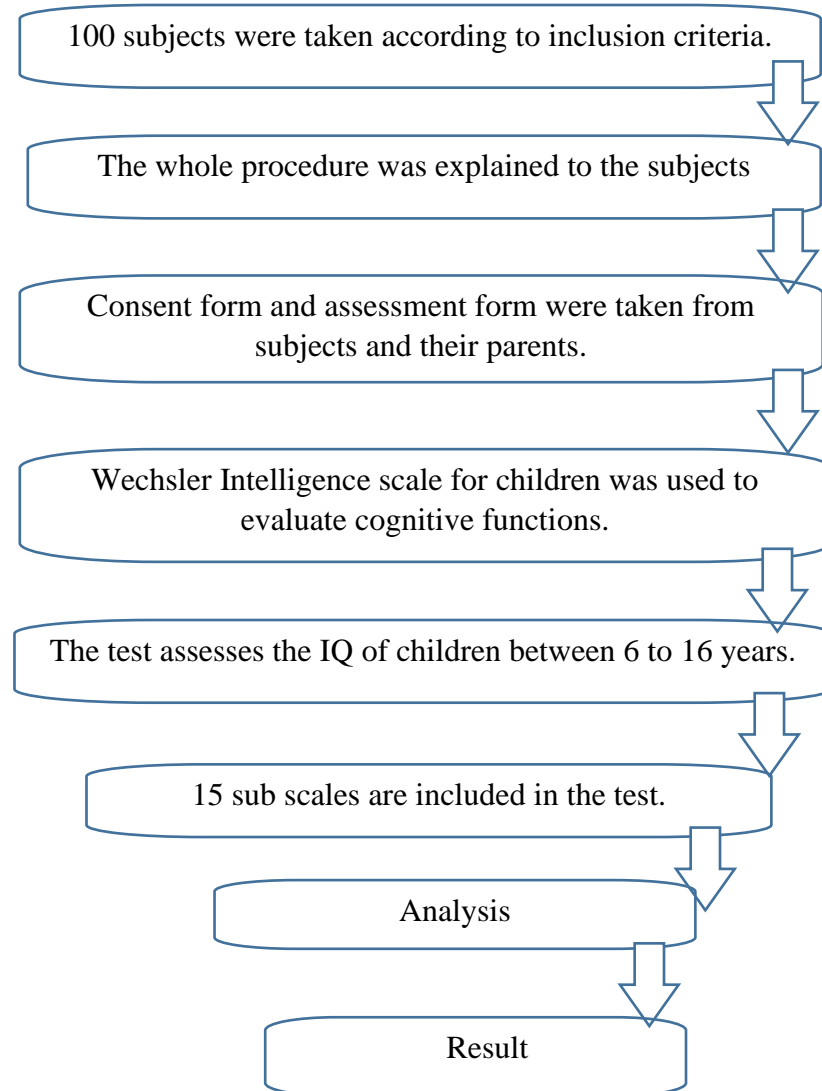
- Physical disability
- Uncooperative child
- Any neurological disorders
- Any other condition that prevent the children from performing the test

Materials Use in Study:

- Pen & paper

- Chair & table
- Assessment form
- Consent form
- Wechsler intelligence scale

Method:



Outcome measure:

- Wechsler Intelligence Scale for Children (WISC).

It measures the following components,

- General cognitive ability,
- Intellectual functioning in Verbal Comprehension (VC),
- Perceptual Reasoning (PR),
- Working Memory (WM) and Processing Speed (PS).

Result:

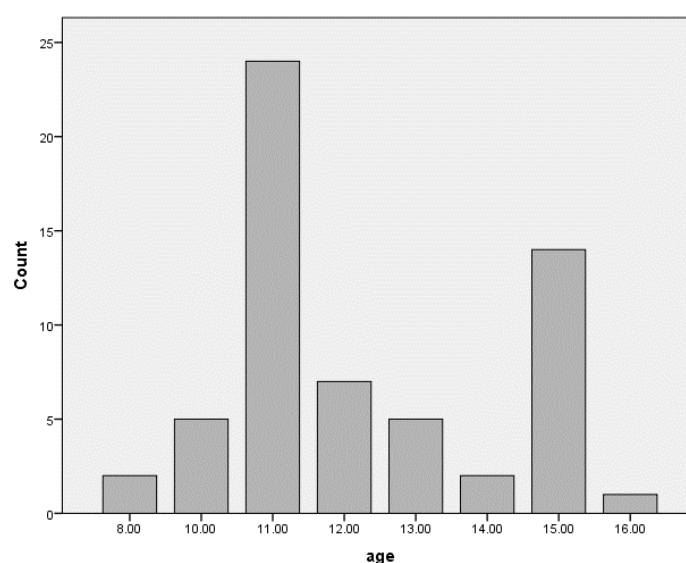
Statistical Analysis

100 Students were enrolled into this study according to selection criteria. Data was coded in Microsoft excel and word were used to generate graphs and tables.

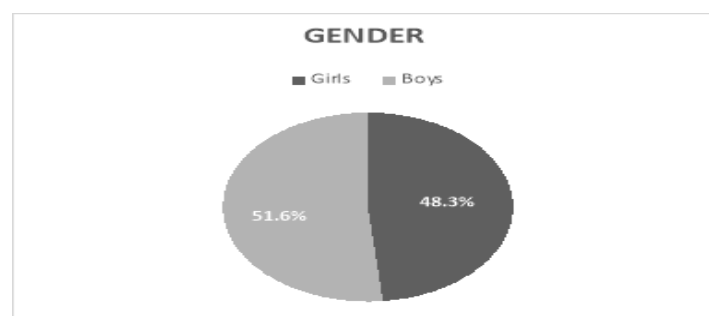
All the statistical analysis was done by the **STASTICAL PACKAGE FOR THE SOCIAL SCIENCE (SPSS)** software version **21** for windows. Normality of data was checked by descriptive analysis.

	N	Mean	Std. Deviation
age	100	12.2167	1.96660

TABLE 1: MEAN DISTRIBUTION OF AGE



GRAPH 1: MEAN DISTRIBUTION OF AGE



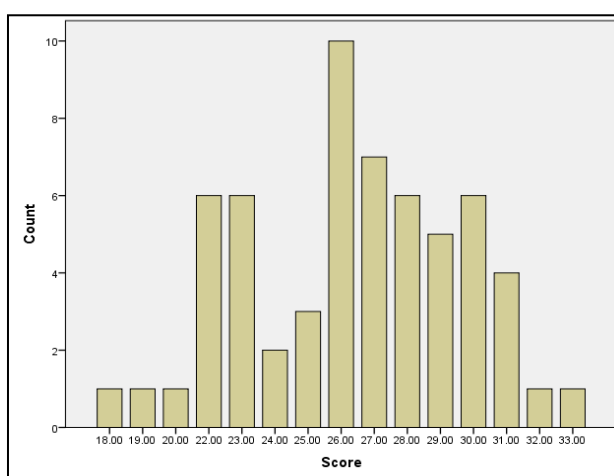
GRAPH 2 : MEAN DISTRIBUTION OF GENDER

Interpretation: the above graph shows the number of participator and percentage according to gender. There are boys has more participated compare to girls.

	N	Minimum	Maximum	Mean	Std. Deviation
Score	100	18.00	33.00	26.3500	3.34373

TABLE 2: STATICAL ANALYSIS OF WISC SCALE

Interpretation: The above table shows mean distribution of WISC score. Score suggest superior average performance of subjects.

**GRAPH 2: STATICAL ANALYSIS OF WISC SCALE****Discussion:**

The aim of the present study was to evaluate the cognition in children with the use of Wechsler intelligence scale for children.

An observational study was carried out in 100 students between the age group of 6 to 16 years. Outcome of Wechsler intelligence scale for children was done by using descriptive analysis in SPSS. The result suggests superior average performance of subjects. There are many different theories about cognition and Wechsler intelligence scale for children.

According to Kurt W. Fischer and Daniel Bullock many cognitive-developmental scholars are moving toward a broader, more integrative orientation, emphasizing relationships among the traditional categories for behavior (cognition, emotion, social behavior, personality, and

so forth) and constructs that highlight the interaction or collaboration of child and environment^[11].

According to Delia Fuhrmann, Anne-Laura van Harmelen, Rogier A. Kievit they found strong evidence that cognitive performance increased over time^[12].

Glutting et al. (2006) used SEM with the same sample, constructing models containing a higher-order g factor as well as Verbal Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed factors from the 10 core WISC-IV subtests. They concluded that g and, to a much smaller degree, Verbal Comprehension factors are the only important factors when explaining Quantitative Knowledge with the WISC-IV. Using the current data set, we found a CHC-based model fit the WISC-IV subtests better than the traditional four-factor model used by Glutting et al., but we found similar results in that g was the strongest predictor of Quantitative Knowledge. Thus, it does not appear that a CHC-based interpretational structure has a major effect on explaining Quantitative Knowledge^[13,14].

Conclusion:

This Present Study Concluded that Wechsler intelligence scale can use as an evaluation of cognitive function disorders among school going children. Further information comes under this study is that the psychologically and mentally disturbed students are susceptible to development of cognitive function disorder. So there is a need to give more focus in this area to gain thinking, reasoning, knowing, remembering, judging, problem solving among school going children.

Acknowledgements:

I feel to acknowledge my indebtedness and deep sense of gratitude to my mentor Dr. Priyanshu R. Rathod for his judicious and opportunity information, expert suggestion, guidance and support during every stage of my work. If it was not for his continuous inspiration and immense patience, she had shown in going through these documents and making necessary correction again, this dissertation work never has become a reality.

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Impact of Business Intelligence for Decision Making in Educational Organizations

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Abstract

Objective: The purpose of this research is to demonstrate how Business Intelligence (BI) can support decision making in an educational organization.

Scope of Research: Business intelligence (BI) is a catch-all phrase for the application of data analytics to assist in business decision-making. The use of business intelligence in education opens up a plethora of opportunities. This study will explore more opportunities to use BI in educational organizations.

Literature Review: Science Direct, IEEE, Scopus, Springer Link, and Google Scholar are the databases used for this study, which has a six-year review span (2018-2023).

Methodology: The research methodology is an analysis of the latest findings from previous researches. Researcher has reviewed various research papers and some examples from corporate companies.

Findings: BI is useful for administrators, management, teachers, parents and students as well. BI solutions cover all information resources required to support choices and incorporate the newest and most cutting-edge technologies. While the ultimate decision-maker values reporting the reality and making decisions, even in education, they permit the models provided to perform calculations and showcase the information. For example, student's performance, teacher's performance, school's growth etc.

Implications of the Study: This study provides new insight for top leadership teams of educational organizations that by implying BI, administration will be smoother.

Keywords: educational organizations, Business Intelligence (BI)

I. Introduction

Schools produce much data than they're able to manage and use well. Despite being surrounded by so much knowledge, they lack understanding. And it makes sense—manually navigating through mountains of hard copies or, at finest, Spreadsheets is a time-consuming chore that takes up a lot of already scarce time. Fortunately, modern technology enables educational institutions to significantly change how they operate. If neglecting modern technology trends, educational organizations have to suffer a lot with huge mountains of papers every year. Thanks to Business Intelligence (BI) that organizations are able to handle all those paper-based data. BI is really useful for school administrators, parents, educators and students. A decision-making process aided by the analysis and integration of an organization's data resources is known as business intelligence (BI). Since information has been recognized as an organization's most valuable asset, it is a crucial resource for its growth and plays an increasingly important role in a variety of organization kinds. A quick and effective decision-making process is necessary given the economy's prospects and the extremely changeable corporate environment. It is a difficult challenge to keep track of these dynamic changes both inside and outside of businesses while sustaining sustainable goals. However, this is achievable because of the various cutting-edge ideas and techniques out there, like BI [1]. Business intelligence is used by many firms to help them make better decisions utilizing both recent and historical data, which helps them flourish. To improve organizational performance and make it easier to identify market trends, it offers performance benchmarks. According to a Technavio research report, the market for BI and analytics systems is expected to rise by USD 12.62 billion between 2020-2024, expanding at a rate of approximately 10% [2].

Objective: The purpose of this research is to demonstrate how Business Intelligence (BI) can impact decision making in an educational organization.

Scope of Research: Business intelligence (BI) is a catch-all phrase for the application of data analytics to assist in business decision-making. The use of business intelligence in education opens up a plethora of opportunities. This study will explore more opportunities to use BI in educational organizations.

II. Literature Review

In their study, Berta D. A.[3] came to the conclusion that business intelligence incorporates data collection, data management, and knowledge transfer with data analytics to present intricate, practical, and competitive information of students, outcomes, performance, and

intriguing correlations between various educational variables. BI solutions cover all information resources required to support choices and incorporate the newest and most cutting-edge technologies. Khan M.A. et al. [4] used the Apriori algorithm to analyze student result data and track the development of students' academic performance in order to help academic planners make wise decisions. They discovered that it produces better outcomes, which raises the profitability of educational institutions, particularly private universities. De Sa Mussa et al [5] explained in their study that when a company uses BI as a decision-support tool, it can store a lot of cube settings and perspectives so that managers can access them. When new views need to be created, a researcher can respond quickly to these demands and produce additional data to support strategic decisions. If pertinent, organized, and trustworthy data and technology are available, BI can be applied in any situation wherein informed decision-making is required. As a result, new research can be created to examine the efficacy of using BI technologies to assist the management in all other non-business sectors, such as educational institutions. Drake B.M. et al [6] explored in their study that Higher education stakeholders (internal and external) are becoming more insistent on "seeing the facts" in reaction to funding cuts, pressure to make tuition more accessible, shifting student populations, and more attention to student performance and on-time graduation. Villegas Ch. W. et al [7] in their study provided the strategy for implementing a BI framework that addresses the handling, examination, and data presentation, which can address any issue that arises in a learning environment. In their work, they described a way for combining data mining models and approaches within a business intelligence architecture to make choices on factors that may have an impact on how well learning occurs. A case study that involved classifying and identifying students based on the information they provide in a university's various information systems was given to evaluate the proposed methodology. In their study, Cardoso E. et al. [8] suggested a higher education-specific BI Analytic maturity model. They outlined the design, the development, and the evaluation of two objects, the maturity model and the maturity assessment method, using a design science approach. The evaluation phase included two workshops with professionals from around ten countries and three case histories with universities from various nations. A BI analytic program is a technology effort as well as an organizational development, according to higher education institutions, who reported that the assessment using this model was I useful and acceptable for their needs; (ii) and did contribute to an improved understanding of the current status of their BI analytic landscape. In their study, Chairungruang S. [9] showed how BI solutions are utilized to assist the academic tasks of vocational education. BI utilizes a variety of analytical tools to support

decision-making for a variety of users, including students, teachers, administrators, and decision-makers. For the suggested management of vocational education, data-driven decision-making procedures with BI solutions include Data, Information, and Knowledge. The ELT procedure (Extract, Transform, Load) is used to take the decision-making process, and the decision output is then saved in a data warehouse. After applying the decision's outcome, the classroom, facility, or district is once again visited.

I. The **Methodology**:

research methodology is an analysis of the latest findings from previous researches. Researcher has reviewed various research papers and some examples from corporate companies. Researcher has studied several BI provider websites, some educational organizations' websites, and also taken data available on official social media pages of BI solution companies. From Google searched top ten BI solution providers and their websites, from google scholar studied related literature for review available between 2012-2023.

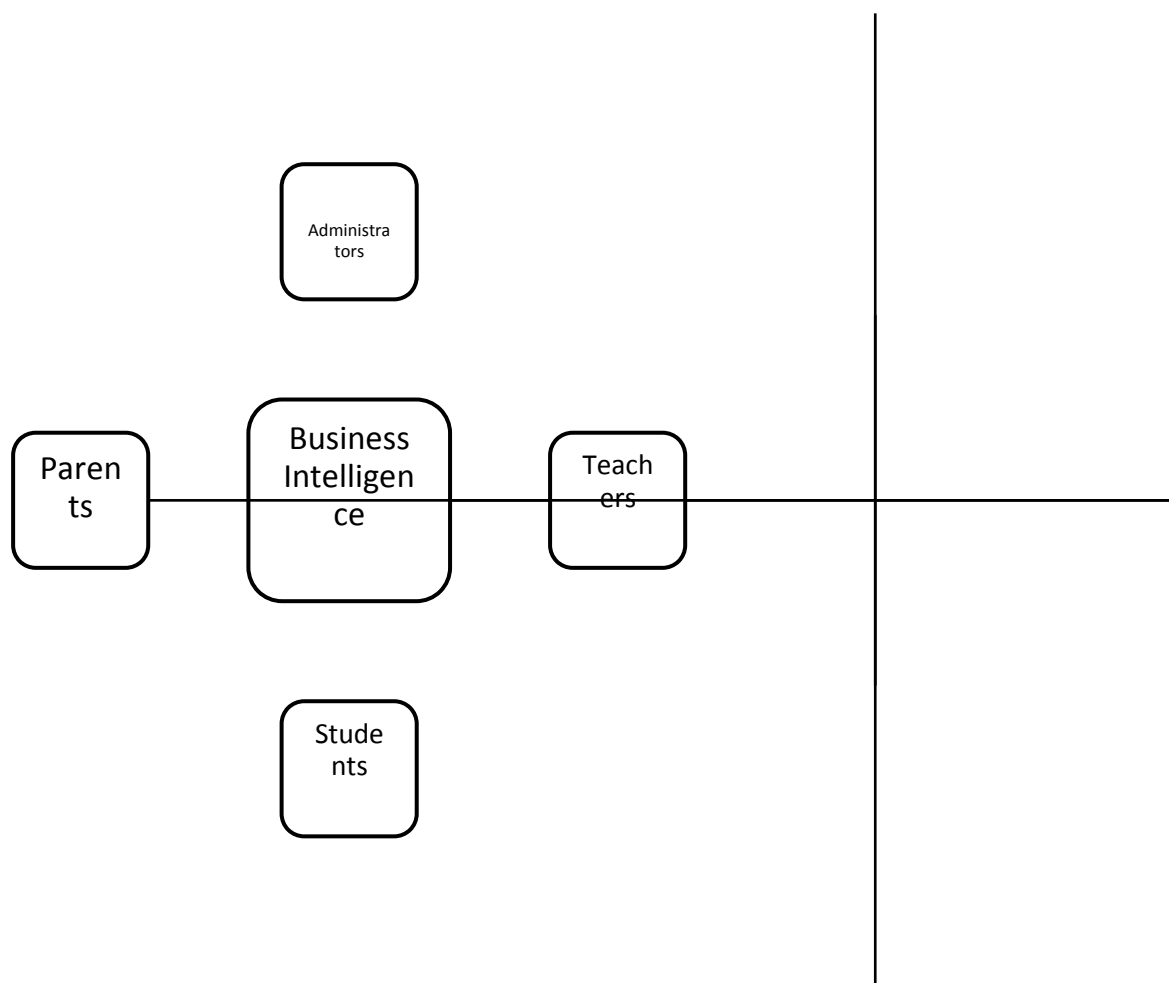


Figure 1: An outline to show people who get benefit from BI in educational organizations

II. Result & Discussion

With funding based on fees, learning achievement, student demography, class sizes, daily average attendance, expanded programs (languages, music, humanities, sports, etc.), and a variety of other indicators that detail as a whole school performance, school officials and boards are frequently expected to do more with less. Each year, it becomes more difficult for schools to retain current pupils while also meeting the demands of parents, governing organizations, education ministries, and governmental requirements. For a long time, stakeholders have required reporting from schools. Additionally, it's a task that requires a great amount of time and administrative resources due to the constantly more difficult operating conditions. Similar to other industries, BI in the educational organizations aids in providing pertinent data in an accessible format, especially for non-technical users, to all stakeholders. Due to the numerous parties involved in the learning process, BI in education is unique in that it uses technology to keep everyone connected at once. School administrators, educators, students, and their guardians can use BI to cooperate at the primary and secondary levels, putting the student at the core of the educational process.

Researcher has found that educational organization's administrators, students, teachers and parents, all of them get benefit from BI solutions. Yellowfin BI [10] has explored reasons why schools should use BI solutions, this table shows in which terms they get benefits:

Administrators	Teachers	Students	Parents
Large Data Storage Employee Observation Optimized Operations Detect risky activities Streamlined reporting Predict future plans Increased involvement	Reduce time in paperwork Reduce effort in paperwork Tracking progress Involve parents Make plans	See own progress Career plan Track homework	See progress report Career plan Be in touch with child Be in touch with teacher Be in touch with administration

Table 1: Benefits of BI solutions for educational organizations

After gathering and organizing benefits BI solutions provide for educational organizations, researcher has explored how BI solutions support the decision-making process of educational

organizations. According to DataFlair Blog [11] Top 10 BI solution tools are mentioned here: Sisense, Tableau, Looker, Domo, SAP Business Objects, Qlik Sense, Microsoft Power BI, Dundas BI, IBM Cognos Analytics and BOARD. BI solution from IBM [12] has explained major components of BI as Reporting Schema, Extraction Processes, Embedded Analytics and Dashboards & Cubes.

BI component	Satekholders	Impact on decision making
Reporting Schema	Administrators	Storage for huge amount of data
Extraction Processes	Teachers	Analyze large amount of data from different sources
Embedded Analytics	Students	Reports & conclusion generation
Dashboards & Cubes	Parents	Statistical reports
		Detailed reports
		Data models
		Multidimensional view of data

Table 2: Impact of BI solutions for decision making in educational organizations

When administrators have BI solution, they easily take decision about teacher's replacement, new teacher recruitment or student's special requirements. If teachers have BI solution, they take decision which students need special education, which class is progressing or not progressing, they decide about difficulty levels of evaluation etc. Parents are able to take decision when they should contact their child's homeroom teacher, when they should talk to child about their efforts in study or extra-curricular studies. Students can take decision about their career, they can decide their subject selection etc. Here is an example how a complicated spreadsheet of a student's progress report can be viewed in a more filtered way and they it can be compared to school's expectations and only limited part of report can be printed:

Progress of Study Content Management

NC Year: Year 5 Include Empty Strands: ☒ Academic Year: 2019/2020 Year: Year 5

Subject/Strands: English: Reading, English: Writing, Handwriting & Presentation, Composition, English: Spoken Language, Mathematics, Science, Art & Design, Computing, Design & Technology, Foreign Language, Geography, History, Music, PE

Column-Heading	Description	Status	Assess IT	Assess	Essay IT	Essay	Short Answer IT	Short Answer
En Composition 5.56.08	using further operational and presentational devices to structure text and to guide the reader (for example, headings, bullet points, underlining)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
En Composition 5.56.09	assessing the effectiveness of their own and others writing		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
En Composition 5.56.10	ensuring paragraphs, sentences, grammar and punctuation to enhance effects and clarify meaning		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
En Composition 5.56.11	ensuring the consistent and correct use of tense throughout a piece of writing		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
En Composition 5.56.12	ensuring correct subject and verb agreement when using singular and plural, distinguishing between the language of speech and writing and choosing the appropriate register		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
En Composition 5.56.13	proof-reading for spelling and punctuation errors		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
En Composition 5.56.14	confirm their own compositions, using appropriate iteration, volume, and movement so that meaning is clear		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

En Composition 5.56.01

User Description:

Default Description: Pupils should understand, through being shown, the skills and processes essential for writing that is: thinking about to generate ideas, drafting, and re-reading to check that the meaning is clear.

Figure 4: A filtered progress report as per schools' expectations

Source: SchoolAnalytics.co.uk

Implications: Both academic researchers and practitioners can benefit from this work. It provides a useful synthesis of studies for academics to comprehend the state of BI system development at the moment.

III. Conclusion:

By reducing the time required for decision-making, BI systems have a significant impact on the quality of strategic decisions. As a result, these systems must help organizations to view data from various angles, drill down to approximate levels, navigate, and digital search files in order to find new indicators that have an impact on business processes, as well as to anticipate and identify trends inside and outside of school. Through innovative methods for extracting, processing, loading, and displaying data in order to convey strategic information, BI systems improve the efficacy of management in educational institutions.

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Without the outstanding assistance of my supervisor, Dr. Kritika Tekwani, neither this work nor the research supporting it would have been feasible. Her energy, expertise, and meticulous attention to detail inspired me and helped me finish this project on time. The kind and insightful remarks have helped this study in countless ways and prevented me from making many mistakes; those that inevitably persist are only my fault.

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Impact of Emerging Technologies Towards Optimisation of Educational Learning Experience

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Abstract

Emerging technologies such as virtual and augmented reality, artificial intelligence, game-based learning, online and blended learning, and digital textbooks have the potential to greatly enhance the educational learning experience for students studying at all levels. These technologies can help students to get immersive and interactive learning experiences; along with personalized instruction as per the need and calibre; and provide real-time feedback of the learning experience. Virtual and augmented reality can help in school/higher education by bringing remote or abstract concepts to life. This can be done by, allowing students to experience and explore the concepts which may not be possible to experience through traditional methods. For example, without ever leaving the classroom, students can use virtual reality goggles to view remote destinations, the human body, or historical sites. Textbooks and other educational materials can also be improved with augmented reality to make them more interactive and interesting. By giving real-time feedback and modifying training as necessary, artificial intelligence and machine learning can tailor instruction to the unique needs of each learner. This may increase motivation and student involvement, which will increase learning outcomes. Additionally, game-based learning can be utilised to make lessons more interactive and engaging, which can help students stay motivated and increase their memory of the information. Online and blended learning can increase accessibility and flexibility by letting students complete their coursework on their own time and at their own pace. Additionally, interactive digital textbooks and learning apps can make educational content more readily available and interactive for students. In conclusion, emerging technologies have the potential to significantly improve the learning experience for students by giving them immersive and interactive learning opportunities, individualised instruction, and real-time feedback. With the aid of these technologies, student success can increase along with motivation and engagement levels.

Keywords: *Internationalisation, Higher Education, Blended learning*

Introduction

In today's world technology plays a pivotal role in a traditional educational setting to spearhead and facilitate knowledge transfer to students through improved speed and effectiveness.

Before we analyse the technological pedagogies used in school education and higher education, we must define few concepts which will be covered under the scope of this paper. 'Efficiency' and 'Efficacy' – these are the two reference-frames around which our paper will be revolutionising and disseminating the information in that area. Here, efficiency would define the speed at which knowledge can be imparted wherein the term efficacy is related to the amount of knowledge that has been imparted and has been operationally grasped.

Methodology

To further enhance our research in this area and learn about the 360-degree impact value and perception, we have used the survey of subjects (mentioned below) from '*The North Star (TNS) School, Rajkot (Gujarat), India*'. At TNS, a tailor-made learning management system (LMS) portal called '*Lily*' is being by the complete management ranging from administrative staff to faculty and strategy devising team. 'Lily' is improvised from time to time based on the requirements and necessities of students. The survey category is composed of the following target groups as all these sections of people can be categorised as learners when technology is directly integrated into an educational environment, such as a school/college:

- Students from grade 1st (Primary School) – 5 respondents: This group comes in touch with education technology products for the first time. Hence, a questionnaire was circulated among students and their teachers were curated to mentor the students in filling the data as answers for the questions.
- Students from grade 12th (High School) – 15 respondents: These students at 'The North Star School' have an experience of using the tailor-made learning management system (LMS) portal and after using the LMS for across the time the inputs devised by them towards the development of 'Lily' helped in understanding the requirements seen with growth of time among students.
- Teaching faculties – 14 respondents: Inputs from faculties were taken to understand how technology abridged the gap between students, teachers and parents.
- Administrative staff members – 9 respondents: These included the members who helps teachers/trainers in maintaining and analysing the record present on 'Lily'. In addition to the answer collected through the questionnaire all these 9 respondents

were also interviewed to understand about the physiological impact these EduTech tools are giving into the mind of students e.g., after declaration of the result on the LMS how students respond to each other's review and what is the difference of the assessment when the results are declared online as compared to being declared in physical mode.

- Parents – 8 respondents: These included the respondents those who have their wards who have already completed their studies and taking higher education at university level. 7 of 8 of these respondents were also interviewed to have insight into the emotional connect their wards have with the institution.

Question - How a tailor-made learning platform is beneficial then standardised platform?

There are multiple web service products developed by various technological companies available in market for schools that aim to simplify creating, distributing, and grading assignments in a paperless way. The primary purpose of such tools are to provide a platform to store the data uploaded by trainers and later distribute and collect among students. These tools also provide students an option to view new notifications about their assignments and submission deadlines.

Some tools used by institutions for optimisation of educational learning experience	Google Classroom
	Microsoft Teams
	Schoology
	Canvas
	Blackboard
	Edmodo

(Table – 1)

To get an answer for the above question, when it was asked from the respondents their answers can be summarised as follows:

- As per 'Teaching Faculties – 4 respondents' each student in a classroom has different level of understanding and grasping the content delivered in the class and as per them the nature of work given as home-work should be completely as per what students studies and understands in the class. Each student in classroom is unique and hence the content for them should be manicured as per their requirement and need.
- As per students (respondents from grade 1 and 12), the presence of assignments and reading material in accordance to their time helped them in balancing their studies

and co-curricular activities. Students were able to dedicate time on studies and other activities without having the physiological fear of lagging in classroom. Students were also happy that, using VR sets they could remember more about the historical monuments, Indian geographical boundaries, cultures and other content which would have been difficult to remember had they used books as the only medium of studies.

Discussion

Discussion points based on the usage of Learning Management Systems:

- a) Any tailor-made software like ‘Lily’ can enable academicians to curate course planning as per student’s need. However, in case a standardised classroom application is used this will be same for everyone and it would hamper the learning process of students.
- b) Parents as respondents to this survey question were very happy to have customised LMS models as the answers and comments for this survey question depict that ‘The customised teaching and learning LMS for individual students helps in the growth of healthy competition among students where students try to excel in studies as a classroom and not as an individual’.
- c) Improving quality of teachers: Teachers at TNS have the best learning and teaching experiences when using ‘Lily’, as its one of the revolutionary e-learning-based learning approaches in this software improves their ability to stay abreast of scientific and technical advancements using the state of art feature of making notes and doing comparative analysis of digital content available online. It also has a feature through which their colleagues can also add inputs if they have expertise in the same field.
- d) Usage of internet with guided control/access to students: A personalised teaching tool is very useful in utilising the technology wisely. Due to the quick advancement of technology, students today can use internet for more than just entertainment—they can quickly obtain harmful content. Thus, it is necessary to encourage kids to use the internet or other helpful technologies by utilising education-based programmes like ‘Lily’ wherein the network access can be monitored viz only this URL can be allowed by parents or system administrators to deliver classroom content (use of limited LAN).
- e) Document Storage: The teaching and learning content can be stored online and this does not require students or teachers to carry hardcopy of books or notes everywhere.

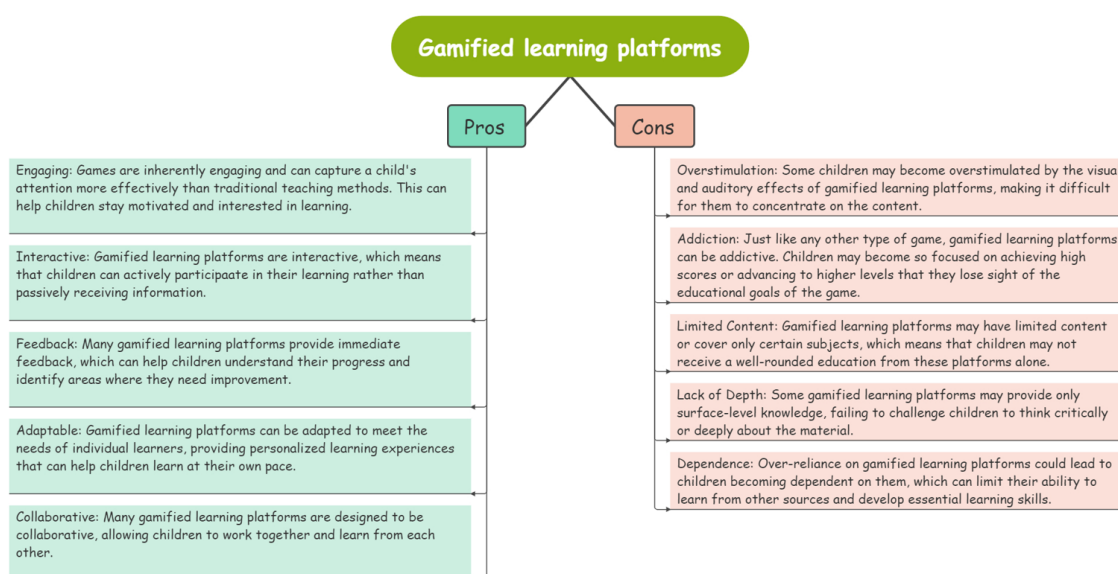
This helps in easy access of materials by students and teachers for reference as per their wish.

Based on the discussion of the questionnaire with the *strategy team*, it was deduced that other than LMS there are several other areas which needs optimisation to improve learning experience of students. Some of these which can be taken into the mainstream are as follows:

- i. Adaptive Learning Platforms: As each student has their specific strengths, weaknesses, and progress it becomes difficult for a human mind to exactly decode the grey areas and design curriculum on that basis. Here, artificial intelligence and machine learning play a major role in personalising the learning experience. Some of the tools available online in this area are like Knewton, Smart Sparrow, and Carnegie Learning.
- ii. Gamified Learning Platforms: Through the questionnaire, it was informed by the management team that gamified applications viz *Kahoot!* (Quiz application) are appreciated by students from all the grades. These tools help in increasing the student's engagement and motivation and improve their learning outcome.
- iii. Usage of analytics tools: Institutions are places where a student come for an all round development and not merely only the academics. To check and track the progress and take steps accordingly institutes should use tools like Ed Analytics, BrightBytes, Mastery Connect etc towards fulfilment of the goal.

Conclusion

Tailor-made software for children can provide a more engaging, effective, and safe learning experience for children, while also being tailored to meet the specific needs of the organization.



(Table 2)

As a result of the discussion on the application of learning management systems (LMS), it is now clear where there may be room for improvement and potential advantages for boosting student learning. Customization developed as a crucial element, allowing academicians to customise course planning depending on the needs of specific students thanks to specially designed software like "Lily." The beneficial effects of personalised LMS models, which encourage healthy competition and classroom improvement, were also highlighted in the parents' input.

Additionally, using LMS platforms like "Lily" has shown to be helpful in enhancing the standard of teachers' teaching and learning experiences. The software's ground-breaking e-learning strategy gives teachers the resources they need to stay abreast of scientific and technological breakthroughs, making note-taking and comparison analysis easier. Colleagues can share their experience through collaboration capabilities in the LMS, improving the learning environment as a whole.

The requirement for student access to the internet under guided oversight was another essential topic covered. Utilising technology responsibly is made possible by customised teaching tools like "Lily," which ensure that students' internet activities are supervised and restricted to educational material. By taking this precaution against exposure to damaging or disruptive content, the internet becomes a useful tool for educational purposes.

Additionally, the use of LMS platforms like "Lily" makes it possible to save documents conveniently, removing the need for students and teachers to carry about traditional books or notes. This makes it easier for people to obtain educational resources and gives them the freedom to consult information whenever it suits them.

The conversation also brought to light other areas where students' learning experiences might be improved. Artificial intelligence and machine learning are used by adaptive learning platforms to customise learning depending on students' particular strengths, weaknesses, and progress. Kahoot! and other gamified learning platforms promote student motivation and engagement, which improves learning results. Institutions can keep a close eye on development overall and promote it by using analytics systems like Ed Analytics, BrightBytes, and Mastery Connect.

Overall, the learnings from this conversation highlight the significance of utilising technology, personalisation, and analytics to build successful and interesting learning environments. By incorporating these techniques, we can continuously improve the learning environment and support educators and students in their pursuit of knowledge and development.

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Behavioural Biases & Investment Decisions – A Review of Literature

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Abstract

Behavioural finance deals with human psychology while making investment decisions. Investors rely more on emotions rather than logic while investing their funds in financial markets. Irrational beliefs and biases like overconfidence, herding, disposition effect, loss aversion affects investment decisions. The purpose of this paper is to systematically analyse the literature depicting impact of behavioural biases on investment decision-making. The relationship between behavioural biases and investment decisions was analysed using research articles published in journals, conference proceedings, working papers and books on behavioural finance. This paper will be useful to researchers, academicians and those working in the area of behavioural finance in understanding the impact of behavioural biases on investment decision-making.

Keywords: Behavioural Biases, Investment Decisions, Overconfidence, Disposition effect, Herding, Cognitive bias.

1. Introduction

In academics, we are studying standard or traditional finance in which we assume that human beings act logically or rationally. For example, Modigliani & Miller Approach, Markowitz theory, etc. this theory of finance is also known as Efficient Market Hypothesis (EMH). In decision making, people have to choose one alternative out of several alternatives available for them. But it is observed that Human beings are not always rational in their decision making. The same will be applicable in case of decisions regarding their investments. This whole process is “investment behaviour”[1] The decisions regarding investment in the investment market are not made by taking calculated risk [2]. This study states that markets are not always EMH.

After the study of Kahneman and Tversky, 1979, the new concept in the field of finance emerged i.e., Behavioural Finance. Behavioural finance challenges the traditional financial theory of efficient market perspective (EMH) and helps to understand why investors behave not in a rational manner while investing in financial assets [3]. Behavioural finance states that the investment decision-making by individuals is influenced by several behavioural biases that encourage investors to deviate from rationality and make irrational investment decisions. The heuristics is the process by which the investors finds out the way of investment by themselves, usually by trial and error, leading to the development of rules of thumb. In other words, Heuristics refers to the rules of thumb, which humans use to make decisions in complex or uncertain environments. [17]

Behavioural biases and prospects are abundant in financial markets especially emerging markets like India. Local investors lack the analytical tools and are prey to rumours.[18] This paper provides which biases are having the influence on individual investment decision making especially with reference to investment in the equity market. From the study, researchers have found that behavioural biases are basically of Two Types [4]:

- i. Heuristics Bias
- ii. Cognitive Bias

2. Heuristic Bias

Heuristics bias plays a major role in investment decisions making. Herbert Simon introduced the concept of heuristics in 1950 and later on Kahneman and Tversky added this concept in behavioural finance in their research. Heuristics are the mental shortcuts that simplify the complex methods ordinarily required to make judgments [5]. Heuristic Bias or Mental shortcuts have been observed to be the key foundation of behavioural decision-making of

individuals since long. There are various biases in Heuristics that affect investment decisions. The various biases are:

a) Representative Heuristics

A person investing in the stock market is significantly influenced by previous sunk results, where future investment decisions may be biased towards an anchor or any attribute or just a similar situation. Thus, investors' evaluation of the current stock selection is affected by heuristics which is a reflection of the experience taken from past stock price trends. Representativeness biases results when people put too much weight on recent experience and ignore the average long-term rate [20].

Representative bias causes prompt actions involving premature decisions due to excessive reliance on pre-convinced assumptions or beliefs. The need to make quick decisions with limited information will lead to representative heuristics. People forecast about the probable outcome that appears the most representative of the evidence without getting much knowledge about the fundamentals.

b) Anchoring and adjustment

Tversky [6] in his paper explained that anchoring refers to the concept used in the circumstances when people use some initial thoughts to make estimations, which are biased toward the initial ones and different starting points yield different assumptions to different people.

Investors always prefer the initial purchase price while investing. Thus, today prices are often determined by those of the past [20]. Anchoring bias also has the reflection in representativeness bias.

Anchoring is a heuristic that describes the subconscious use of some information, such as the purchase price of a security, as a fixed reference point (or anchor) for making decisions about purchasing that security. One of the consequences of anchoring is that investors having this bias tend to hold investments that have lost value because they have anchored their fair value estimate to the original price rather than to fundamentals. Investors are better at relative thinking as compared to absolute thinking [21].

c) Availability

The concepts of salience, availability and cue competition are generally used interchangeably in the extant literature and may be subsumed under availability heuristics. availability bias has a significant impact on the investor decision making while herding bias doesn't have any significant impact [7]. Emotions and intuition like investor mood, financial crisis, weather

conditions, sports events and information availability also affect investor behaviours significantly [8]. Individual investors make an investment decision based upon available information and it is also found that the risk-avoider investors turns into risk-takers because of external locus of control at the time of making investment decisions after the study of Pakistan stock exchange [24].

d) Mental accounting

Mental accounting refers to the different values a person places on the same amount of money, based on subjective criteria, often with detrimental results. Mental accounting is a process whereby people code, categorise, and evaluate their economic outcomes [9]. Mental accounting leads to impulsive investment behaviour and evidences the disposition effect of investors in which they tend to sell profitable assets. (Ko & Huang, 2012). On the other hand, People avoid losses because their emotions are more severe in case of losses as compared to those when they win. Investors are stick to take risk when there is a huge chance of losing.

e) Gambler's Fallacy

The gambler's fallacy is the irrational belief of the investors that prior outcomes in a series of events, with respect to any investment avenues, affect the possibility of a future outcome, even though there are no relation of the events in question.[23] The gambler's fallacy or the Monte Carlo fallacy occurs when an individual erroneously believes that a certain random event is less likely or more likely to happen based on the outcome of a previous event or series of events. This type of psychology is incorrect, as previous events do not affect the probability that certain events will occur or not occur in the future. Investors believe that the previous performance of the stock is the major display of its future path. They label the stocks that indicated superb performance for the past 3 to 5 years as winners and expect a great performance from them in the future.

3. Cognitive Biases

The irrational behaviour of investors based on cognitive bias explains the anomalies and the mental error of the investors in investment decision making. [19] Cognitive psychology states how investors think.

a) Overconfidence

People are overconfident about their abilities to make decisions. Overconfidence is associated with the personality of an individual. Overconfidence is an individual's belief that the precision of their forecasts is greater than is actually warranted [10].

Overconfidence is, in general, considered as a dominant behaviour in investment decision making. In most of the situations, optimistic investors become overconfident on certain stocks which they believe to be beneficial. Greater overconfidence leads to greater trading and to lower expected utility. Psychologists find that in areas such as finance men are more overconfident than women. This difference in overconfidence yields two predictions: men will trade more than women, and the performance of men will be hurt more by excessive trading than the performance of women.

Odean [1998] points out that overconfidence may result from investors overestimating the precision of their private signals or, alternatively, overestimating their abilities to correctly interpret public signals. Self-attribution motivates overconfidence and overconfidence causes over optimism in investor behaviour which ultimately hinders the rational decision making of the investors [11].

b) Herding Bias

Herding is the bias wherein rational people start behaving irrationally by imitating the judgements of others while making decisions. Individual investors tend towards demonstrating herd behaviour because they follow the decisions of a large group or noise traders. It is found that individual investors are very influenced by herding behaviour [12].

In Herding Bias, it is possible that the investor prefers to not take any risk in relation to investment in a particular stock by going against the trend. Herding behaviour is the most common behavioural bias that impacts financial markets. This study showed that stock investors are highly probable to show herding behaviour when they obtain most of their financial information from word of mouth when compared to any other source of information [13].

c) Overreaction Bias

Investors overestimate their knowledge and think that the past performance of the stock is the best information to predict the future performance of a company. Investors generally overreact to any new information that arrives in the market, and it affects their decisions. Investor overreaction to a long series of bad news could produce predictable mispricing of stock. [21]

Overreaction also differs in case of good news and bad news [22]

Investors follow two concepts at the time of making investment: one is the trend of the earnings, and secondly, they believe that after-profit from earnings announcement, there will be adverse effects, and it will cause them a loss on their investment [14].

4. Conclusion

Understanding the investment behaviour of the investor helps to convert the psychological biases into financial benefits to the retail investors. Through the study of behavioural biases helps investors to overcome these biases which lead them to erroneous decisions. The errors in judgement making of investors can be rectified with an in depth understanding of investors' psychology under the behavioural finance.

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A Systematic Literature Review - Workforce Agility: An Innovative Driver

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Abstract

In the modern-day corporate business world, management and organizational practices are progressively recognized as a crucial driver of organization's innovation. In this paper we advance this line of research by directing on an innovative section of work organization that is attributed to mounting significance by the management and literature, namely workforce agility. Troubled by rising uncertainty in the business environment, many firms have a robust urge to become agile. Studies on agility at organization are meticulously and excessively based on technical attributes, and miniscule deliberation has been given to the workforce. Workforce agility has been categorized as an HRM strategy that consensuses organization to response quickly and proficiently to threats and opportunities arising from a competitive and unbalanced business environment. In the current literature, there is still an absenteeism of efforts to scientifically assess the state of the art on this theme. The aim of this paper is to address this gap by reviewing the research development on workforce agility. A systematic literature review was carried out to investigate the academic articles within the workforce agility topic that were published till date. This study will highlight how the arena has advanced. Concerning the theoretical characteristics, the discoveries permitted us to distinguish that an agile workforce contains of four interconnected and inter-reliant scopes: proactivity, flexibility and adaptability, resilience, and competence. These qualities can be recommended through HRM methods related to i) Learning organization, ii) organic structure, iii) flexible human resource management practice, iv) team, v) Technology. This paper contributes by endorsing a debate on a theme still emergent in the literature, and by highlighting the probable competitive advantage accompanying with workforce agility for organizations.

Keywords: Workforce agility, Innovation drivers, dimensions of workforce agility, approaches towards workforce agility.

1. Introduction

Organizations round the world are involved in a situation where change is a crucial characteristic. Swift technological development, globalization, stormy business models, innovative and evolving markets, and ever-changing customer likings are some of the encounters that most organizations oscillating, from small to large, are coping with (Zitkiene & Deksnys, 2018). So far, numerous explanations such as reengineering, networking, virtual enterprises, modular corporations, high performing organizations, flexible manufacturing, and employee empowerment have been proposed, and that of “agility” has been projected as one of them as well (Sherehiy et al., 2007). The challenges revealed above vigor organizations to track those guidelines which type them more competent and agile in order to last. Hence, organizations should be proactive and be able to forestall change. To do so, organizational structures should grip additional stages of agility through respond and flexibility. Professionals in the market need new organizational solutions, tools, and techniques to deal with environmental variations, categorize novel prospects, and be extra improved to exterior forces. In other words, an agile organization strains agile enablers, drivers, abilities, strategies, and practices (Deksnys, 2018). Organizational agility, that which is the competence of rapidly retorting to environmental changes through adjusting products and services, is progressively becoming a grave subject to attain and preserve a continuous competitive advantage in the fast-changing market (Singh et al., 2013; Zitkiene & Deksnys, 2018). One of the fundamentals of an agile organization is an agile workforce (Breu et al., 2002; Muduli, 2013). According to Virchez, (2015) the features of such organizations are assembled into five groups: strategic awareness, a reconfigurable, organizational learning, unblemished implementation and an agile workforce. Organizational agility is one of the most fundamental subjects of human resource management through the world as the variations in both workplace and the demand and supply of workforce should be considered in human resource strategies. Having studied the position of workforce agility in organizations and given the scarcity of systematic studies considering its spirit and concept, (A. Gunasekaran, 1999; Sherehiy & Karwowski, 2014) it has been distinguished that up till now the majority of the research has emphasized the position of agility from technical perspective (Sherehiy & Karwowski, 2014). Given that studying specific human resource activities that would backing the development of workforce agility have been ignored throughout the literature, this paper aims to study the basket of research on workforce agility integrating drivers, strategies, and practices.

2. Workforce agility

In order to tackle and take lead at all challenges, experts and researchers accept the potential of organizational agility, distinct as ‘The competence of an organization to empower efficient action in a highly unsettled environment, by responding swiftly to change [and] forestalling and grasping opportunities, in particular through revolution and learning’. (Felipe et al., 2016). Human resources of an organization, placing of agility endorsing features and often referred to as “workforce agility”. (Alavi et al., 2014; Sherehiy, 2008). The first study addressing employee agility was published in 1997. Since then, the research field has been steadily growing, albeit at a relatively low pace until 2008. Regardless of its significance and importance, designated by the studied surge in publications consent about what is meant by agility at the individual level has not thus far been recognized in the literature, which is currently categorized by a great diversity of definitions and views on the phenomenon. Considering a strategic tactic, HRM is concerned with the organization’s purposes and can make key aids, in that it generates a promising environment and forms HR toward envisioned consequences, thereby attaining organizational agility (Bowen & Ostroff, 2004; Harsch & Festing, 2020; Shafer et al., 2001). Considering these research shortages, the inclusive objective of this study is to deliver a systematic synopsis of what we by now know about workforce agility and the probable role of HRM practices and systems. We purpose at evolving the field by imparting conceptual clearness. Due to the above-mentioned enhanced pace of change in organizational environment this vital foundation is exclusively imperative, since it empowers future research to shape on a comprehensive theory-based conceptualization of workforce agility.

3. Research objective

We aim to contribute into research field by achieving following objective. First understanding the evolving importance of workforce agility, this research intent at providing an investigation, combination, and alliance of the prevailing works on the academic definitions, theoretical fundamentals, recommended measures, and the role of HRM in evolving workforce agility. Next structure on the discoveries of our research, we contribute to fundamental clarity and theory-building by theorizing workforce agility and developing a framework that clarifies workforce agility in a dynamic environment. Third, in order to encourage future researchers to further developing this significant research arena, we offer an encompassing research agenda. The graph of this paper is organized as follows. We enlarged a crisp introduction to the topics of organizational and workforce agility. Later, we define the

methodology applied in the research. The outcomes emphasis on theoretical development, scale measurement and the role of HRM. Next, we elaborate the newly recommended theory-based framework for explaining workforce agility. Lastly, we suggest an encircling future research agenda, and we settle the paper by outlining its limitations.

4. Methodology

We steered this systematic literature review, which permits one to achieve a detailed investigation of the literature by covering a detailed area while ensuring a high degree of transparency and replicability (Tranfield et al., 2003). We followed the five-step approach suggested by Denyer and Tranfield (2009), including research question construction, study location, study selection and evaluation, data analysis and synthesis, and finally results reporting.

Affiliated with our research objectives focusing on definition and measurement, underlying theories, frameworks or concepts, and its measurement as well as the role of HRM in promoting workforce agility, we led our search of peer-reviewed, English-language articles by retrieving manually searching Google Scholar in the wider business literature. We initiated the following search keywords: “agility”, “agile,” “workforce,” “employee,” “HRM role in agility” which resulted from an initial study in which we first manually recognized important contributions in the field of interest, trailed by a scrutiny of keywords, titles, and abstracts in these contributions. Furthermore, we used the reference lists of the appropriate articles to discover additional relevant articles in Google Scholar. In addition, we searched for relevant studies in agility-focused special issues of business journals. Despite our focus on research articles, we also encompassed the thesis by Sherehiy (2008), as this signifies the theoretical foundation for a number of papers. We only considered publications starting from 1991, as the agility was recognized by then in the business and organizational context by the Iacocca Institute (Nagel & Dove, 1991), until the conclusion of our search on September 2022. Associated with the variety criteria, we recognized applicable papers by abstract, next by full-paper screening. Based on this method, we acknowledged 76 studies in whole, with 31 by database search, 9 cross-referencing, remain by manual search, and 1 thesis inclusion. (fig 1)

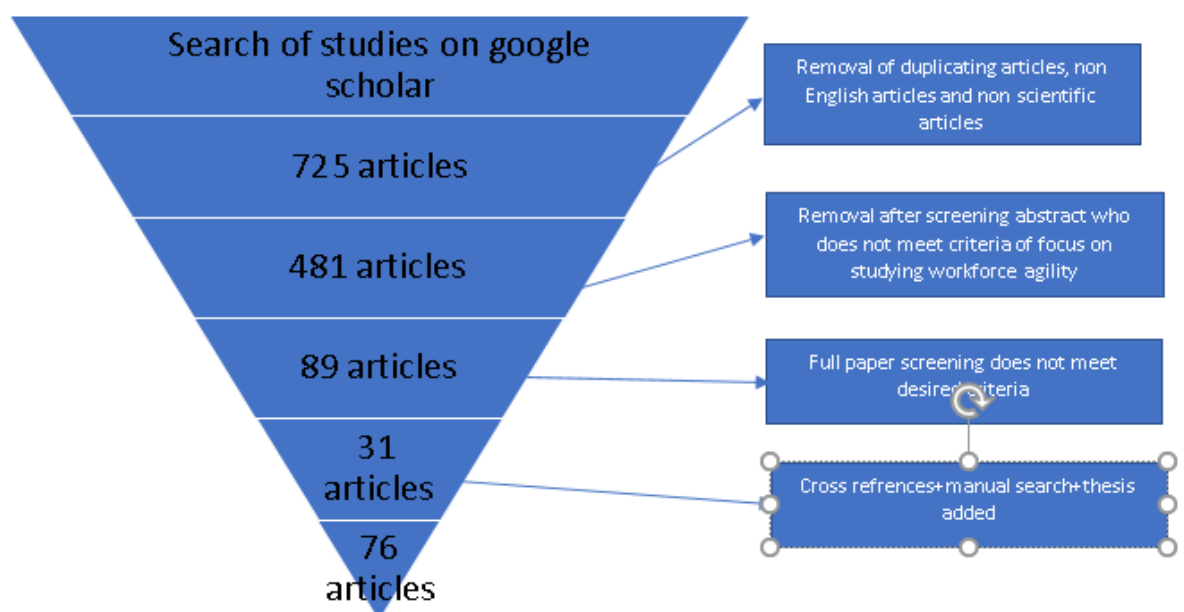


Fig 1. Flow diagram with search strategy

4. Analysis and results

4.1 Evolving information about the research

The initial learning addressing workforce agility was published in 1997. Later, the academic research area has been progressively rising, with slow leap until 2007. In whole, we recognized 76 empirical studies. A substantial surge in research can be experiential after the publication of a measurement scale by Sherehiy (2008). Up to that point, only few had been published, and of those, looked at agility from a cross-training perspective, i.e. ‘the ability of employees to be assigned a greater variety of tasks’ (Sumukadas & Sawhney, 2004). Around 50 papers, published after Sherehiy’s contribution in 2008 until September 2022, include empirical studies, conceptual studies, and literature reviews. The studies directed in different countries including India, Iran, USA, China, Germany and UK. Manufacturing and a blend of the manufacturing and service sectors were the most studied industries. Following our research objective, we bunched our analysis into three section namely, theoretical development of workforce agility, scale measurement, and contribution of HRM.

4.2 Theoretical development

Theoretical definition. 40 papers comprised a definition of the agility as a concept to study on the workforce level (see Table 1). Majority of below defined and mentioned definitions in table 1 consist of attributes mentioning dynamic environment i.e. newness, unpredictability, change, turbulence environment, speed, proactivity etc. Great variety of definitions and the

diverse overlapping directions (behavior, abilities, and attitudes) reveal the absence of agreement on what is intended by agility at the employee level.

Further repetition on theoretical development. Varied definitions are plotted, formed, evolved, edited and accepted in the area of workforce agility like Plonka (1997) van Oyen et al. (2001) define workforce agility as “Workforce agility that can be fervently fixed to diverse job or levels the value of a worker is mainly absorbed on how many competencies one has and how overgenerous one can be to attain a complete job.” While Breu et al. (2002) described “Receptivity to numerous customer necessities /to changing market circumstances/quickly emergent innovative skills /speed of progressing the skill for business environment/pace of innovative management competencies/Speed of acquiring novel IT competencies/Efficiency through functional boundaries/Comfort of juggling among projects/workforce empowerment”. Furthermore, Hopp and Oyen (2004) said “Features of employee agility incorporate of temporary flexi working hours, workforce training, competencies inclusiveness and intensity, data, and the practice of cross-trained workers with effective management.” And Jordan et al. (2004) mentioned Cross-training can reinforce workforce agility. While Sumukadas and Sawhney (2004) mentioned Ability of an organization’s workforce to be given a larger unpredictability of responsibilities, Chonko and Jones (2005) defined ” The ability of the sales team to respond to changes in appropriate customs and in due time.”, Joiner and Josephs (2007) mentioned “Executives use context-setting agility to examine their position, anticipation of considerable changes, and show initiatives. This characteristic also comprises the ability to adjust the optimum choice of an initiative and its estimated results. Stakeholder agile Leaders use stakeholder agility to categorize the important stakeholders, differentiate what they have at stake, and evaluate the significant to which their opinions and purposes are related with their own. Inventiveness agile adapts compound, innovative problems into foreseen outcome. Self-leadership agile leaders inhabit in self-leadership by defining the kind of leader they want to be”, Sherehiy et al. (2007) (2008) (2014) define” The characteristics of the workforce agility were bundled in three skills: proactivity, adaptivity, and resilience.”, Qin and

Nembhard (2010) state that ““the skill of people to revert deliberately to uncertainty”, Hahn et al. (2012)

Hosein and Yousefi (2012) described as ““the agility of a manager is formed by bundling numerous competencies and knowledge attained from experience, education and training.”, Alavi and Wahab (2013) defined ““Generally, agile workforce has two characteristics: cross training and flexibility”, Muduli (2013)(2017)(2016)labelled “Agile people is

systematized and self-motivated and having aptitude that can punctually carry the perfect competencies and knowledge at the right time, as desired by enterprise's demand", "It signifies to the aptitude of an employee to retort and adjust to changes sharply and appropriately and take assistance to benefit his/her firm. people with great agility performance are calm with changes, new ideas, and innovative technologies. Agility performance has three dimensions: proactivity, adaptability, and resilience." And "Agility contains of environment to envisage change and retorting in an suitable and effective way when changing situations want it." They are well-trained and flexible that can familiarize quickly and confidently to new estimates and market conditions. we may admit the following as the capability of an agile workforce. Adaptive, Flexible and speed, Wendler (2013) Alavi et al. (2014) said "The employees can react and acclimate to change swiftly and appropriately and the employees are capable of appealing advantage of changes to profit the firm, Sohrabi et al. (2014) define "a firm's competence to rapidly retort and achieve with the unanticipated internal and external environmental changes.", Al-Kasabeh et al. (2016) described "the ability of the workforce to respond to and keep well-informed of the unforeseen internal and external environment changes in a timely manner.', Goswami and Kumar (2018) Muduli and Pandya (2018) Pitafi et al. (2018) defined People agility deliberates to the ability of an employee to rapidly and appropriately retort to unforeseen changes and effect those changes as opportunities. Theoretically, it is comprised of three dimensions: proactivity, adaptability, and resilience, Abdelhamid and Sposato (2019) labelled Pace of responding to changing consumer requirements and market situations, i.e. workforce intelligence and capabilities, are measured as the prominent factors of an agile workforce, Bushuyeva et al. (2019)

Doeze Jager-van Vliet et al. (2019)	An agile manager has a prospecting viewpoint, a belief that they can substitute further due to the competence's developments within the firm.
	Employee agility appears to contain of two important features: (a) adaptive behaviour, (b) proactive behaviour, the following attributes are pragmatic as mechanisms fitting to agility: resilience, teamwork, coping with change, decisiveness, eagerness to learn, independence, and courage.
Frino and	'Ability for the workforce to react, through implementation, to continuing organizational

Desiderio (2019)	changes' (Wischnevsky, 2004). employees within the organization need to be agile, to adapt changes.
Joiner (2019)	The Leadership Agility framework has four dimensions: Context-setting agility, Stakeholder agility. Creative agility, Self-leadership agility.
Muafi and Uyun (2019)	Leadership agility is the ability to lead efficiently and effectively during quick change and uncertainty.
Pitafi et al. (2019)	Employee's agility, which emphasizes on the individual skill to respond and familiarize quickly the unforeseen environmental changes and benefit the organization through these changes.

. In a few researches, we sensed at least some agreement on certain essentials of the definitions (like functioning in uncertainty, novelty and challenges, adaptability/responsiveness to change, speediness, proactivity, resilience, and flexibility) and features for employee agility (like cross-training and skills), while other features such as people perspective, people integrity, people conflict resolution, courage and analysis are only imitated in only single definitions. Additional concern alarms the widely used tag to this research area i.e “workforce agility,” or “agile workforce,” or “employee agility” or “agile people”. However, in many definitions, “workforce agility” is theorized as an individual-level rather than organizational level, in that it alarms an obvious performance or skill of a sole employee. Therefore, in the following, we incorporate all labels under the tag “workforce agility”. Finally, we found that despite challenges regarding theoretical basis and clarity, some studies (e.g. Sherehiy, 2008) assisted as aligning ideas for further studies, which provided the base of a more similar research field but still lack developing its fundamentals further. To settle, we detect that due to the deficiencies specified above, theoretical clarity is not mainly well established. This is a challenge, because clearly and precisely definite fundamentals are the elementary basics of theory, and theory in turn formulae the supporting element of scale development, thus making the scale measurable (Hinkin, 1998) and this useful in real-world.

Table 1: References of literature in terms of definitions for “Workforce agility”

Sachin et al. (2019)	The workforce is made up of knowledge worker. It is an advanced work-based architecture or a workforce model systematized by employees who are not like casual, integrating job application with admittance to competency or authorities found within or outside the organization.’
Snyder and Brewer (2019)	An agile workforce validates flexible behaviors and proactively, adaptively, and resiliently responds to change. Agile behaviors match the magnitudes to retort swiftly to change. Finally, an agile workforce is a group of strategic and dynamic workers who can bring the right skills and knowledge at the right time.
Akkaya (2020)	Our manager is a role model for people who are exposed to novelty, sharing tasks, is flexible is adjust to change, brings psychological safety, is result focused on and has vision.’
Baran and Woznyj (2020)	The skill of a employee to sense and respond rapidly to change.
Fachrunnisa et al. (2020)	Agile leadership is a leader who can direct his team and often motivate his team behavior by defining, disseminating, and conserving vision. Agile entrepreneurs are preoccupied with serving extra value to customers. Leadership agility means agility in affecting people and make a change.

Harsch and Festing (2020)	Agile aptitudes are doers with potential, who act as multipliers and motivate to other workforces and advance the firm and build on its success. They are advanced, portable, customer-oriented, rough, and flexible, have a great ability to acquire and a great inclination to achieve.
Reitz et al. (2020)	leaders' ability to change
Storme et al. (2020)	'Agile employees are not only able to adjust to unexpected changes, but also to take gain of such changes.
Varshney and Varshney (2020)	Agile employees is expected to grasp imprecision and difficulty as well as exercise self-sufficiency when retorting to unforeseen events.
Wei et al. (2020)	Workforce agility denotes to the aptitude to retort to and adjust changes
Xing et al. (2020)	An entrepreneurial team must be agile sufficient to make quick modifications or versions, with an appropriate sense of effectiveness because being too initial or too late can be equally expensive.
Ghosh et al. (2021)	Can respond to a stormy and volatile marketplace.
Pereira et al. (2021)	workforce agility - proactivity, adaptability and resilience of workforce.

4.3 Workforce Agility attributes

Efforts towards nurturing workforce agility are various, across numerous disciplines, and at diverse classified levels. Terminologies and classification methods for characterizing

workforce agility are similarly varied. I found a substantial variety of Attributes to describe employee agility.

Table 2: Attributes of workforce agility

Researchers	Attributes
Breu et al. (2002)	Intelligence Competencies Collaboration Culture Information System
sherehiy (2008) Hosein and Yousefi (2012) Al-Faouri et al. (2014) Muduli (2016) Alavi et al. (2014) Sherehiy and Karwowski (2014) Sohrabi et al. (2014) Alavi (2016) Cai et al. (2018) Müceldili et al. (2020) Varshney and Varshney (2020) Wei et al. (2020)	Proactivity Adaptability Resilience
Suofi et al. (2014)	Intelligence Maturity Perseverance & Hard Work Creativity & Innovation Being responsive Flexibility Information & Communication
Fachrunnisa et al. (2020)	Share responsibility Effectiveness in recognizing problems making decisions Adaptive system Flexible structure

Muduli (2017) Muduli and Pandya (2018) Storme et al. (2020)	Adaptability Flexibility Development Collaboratives Speed Information Competency
Pitafi et al. (2018)	Resiliency Self-reflection & self-management Personal integrity & reliability Personal communication Relationships & interaction Leadership Teamwork Conflicts & crises Ingenuity Harmonization

Source:

As we seen in table 2, relatively large number of references defined, redefined or modified the attributes set by Sherehiy (2008) which are Proactivity, Adaptability and Resilience. Apart from which intelligence, flexibility (structure, team, task, system) and information system are largely mentioned attributes to measure workforce agility. Proactivity relates the level of engagement that contribute to the enterprise and employees themselves. However, adaptability specify behaviors, attitudes or skills to receive and involve in changes linked to labor settings, responsibilities, and prospects. On the other hand, resilience is basically connected to proactivity and it denotes to optimistic attitudes to change, novel technologies, innovative ideas and emergent ways of forming work and production (Muduli & Pandya, 2018).

4.4 Endorsing Workforce Agility

As we seen difficulties in defining workforce agility as well as diverse agility attributes relating to different sectors, Industries and continent. In the same manner it is difficult to endorse and imbibe the concept of employee agility in practical world. Table 3 reviews the diverse viewpoints and the key policies, strategies, and actions recognized as probable

mediators and agents of an agile workforce. This cataloguing is extensive for enterprise working in environments of ambiguity and rapid changes.

Table 3: Characteristics and dimensions of an agile workforce

Researchers	Characteristic	Dimension
Van-Oyen et al. (2001); Hopp and Van-Oyen (2004); Sumukadas and Sawhney (2004); Qin and Nembhard (2015); Hopp et al. (2004) Qin and Nembhard (2015) Alavi (2014); Muduli (2016) Sohrabi et al. (2014).	1.Cognitive abilities 2. Practical application of knowledge 3.Organizational 4. learning 5.Cross training	Training & Learning
Sherehiy and Karwowski (2014); Sumukadas and Sawhney (2004); Muduli (2016, 2017); Qin and Nembhard (2015); Varshney and Varshney (2020). Sumukadas and Sawhney (2004); Hopp and Van-Oyen (2004).	1. Self-Managed Team 2. Job enrichment 3. Job enlargement 4. Job rotation 5. Team work 6. collaboration 7. Autonomy	Job Demands
Sumukadas and Sawhney (2004); Muduli (2016, 2017); Qin and Nembhard (2015); Sumukadas and Sawhney (2004); Sumukadas and Sawhney (2004); Muduli (2016, 2017); Harsch and Festing (2020); Qin and Nembhard (2015).	1. Team-based group incentives 2. Non-monetary rewards 3. Talent management 4. Staffing 5. Feedback 6. Goal setting	HRM perspective
Sohrabi et al. (2014); Alavi et al. (2014); Muduli (2016, 2017); Muduli and Pandya	1. Horizontal structure 2. Information & Communication	Culture and structure

(2018);Sumukadas and Sawhney (2004); Muduli (2016, 2017); Cai et al. (2018); Pitafi et al. (2019).	3. Shared vision and goals 4. Empowerment 5. autonomy 6. decentralization of decision making	
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4.3 Scale measurement

We observed a significant diversity of measures to evaluate workforce agility, counting newly established scales (Table 4) as well and many researchers have occupied scales from previous studies (Table 5).

Table 4

References	No of Characteristics measured	Proficiencies Measured	Origin	Size of sample
et al. (2002)	10	Intelligence collaboration culture Information system		515
sherehiy (2008)	39	Proactivity adaptability resiliency (PAR)		
hahn et al. (2012)	4			
hosein and Yousefi (2012)	25	PAR	sherehiy (2008)	225
al-faouri et al. (2014)	13	PAR	sherehiy (2008)	430

suofi et al. (2014)		Intelligence, maturity Perseverance & hard Work creativity & Innovation Being responsive flexibility Information & communication		258
mooghali et al. (2016)	15	Intelligence & awareness merit collaboration culture use of IT		285
muduli (2016)	7 Items	adaptability flexibility Development collaboratives speed Information competency	Breu et al. (2002)	40
Braun et al. (2017)	5			392
goswami and Kumar (2018)	5			225
fachrunnisa et al. (2020)	4	share responsibility effectiveness in recognizing problems and making decisions adaptive system flexible structure	Parker et al. (2015)	519

Source: Katharina Salmen & Marion Festing(2021)

Contribution with respect to measurement of application**Table: 5**

References	Items	Content measured	Source	Size of sample
sumukadas and sawhney (2004), Joiner and Josephs (2007a) alavi et al.	1		sawhney and Piper (1999)	58
Joiner and Josephs (2007a) alavi et al. (2014)	25	Personality development Proactivity, Adaptability, resilience	sherehiy (2008)	384 161
sherehiy and Karwowski (2014)	29	PAR	sherehiy (2008)	176
sohrabi et al. (2014) alavi (2016)	26	PAR	sherehiy (2008) sherehiy (2008)	144 161
muduli (2017)	7	adaptability flexibility Development collaborativeness speed Information competency	muduli (2016)	524
cai et al. (2018)	15	PAR	alavi et al. (2014)	167
muduli and Pandya (2018)	7	resiliency adaptability	based on sherehiy (2008) muduli (2016)	344

Pitafi et al. (2018)	12	flexibility Development collaborativeness speed Information competency Proactivity, adaptability,resiliency	alavi et al. (2014) based on sherehiy (2008)	161
Doeze Jager- van Vliet et al. (2019)	31	adaptability, resiliency	cubiks (2014)	32
frino and Desiderio (2019)	6	–		371
muafi and uyun -2019	5	–	adapted from Joiner and Josephs (2007a); Joiner (2009a; 2009b); lediju (2016)	170
Pitafi et al.- 2019	22	PAR	alavi et al. – 2014	167
müceldili et al. (2020)	15	PAR	alavi et al. (2014) based on sherehiy (2008)	210
storme et al. (2020)	scale I: 7	scale I:	scale I:	$N = 808$
		adaptability	muduli (2017)	
		flexibility		
	scale II:12	Development	Muduli (2016)	

		collaborativeness		
		speed	sherehiy (2008)	N=256

Source: Katharina Salmen & Marion Festing(2021)

Our investigation discovered that nobody of the recently established scales had undertaken a general scale development procedure. In the situation of revised or adapted scales, researchers did not completely imitate scale testing. A comparatively great amount of the research used scales grounded on Sherehiy's measure (2008), and of these, again great variety of researchers used the scale in a reduced form.

5. Contribution of HR towards developing Workforce agility

As seen from table 3 various dimensions of HR has been observed through various researches. Listed as Training, cross-training, learning, Job demands, organic structure etc. Fostering agile workforce is of utmost important for survival of an organization and hence can be achieved through aligning HR capabilities with business vision and identifying and understanding the need of people and business. HR policies which endorse Flexibility can be a crucial feature in the framework of workforce agility, which provide an organization with competence with the ever-changing requirements of the competitive environment (Ketkar & Sett, 2010). Agility cannot be attained lacking people's knowledge and competencies (Hopp & Van Oyen, 2004; Plonka,1997). The utmost agile people benefit from their competencies by transforming. Cross-training has been revealed as influential approach for confirming workforce agility (Hopp & Van Oyen, 2004). Rewards, such as performance-based pay and incentives on improving performance have been revealed in further enhancing workforce agility. Whereas learning the involvement of people, Sumukadas and Sawh-ney (2004) presented that great people participation practices (such as job enrichment and job enlargement) promote agility within workforce. Team work is again a very prominent feature to foster agility among workforce. Researchers necessitates consideration to the internal, external, intra-group, and cross-functional team working culture (Breu et al., 2001). effective technology is central to get speed, flexibility and quick decision making among their people. numerous communications and network technologies, which covers computer-aided technology and DSS, can be used to backing and enhancing firm's flexibility (Yusufet al.,

1999).



Figure 1 - HR practices enhancing workforce agility

The above discussed strategies can be concluded in fig 1 showing agile HR strategies enhance agility among employees.

6. Paving way for future researchers

We contributed into founding theoretical simplicity, progressing research areas, and weighing the importance of HR in workforce agility research surfaces the mode for more exploration. Illustrating on the conclusions generated by this literature review, we descend the subsequent forthcoming study avenues. Primary, grounded on the recommended explained definition, it is essential to progress measuring and respecting clear methodical, typical procedures (e.g. Hinkin, 1998), conduct next, contextualized pragmatic study, and examine the role of HR systems and strategies in nurturing workforce agility.

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Efficacy of Telephysiotherapy in people with low back pain

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Abstract

Background: Telephysiotherapy is use of information and communication technology for Physiotherapy consultation and treatment purpose. Low back pain has been commonest cause of disability and impacts most people at some time in their lives. Therefore, this study aims to avail Physiotherapy services to people with low back pain within their home environment to improve functional ability and boost self-management.

Methods: This is an Interventional study where 30 subjects were enrolled for 4 weeks of telephysiotherapy intervention aged between 24-44 years. They were instructed to perform at least 14-21 exercise sessions per week. Oswestry disability index (ODI) and Numerical pain rating scale (NPRS) have been assessed prior and at the end of every week for 4 weeks.

Results: Data was normally distributed. Repeated Measures ANOVA was applied for ODI (p value< 0.05) showing significant difference at every week. Within Group comparison was done with paired T test showing significant changes in mean of pain intensity, sitting and standing sections in ODI.

Conclusion: Telephysiotherapy demonstrated Reduction in pain and improvement in functional abilities such as sleeping and sitting, thereby enhancing activities of daily living. Thus telephysiotherapy can be important tool for people with such common chief complaints and can be useful tool to improve health outcomes in people with low back pain.

Keywords: Telephysiotherapy, low back pain, activities of daily living

Introduction

Telephysiotherapy is use of information and communication technology, Sanjeev [1] defined Telephysiotherapy i.e. Real time Video Conference, e-health Applications, Store and forward Videos for Physiotherapy consultation and treatment purpose. Information and Communication Technologies have strong potential to address some health concerns dealt by both developed and developing countries in providing accessible, cost-effective, high-quality medical assistance. According to Holland [2] telemedicine with help of ICTs imparts better health care services over distant areas overcoming topographical and socio-economic barriers.

Low Back Pain represents a major social and economic problem. The prevalence of low back pain once in a lifetime is notified to be as high as 84%, where as that of chronic low back pain is about 23%, while 11–12% of the population being disabled by low back pain [3]. All age groups are equally affected; however, adults are more prone to have hampered quality of life than that of adolescents. According to Indian Council of Medical Research(ICMR) report near about 8% peoples of all states of India, and females are slightly high than male Yearly lived with Disability (YLD) low back pain [4].

People with Low Back Pain usually present with complaints of tenderness, stiffness or dull aching localized in lower back area called lumbar region or Para spinal area or above inferior gluteal folds, with or without leg pain [5]. The lower back pain is likely to origin from degenerative changes or trauma in intervertebral disks, facet joints, muscles, fascia, ligaments, vertebrae and neural networks. There are some potential Mechanical factors, such as lifting and carrying, occupational sitting, awkward postures, prolong standing and walking, pushing or pulling, bending and twisting; wrong office ergonomics that contribute to wear and tear and cause back pain in lower region of spine.

Conventionally, clinical management of LBP relies on face-to-face consultation between the Physiotherapist and the patient. However, this approach is not affordable or accessible to a large number of individuals, particularly those living in remote locations. Given the increase in use of technologies to scope up physiotherapy practice, telephysiotherapy has emerged as a potential alternative to deliver therapeutic interventions for Low Back Pain. Online Consultation ensures instant reporting of signs and symptoms and thereby, preventing the chronicity of the condition.

Recent guidelines recommend non-pharmacological management such as Physiotherapy intervention that includes exercise therapy and manual therapy [5]. Exercise therapy is widely used as a treatment for low back pain. For the prevention of low back pain exercise interventions seem to be effective to quite a good extent. However along with exercises, ergonomic advice, lifestyle modification, use of shoe insoles, practicing work ergonomics may show little effect on low back pain. Exercise interventions in Low Back pain is characterized by the exercise program design, delivery type, intensity, duration, inclusion of additional interventions, and the types of exercises included [6].

Materials and Methods

Study design:

This was an interventional study conducted between January'21 and March'21. It was accepted by CDSCO approved Research ethical committee, R K University. Informed consent was strictly recorded from each participant.

Intervention:

The mode of Communication was through Mobile Phone, as its use is widely spread even among less educated people and is convenient. Videos of each exercise with clear instructions in Gujarati and English Language were prepared beforehand data collection. Detailed Procedure of the programme was explained to patient in their own language via telephonic communication and consent was taken. These subjects were screened for Pain perception and functional disability via telephonic communication before prescribing exercise protocol. Necessary Calls were established between patient and Therapist every week (total five times in 4 weeks) to assess changes in pain perception, functional disability and gave necessary correction or modification of prescribed exercises when needed.

Outcome Measures:

The primary outcome was Oswestry disability index and secondary outcome was numerical pain rating scale. Both the measures were assessed before the intervention and at end of every week for 4 weeks.

Functional Assessment:

The Oswestry Disability Index (ODI) was selected as primary outcome measure. It is an easily understandable questionnaire divided into ten sections designed to assess limitations of various activities of daily living. Every section of the scale is scored on a 0–5 scale, 5 stands for the greatest disability. The ODI index is calculated by dividing the obtained score by the total possible score and then multiplied by 100 which is expressed as a percentage.

Pain Perception Assessment:

Numerical Pain Rating Scale is an eleven-point scale selected as secondary outcome measure in which a respondent verbally selects a number (0–10 integers) that best reflects the intensity of pain that they have perceived.

Exercise Protocol:

Exercise Protocol included two stability, two mobility and one strengthening exercise in order to improve functional Mobility and Structural Stability. Subjects were instructed to perform these exercises 3 times per day for 4 weeks.

TYPE	EXERCISE PRESCRIPTION
Stability Exercise	<ul style="list-style-type: none"> • Static abdominal Exercise • Bridging with Abdominal Bracing
Mobility exercise	<ul style="list-style-type: none"> • Supine Lumbar rotation • Prone On Hand lumbar Extension
Strengthening exercise	<ul style="list-style-type: none"> • Reverse Crunch

Results:

All Subjects belonged to Adult Age Group. Total 30 Subjects actively participated out of which there were 13 men and 17 women. Both genders with age ranged between 24 and 44 years participated. Mean Age of 30 subjects was 33.53. Although Low Back pain is prevalent in all age groups, subjects approaching for telephysiotherapy programme for low back pain were aged between 24 to 44 years.

Test for Normality was applied for analyzing data distribution where level of significant was considered <0.05 and Confidence Interval 95% Data Analyzed with Kurtosis and skewness which remain between +1.96 and -1.96, Shapiro Wilk >0.05 and Histogram observed Normal Distribution of Data for Oswestry Disability Index recorded on Day 1. Mean ODI i.e. Functional Disability caused due to low back pain showed reduction from 28.179 before intervention to 19.038 at the end of 4- week Protocol.

Mean NPRS i.e. pain perceived in lower back showed significant reduction from 6.13 before intervention to 2.19 after intervention. The sub sections of the Oswestry disability index were analyzed applying Paired T test, confidence interval set at 0.05. The p value of Pain Intensity, Personal Care, Lifting, sitting, standing, sleeping and travelling were less than 0.05, thus

there was significant improvement seen in these activities of daily living. The standard error of difference of section 8 social life was 0, thus t value cannot be calculated which suggests that there was no change in limitations related to social life. The p value of Walking and Employment/Homemaking was more than 0.05, thus accepting null hypothesis that there was no significant improvement seen in walking and occupational activities after the intervention.

There was significant increase in number of mild disability from 8 on Day 1 to 17 on Day 29. The number of Participants with moderate disability reduced from 18 to 12 in just 4 weeks. However, there was little reduction seen in number of participants with severe disability from 4 to 1 in a 4-week protocol.

Discussion

This study investigated the effect of a 4 week telephysiotherapy intervention on pain and disability in people with low back pain.

The exercises chiefly showed to be bring static stability more than dynamic stability in people with low back pain.

The objective of isometric abdominals was to induce analgesia and that of lumbar rotation and bridging was to decompress the par interarticularis of lumbar vertebrae that would have reduced pressure on facet joints minimizing stimulation of nociceptors n hence reduction in pain. The exercise of lumbar extension in prone lying position on hand thought to increase approximation of facet joints that helps increasing threshold level of facet joint compression which in turn brings change in the spinal reflex by mechanoreceptors as well as central pattern by pain perception. Given the accurate Dosage of exercises based on severity of condition, there was significant improvement seen in activities of daily living where static stability was more required e.g. sitting, standing, lifting. All exercises were prescribed in non weight bearing position either in prone lying or in supine, hence that could be the reason for increasing static stability more than dynamic stability.

Thus telephysiotherapy was found to be an important tool for treating mild to moderate low back pain and related disability.

Conclusion

In context to result and discussion we would like to conclude that telephysiotherapy is efficient tool to deliver physiotherapy assessment and treatment for people with low back pain. Telephysiotherapy demonstrated Reduction in pain and improvement in functional abilities such as sleeping, standing, sitting, travelling, lifting thereby enhancing activities of daily living. Thus telephysiotherapy can be important tool for people with such common

chief complaints .However, back pain during Occupational activities and walking needs to be taken into consideration to optimize the physical performance in ODI.

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Review of the Literature on Problems and Challenges in Teaching Successful Online Courses in Higher Education

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Abstract

Online learning has an impact on every aspect of teaching and learning in higher education. Many empirical studies have been conducted to examine issues with providing online courses, but few have synthesised past studies and provided an overview of these issues. Using Cooper's method, a literature review was conducted to identify these issues. The three primary areas of findings were issues with instructors, content development, and online learners. Among the issues that learners encountered were expectations, preparation, identity, and involvement in online courses. Among the issues teachers faced were changes in faculty responsibilities, the transition from face-to-face to online instruction, time management, and teaching strategies. Among the issues with content were concerns about content generation, the role of instructors in generating material, the use of multimedia in content, and the use of instructional approaches. To address these challenges with online education, higher education institutions must provide professional development for educators, student training, and technology support for content creation.

Keywords: Postsecondary education, pedagogical concerns, human-computer interaction, distant education and tele-learning, instructional methods

1. Introduction:

Online education has become more common in American higher education during the past two decades, and the majority of institutions of higher learning believe that this format of instruction is crucial for the future of higher education (Allen & Seaman, 2014). Online education is currently an essential part of higher education due to the availability of the internet and the flexibility of online courses (Li & Irby, 2008; Luyt, 2013; Lyons, 2004). A larger focus is being placed on using online education by many higher education institutions due to the expectations of students and their financial struggles (Limperos, Buckner, Kaufmann, & Frisby, 2015). Given the advantages it offers to institutions, instructors, and students, it is scarcely remarkable that online education has received so much interest (Konetes, 2011).

Numerous empirical studies have been conducted to look at various aspects of online course quality. Studies have recognised and looked at important elements that affect the quality of online education, including communication, technology, time management, pedagogy, and assessment (Bassoppo-Moyo, 2006; Conaway, Eston, & Schmit, 2005; Ko & Rossen, 2010; Limperos, et al., 2015). By providing tools and opportunities for collaboration on curriculum development, organisations like Quality Matters and the Online Learning Consortium may raise the quality of online education in higher education. However, there is a need for literature reviews that further synthesise and integrate the results of empirical studies and give an overall assessment of the current challenges associated with teaching online courses. According to Mayes, Luebeck, Yu Ku, Akarasriworn, and Korkmaz (2011), online educators typically face the difficult job of sifting through the fast expanding body of information to identify these issues for themselves.

2. Method:

Cooper's (1988) method for synthesizing literature was used to conduct a literature review in order to achieve the objectives of the study. This method involved the following steps: formulation of the problem, data collection, assessment of the appropriateness of the data, analysis and interpretation of the pertinent data, and organization and presentation of the findings. A model that depicts the issues that impact the delivery of online courses and how these issues connect to one another was created using the findings. For the purposes of this study, online education is defined as credit-bearing postsecondary coursework that is delivered fully online utilizing learning management systems (LMS) like Blackboard or Moodle. This study focuses on online courses offered by American academic higher

education institutions, including for-profit, private, and public universities. Students take online courses as part of their degree requirements.

3. Problem Formulation:

The problem is that educators have been sidetracked from thoroughly defining the most challenging facets of online course delivery and assembling an overall picture based on earlier research because of the rapid adoption of online learning in higher education. Studies have brought up a lot of challenges, but they haven't been organized into any kind of theme categorization to provide online educators with an organized overview of the problems (Mayes et al., 2011). For example, Brooks (2003) identified instructor attitudes as a major issue affecting the delivery of online courses. Arbaugh (2005) listed technology, student behavioral characteristics, and teacher teaching approaches as three of the main issues. According to Jacobs (2014), student assessment is a big issue with online courses. Yueng (2001) lists instructor and student support, course development, course structure, and how the institution evaluates online learning as major areas of concern.

In order to acquire a whole picture of the issues with teaching online courses, educators may need to spend more time assessing the research because to the vast variety of diverse reports. To address the issue and give a consistent classification of reported issues with online course instruction, the following question served as the review's driving principle: What are the primary issues and challenges preventing American higher education institutions from offering online courses?

4. Data Collection:

Locating empirical research on identifying issues in online education that had been published in peer-reviewed journals between 1990 and 2015, including quantitative, qualitative, mixed methods, and literature reviews, was the goal of data collecting. Some of the keywords used included distance learning, e-learning, online instruction and issues, web-based instruction, online teaching and challenges, course redesign, instructional design and online learning, curriculum design and online faculty, and online courses and issues. Among the databases used for the literature search were Google Scholar, the Educational Resources Information Centre (ERIC), JSTOR, Teaching and Learning Journals, Conference Proceedings, and EBSCO HOST.

5. Data Evaluation and Analysis:

104 items were found using the method given. The collected articles were examined utilising the content analysis approach in accordance with the study's main problem (Strauss, 1987).

When choosing which studies to include or omit, factors such as the subjects taught in online courses, student demographics, and course levels (undergraduate vs. graduate) were not taken into consideration. Instead of looking at higher education institutions as a whole, the focus was on including research at the level of particular online courses that the school provided. In other words, rather than institutional factors like administrative regulations, financial matters, or the development of online programmes, research that was considered for the evaluation concentrated on issues connected to teaching and learning in online courses. The works were assembled into major subject topics. Additional topics were added to the data until all new data could be categorised within the preexisting themes. Of the 104 publications on online courses that were found, 25 dealt with concerns impacting students, 23 with content design, 45 with problems affecting teachers, and 11 with problems affecting teachers, students, and material simultaneously. We excluded from our research the remaining articles that did not cover specific subjects in the aforementioned three categories.

6. Limitation:

Although the review was incomplete, the literature search for the study was extensive and meticulous, using a framework to find as many pertinent papers as was practical. The results were limited to those that surfaced in the databases that the aforementioned keywords were used to search. It's possible that there were more, comparable research in the literature that went unnoticed and unconsidered for our assessment.

7. Results:

The following three major themes of learner, instructor, and instructional challenges emerged after a review of the research and classification of the findings into key topic issues.

8. Issues Affecting Learners

Expectations, readiness, identification, and participation in online courses are the four categories in Table 1 that the study of the literature suggests should be used to group learner-related challenges.

Learners' expectations

• Table 1. Learners' Issues and Related Sources

Learners' issues	Sources
• Expectations	a. Li and Irby (2008) b. Lyons (2004)

<ul style="list-style-type: none"> • Readiness • Learning style • Cultural differences • Technical skills • 	<ul style="list-style-type: none"> • Aragon, Johnson, and Shaik (2002) • Hill (2002) • Hung, Chou, Chen, and Own (2010) • Luyt (2013) • Mayes et al. (2011) • Peng, Tsai, and Wu (2006) • Roper (2007) • Smith et al. (2003) • Tsai and Lin (2004)
<ul style="list-style-type: none"> • Identity • Isolation • 	<ul style="list-style-type: none"> • Goodyear and Zenios (2007) • Koole (2014) • Lapadat (2007) • McInnery and Roberts (2004)
<ul style="list-style-type: none"> • Participation 	<ul style="list-style-type: none"> • An and Frick (2006) • Ching, and Hsu (2015) • Hew and Hara (2007) • Hrastinski (2008, 2009) • Ice, Curtis, Phillips, and Wells (2007) • Morris et al. (2005) • Olesova, Richardson, Weasenforth, and Meloni, (2011) • Romiszowski and Mason (2004) • Vonderwell and Zachariah (2005) • Wise, Speer, Marbouti, and Hsiao (2013)

It can be challenging and perhaps impossible to teach online courses effectively due to student expectations (Li & Irby, 2008; Luyt, 2013). Some students could have unreasonable expectations, such as the demand for instant response on their projects and online comments, or they might come out as rude and forceful in their emails. Others might not take the assignment due dates seriously, while some could question their performance (Li & Irby,

2008; Lyons, 2004). By defining their course policies and procedures at the beginning of the semester, teachers may prevent students from developing unjustified expectations.

Learners' Readiness.

The readiness of learners to enrol in online courses is one of the major themes discussed in the literature (Hung, Chou, Chen, & Own, 2010; Smith, Murphy, & Mahoney, 2003). Not all learners can successfully finish online courses. Learning styles and skills required to participate in online courses may be challenging for learners to recognise and adjust (Mayes et al., 2011; Luyt, 2013). Learners must be primarily motivated by and guided by themselves. Online instructors must be ready to help learners who need it. To better support learners, the essential elements or aspects of preparation should be made more explicit. Research suggests that a learner's technical familiarity with computers and the Internet, attitudes towards and perceptions of the Internet, cultural and non-English backgrounds, and time management skills may all affect how prepared they are to participate in online courses (Peng, Tsai, & Wu, 2006; Tsai & Lin, 2004; Luyt, 2013).

A helpful overall model with five primary readiness criteria and a tool to assess the dimensions was offered by Hung et al. (2010) to help learners discover the essential skills. The five characteristics are motivation for learning, learner control, computer and Internet self-efficacy, and online communication self-efficacy (Hung et al. 2010). First, self-directed learning is defined as a process in which students take charge of determining their learning needs, establishing learning objectives, and putting learning strategies and evaluation into action (Knowles, 1975).

Learners' Identity.

In online courses, students' sense of isolation and alienation may hinder learning (McInerney & Roberts, 2004). Students' ties to the learning community have an impact on how they feel about themselves and how much they are learning (Koole, 2014). From a social constructionist perspective, learners' identities are jointly created by them and the social society in which they participate. Supporting students in developing a shared sense of identity, meaning, and norms is therefore essential (Koole, 2014; Lapadat, 2007).

Learners' participation

The type of student participation and engagement in online situations is a key subject that academics frequently discuss. Some researchers (Romiszowski & Mason, 2004; Vonderwell & Zachariah, 2005) regarded writing interactions with peers and teachers as participation, while others asserted that students who observed the interaction and spent more time reading than writing were still actively engaged in their learning (Hrastinski, 2008, 2009; Wise,

Speer, Marbouti, & Hsiao, 2013). Students' participation in online discussion is significantly influenced by a complex phenomenon known as online listening and observation. According to research (Wise et al., 2013), 96 undergraduate students attending 3-week online courses spent three-quarters of their time participating in or following online discussions. According to Romiszowski and Mason (2004), there hasn't been much debate in the literature challenging the assumption that infrequent contributors are passive consumers rather than actively engaged in learning. Online listening or viewing, however, is a form of active learning since it entails engagement with the subject matter, thought, and reflection (Hrastinski, 2009). This is founded on the concept of "vicarious learning," in which people pick up knowledge by listening to other people's talks (McLendree, Stenning, Mayes, Lee, & Cox, 1998; Kolb, 1984). Understanding and appreciating the many ways that students interact online is a lesson that online instructors should take to heart. It would be simplistic to judge a student's participation just by the quantity or length of their online postings. It is possible to use a more comprehensive framework that incorporates doing, talking, thinking, and feeling—activities that take place in both online and offline environments—to assess learners' online participation (Hrastinski, 2008, 2009; Wise et al., 2013). This framework is based on the social perspectives on learning discussed by Vygotsky (1978), Wenger (1998), and Sa ljo (2000). Using audio or video conversation has certain drawbacks, including the difficulty of quickly extracting ideas from long remarks as compared to text comments (Ching & Hsu, 2015). Generally speaking, it has been suggested to use audio or video interaction to promote community, break the ice, and as a complement to text postings for clarification and elaboration.

Issues Related to Content

A review of the literature revealed four categories for the classification of content-related issues, as shown in Table 2: the role of instructors in developing content, the incorporation of multi-media into content, the role of instructional strategies in developing content, and considerations for content development.

Content development and instructors.

Most online courses include prepared material that professors use to instruct students. These courses deal with the problem of underempowered educators (Evrin, Correia, & Thompson, 2011). According to Rennert-Ariev (2008), in these conditions, the significance of instructors in creating, moulding, and merging their own experiences into the course material has been diminished. Online educators are asked to take part in the content creation process and play

an autonomous and active role by routinely questioning their assumptions about online education (Evrin et al., 2011).

The design and creation of course materials may come under the teachers' responsibility for online courses. It could be challenging to develop new materials or modify resources from in-person sessions for usage online (Li & Irby, 2008). Teachers typically lack the essential support and training when transferring course material from face-to-face contexts to online ones (Kyei-Blankson & Keengwe, 2011).

Table 2. Content Issues and Related Sources.

Content issues	Sources
<ul style="list-style-type: none"> • Development and instructors 	<ul style="list-style-type: none"> • Allen and Seaman (2010, 2014) • Evrim, Correia and Thompson (2011) • Hoyt and Oviatt (2013) • Herman (2013) • Kyei-Blankson and Keengwe (2011) • Koehler, Mishra, Hershey, and Peruski (2004) • Li and Irby (2008) • Parker (2003) • Rennert-Ariev (2008)
<ul style="list-style-type: none"> • Content and multimedia 	<ul style="list-style-type: none"> • Almala (2005) • Hathaway (2013) • Mayer (2014) • Miller (2014) • Niess and Gillow-Wiles (2013) • Yue et al. (2013) •
<ul style="list-style-type: none"> • Content and instructional strategies 	<ul style="list-style-type: none"> • Chametzky (2014) • Jacobs (2014) • Luyt (2013) • Niess and Gillow-Wiles (2013) • Twigg (2005)

	•
• Content and consideration	<ul style="list-style-type: none"> • Allen et al. (2013) • Gikandi, Morrow, and Davis (2011) • Miler (2014)

Content from a face-to-face setting cannot simply be copied and pasted into an online setting. Koehler, Mishra, Hershey, and Peruski (2004) advise teachers to consider content, pedagogy, and technology while developing online courses. Teachers might not want to change their pedagogical approaches while moving from a face-to-face to an online course, though (Barrett, 2010).

In addition to a lack of training and support, instructors think there aren't enough incentives for developing and delivering online courses (Allen & Seaman, 2010). By offering suitable incentives, an instructor's motivation to design and teach an online course is boosted (Hoyt & Oviatt, 2013). Although extrinsic financial benefits may not always be what faculty want, institutions are recommended to talk with professors before deciding what rewards to provide (Herman, 2013). Teachers may be persuaded to instruct online courses by a flexible schedule and their own feeling of fulfillment. Other extrinsic motivators, such as a reduced workload and more leisure time, could be more effective than monetary benefits (Parker, 2003).

Content and multimedia:

In order to enhance the learning experience, constructivist theory principles may be applied to create material based on strategies such integrating multimedia (Almala, 2005). Multimedia includes, among other things, educational video games, movies, and simulations. It's important to keep in mind that creating online courses entirely with multimedia isn't always the ideal approach. Teachers should think about how technology can improve the instructional plan. If multimedia is used incorrectly, learning may suffer (Yue, Bjork, & Bjork, 2013). According to multimedia learning theory, there are three instructional design methods that can improve learning: less-is-more, more-is-more, and focused-more-is-more (Mayer, 2014). The less-is-more approach places an emphasis on omitting or eliminating irrelevant material to avoid detracting from learning.

Content and instructional strategies:

Online course material should be learner-centered in accordance with andragogy principles (Chametzky, 2014; Luyt, 2013). Peer collaboration is another strategy to enhance learning and engagement in online courses (Niess & Gillow-Wiles, 2013). The curriculum should

contain cooperative activities with corresponding rubrics indicating expectations for interaction and participation. When developing content for an online course, it is advisable to include cooperative activities, reflective exercises, defined assessment criteria, and technology integration (Niess & Gillow-Wiles, 2013). Utilising course redesign approaches is another effective strategy teachers may use to effectively move their in-person classrooms to online courses and include technology into the latter. Gilroy (2006) and Spiceland, Spiceland, & Schaeffer (2015) both found that updated courses are more cost-effective and had greater retention rates. Using multimedia technology and andragogy concepts, course redesign strategies enable interactive learning in online contexts (Twigg, 2003). To assist students in topic mastery, the provision of automated feedback, small discussion groups, online tutorials, and a supportive learning community are among the major components of course reform (Twigg, 2005).

Considerations for content development: The content should be provided throughout the whole course in easily consumable portions, and students should have a clear knowledge of how the course progresses (Allen, Kiser, & Owens, 2013). Better student understanding depends on both clear assignment instructions and giving students additional time to complete online collaborative learning activities (Allen et al., 2013; Miller, 2014). The information should be presented in manageable pieces throughout the whole course, and students should be able to see how the course progresses (Allen, Kiser, & Owens, 2013). Better student understanding depends on both clear assignment instructions and giving students additional time to complete online collaborative learning activities (Allen et al., 2013; Miller, 2014).

Issues Related to Instructors: According to the analysis of the literature, issues with instructors may be divided into four main categories, as indicated in Table 3: changing faculty duties, switching from in-person to online education, managing faculty time, and instructional methodologies.

Changes in faculty role: One of the main challenges in online education is the instructor's changing position (Berge & Collins, 1996; Coppola, Hiltz, & Rotter, 2001; Syverson & Slatin, 2010). According to Berge (1998), online instructors are given one of four roles: instructional, social, managerial, or technological responsibilities. The terms "pedagogical responsibilities" and "social responsibilities" refer to teaching methods, "managerial responsibilities" to tasks involving administration and organisation, and "technical responsibilities" to the technical support that instructors provide to students, respectively. The

majority of pedagogical assignments are how online instruction achieves its educational objectives (Doll, 1993; Robertson, 2000).

Other literature emphasizes the ability to deliver content, transition from teacher-centered to student-centered education, improve communication, and use technology, which supports the change in the role of the instructor (Berge & Collins, 1996; Choi & Park, 2006; Coppola et al., 2001; Doll, 1993; Fein & Logan, 2003; Juan, Steegman, Huertas, Martinez, & Simosa, 2011; Neely & Tucker, 2010; Robertson, 2000; Syverson & Slatin, 2010; Yang & Cornellius, 2005). A new position for the teacher—that of a facilitator—was created as a result of the transition from faculty-centered education (faculty lectures) to a more student-centered approach. According to Coppola et al. (2001), the job of the faculty shifts from "performer" in front of a live class delivering knowledge in the lecture-style to "guides" who must adapt the distribution of content based on their online settings. In other words, rather than serving as an expert who guides students' learning, an online teacher now serves as a knowledge transmitter (Juan et al., 2011). Instructors encourage students' learning (lead lecture) rather than lecturing them in this role. The instructor may also provide instructive remarks, draw attention to organisational or management techniques, and promote student cooperation (social interactions; Berge, 1998; Yang & Cornellius, 2005).

Table 3. Instructors' Issues and Related Sources.

Instructors' issues	Sources
Changing role of faculty	Berge (1995) Berge and Collins (1996) Choi and Park (2006) Coppola et al. (2001) Doll (1993) Fein and Logan (2003) Juan et al. (2011) Neely et al. (2010) Robertson (2000) Syverson and Slatin (2010) Yang and Cornellius (2005)
Transition from face-to-face to online	Anderson et al. (2011) Baran, Correia, and Thompson (2011)

Communication barriers Student vs. faculty lead courses Instructor's interest Teacher preparation programs	Chang, Shen, and Liu (2014) Coppola et al. (2001) Crawley et al. (2009) Edge et al. (2000) Fein and Logan (2003) Juan, et al. (2011) Limperos, et al. (2015) Osika et al. (2009) Sherry (1996) Sundar (2007; 2008)
Time	Anderson et al. (2011) Capra (2011) Cavanaugh (2005) Fein and Logan (2003) Juan et al. (2011) Li and Irby (2008) Kyei-Blankson and Keengwe (2011) Moreland and Saleh (2007) Mbuva (2014) Tunks (2012)
Teaching styles	Anderson et al. (2011) Bawane and Spector (2009) Choi and Park (2006) Crawley et al. (2009) Fein and Logan (2003) Graham et al. (2001) Juan et al. (2011) Limperos et al. (2015) Moreland et al. (2007) Sundar (2007) Tunks(2012)

The multiplicity of responsibilities is more difficult to manage for an online instructor who is a novice teacher. According to Choi and Park (2006), online courses offer potential for student-teacher involvement as well as a demanding workload for new teachers. The primary pedagogical challenge is caused by teachers' inability to smoothly adapt their in-person course contents to the online environment (Choi & Park, 2006). Professors have challenges with online education's design, delivery, and follow-up stages, according to Fein and Logan (2003). Teachers must take into account how students learn and what to include during the design phase of the course in order to make sure that the materials are interesting and engaging for the students. A few of the suggested choices include the use of media, lecture notes, and other sources that could augment the course materials. Since many lecturers are unable to adapt the material for the online format, delivery problems exist. The follow-up phase covers concerns like material distribution and data storage. Instructors may notice a discrepancy between the content that is actually provided in the classroom and the design of the curriculum and design team in addition to the uncertainty around the transfer of information from one medium to another (Neely & Tucker, 2010).

These specifications cover those for teachers, students, groups, and employees. If there are no defined guidelines and expectations for the faculty to follow, it is impossible to assess how effectively these online courses are performing. According to Anderson et al. (2011), they seldom modified their training based on student feedback, as they would in a face-to-face session.

According to Anderson et al. (2011), Fein & Logan (2003), and Juan et al. (2011), the mode of delivery used for online education varies from traditional face-to-face instruction in that student interactions are primarily between students and their peers and technology. Of course, as demonstrated by Fein and Logan (2003), the curriculum and technology designers must accommodate this modification in the instructor's role. The opportunity for instructors to promote relationships between students and their peers was described by Coppola et al. (2001) as a role shift. The interactions between the LMSs may vary, but they are still essential to the success of the course. Many instructors struggle to teach the content and engage their students due to a lack of visual and face-to-face engagement with them (Crawley, Fewell, & Sugar, 2009). They feel less in control of how to alter their teachings as a result.

The interactions between the LMSs may vary, but they are still essential to the success of the course. Many teachers struggle to teach the subject and engage their students since they don't have face-to-face or visual engagement with them (Crawley, Fewell, & Sugar, 2009). In turn,

individuals experience a decrease in their sense of control over how to alter their teachings. In accordance with the changing role of the faculty, the emphasis is shifting from face-to-face, instructor-led classrooms to more student-led or student-focused classrooms in the online setting. The traditional lecture model of the classroom is less likely to be successful online due to the requirement to adjust knowledge delivery to a dynamic interactive environment (Kember & Kwan, 2000). Another issue is striking the correct balance between providing technology's "bells and whistles" and the content necessary to assess students' learning outcomes (Fein & Logan, 2003, p. 47). The "bells and whistles," as suggested by Fein and Logan (2003), might not always produce the best outcomes for students who might be easily distracted by the videos, graphics, and other similar technologies used in the classroom and miss the opportunity to participate in class discussions that could lead to learning. According to Edge and Loegering (2000), these issues need raising resources to match those devoted to running the class and sustaining the online presence. As a result, professors usually find that giving lectures online requires more time than giving lectures in-person.

Fear of the unknown or a challenge communicating with students in an online context may be to blame for this anxiety. Due to their fear of the unknown, many instructors were concerned that they will be replaced by computers (Berge & Collins, 1996; Osika et al., 2009). Because they believe that the online environment is cold and distant for students, some instructors have yet to connect the subject matter to the best manner to teach their lectures online. The second issue is that online education preparation courses' instructors may not be aware of how to educate educators for the transition from traditional face-to-face training to online teaching (Baran, Correia, & Thompson, 2011). One of the problems mentioned in a number of studies is that teachers are adapting their conventional teaching techniques to online learning, but it doesn't appear to be working (Coppola et al., 2001). The issue is that there should be a different way to examine online teaching methodologies and faculty development programmes in order to take into account fresh methods to support better education for students.

Time: One of the major issues teachers have is the demand on their time because it takes a lot of work to set up, organise, and teach an online course (Capra, 2011; Fein & Logan, 2003; Humphries, 2010). Professors must spend twice as much time per student preparing for and instructing an online class as they would in a traditional one (Cavanaugh, 2005). One of the major issues teachers have is the demand on their time because it takes a lot of work to set up, organise, and teach an online course (Capra, 2011; Fein & Logan, 2003; Humphries, 2010).

Additional recommendations for enhancing the effectiveness of online instructors come from Juan et al. (2011). These include the use of different e-learning techniques and strategies like dynamic presentations, laboratory tutorials, simulations, conceptual discussions, interaction and collaboration with students to support their activity, exploration, and knowledge development.

Teachers must take advantage of the tools available while also considering the most effective manner to teach the topics if they want the greatest outcomes for student learning. The teacher is by far the most important factor in a student's success in an online course (Tunks, 2012). The students' learning outcomes are entirely dependent on the instructor's communication, community-building, and delivery of the essential lesson. More proof shows that in order to ensure the success of online learning, faculty-student interaction is necessary. This interaction needs to be personal, which means getting to know the students well, being able to relate to them, and giving them a sense of belonging in the classroom. Students laud educators who "have that personal touch" and employ modern technologies for student involvement. Researchers have emphasised the need for faculty to be knowledgeable about the communication channels accessible to foster innovative and fruitful engagement with students, to use the software to foster a sense of community among the class members, and to give students the opportunity to interact in ways that foster the bonds necessary to be a part of the class community (Bawane & Spector, 2009; Fein & Logan, 2003; Limperos et al., 2015; Sundar, 2007, 2008; Tunks, 2012).

According to the data that has been evaluated, one recommendation would be to provide new teachers the opportunity to observe more senior and seasoned professors in order to guarantee that effective teaching methods are passed on. The results of the Anderson et al. (2011) study, in which the instructors believed that student feedback may assist them in improving course assignments and student learning, provide an alternative strategy for addressing the challenges teachers and students face in the online classroom. Students may have the opportunity to talk on what works or doesn't for them as they complete each activity while enrolled in the course. This approach could assist instructors in making the necessary adjustments while they conduct online courses to create the best learning environment for their students.

8. Conclusion:

Utilising Cooper's methodology, a literature review of the subject was conducted in order to identify the issues and challenges related to teaching online courses. There were three primary categories of findings regarding the challenges faced by online teachers, students, and material producers. The relationships between the three primary groups and related issues are depicted in Figure 1. The challenges that affected learners were expectations, readiness, identity, and involvement in online courses. Concerns for content development, the role of instructors in generating content, the use of multimedia in content, the use of instructional techniques, and other content-related topics were all addressed. The problems affecting instructors fell into four categories: shifting faculty responsibilities, switching from face-to-face education to online learning, time management, and teaching strategies. The results of this review of the literature suggest that in order to address the problems with online education and boost the effectiveness of online teaching and learning, higher education institutions should provide professional development for teachers, training for students, and technical support for the development and delivery of online course materials.

Higher education institutions are crucial in raising the standard of online education by assisting instructors, learners, and material creators. The three basic components of instructors, students, and material are continually influencing one another in the dynamic environment of online learning, as shown in Figure 1. These three components are significantly influenced by institutional support as well.

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A study on Problem face and benefit derived by end users (clients) on financial services and product offered by Business

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Abstract

Financial inclusion is the delivery of financial services at affordable cost to sections of disadvantaged and low-income segments of society. Achieving financial inclusion is the mission of government for which many initiatives have been taken. Appointing business correspondents is one of them.

Business correspondent model was introduced in the year 2004 to overcome the limitation of opening of brick and mortar branches. Engaging more business correspondents can ease the burden of opening bank branches in the areas where profitability is less. Business Correspondents are appointed as bank agents and are assigned dedicated villages. Business Correspondent provide basic financial services like opening saving accounts, small financial transactions, assisting loan services and other basic financial services on commission basis. Business correspondents are linked with a branch which acts as their home branch and provides a necessary hand holding facilities. The present paper is on “A study on Problem face and benefit derived by end users (clients) on the financial services and product offered by Business Correspondents.”

The present paper focuses on problem faced and benefit derived by end users (clients) on the financial services and product offered by Business Correspondents. It further outlines areas of intervention required to strengthen Business Correspondent Model. Further suggestions for better working of the model will be provided after analysing the ground situation.

Keywords: Business Correspondent Model, Business Correspondents, Financial Inclusion

Introduction:

Business Correspondents (BCs) have emerged as key entities in the financial inclusion landscape, especially in areas where traditional banking infrastructure is limited. BCs act as representatives or agents of formal financial institutions, extending their services to individuals and communities who would otherwise have limited access to financial products. This study aims to delve into the challenges faced and examine the benefits derived by end users through BCs' financial services and products.

Methodology: Qualitative research methods were utilized to collect data for this study. Interviews and surveys were conducted with end users who have utilized financial services provided by BCs. The sample consisted of individuals from diverse socio-economic backgrounds, representing both rural and urban areas. The interviews and surveys were designed to capture insights regarding the challenges faced and benefits derived by the clients.

Results:

Challenges Faced by End Users: The study identified several challenges faced by end users in accessing financial services through BCs:

1. **Limited Awareness and Understanding:** Many end users, particularly those from rural or marginalized communities, have limited awareness and understanding of the financial services and products offered by BCs. This lack of knowledge hinders their ability to fully utilize the available services.
2. **Inconsistent Availability of BCs:** End users may encounter challenges in accessing BCs due to their limited presence in certain areas or irregular working hours. This can restrict their ability to carry out transactions or seek assistance when needed.
3. **Connectivity Issues:** BCs often rely on technology infrastructure such as mobile networks or internet connectivity for their operations. In areas with poor or unreliable connectivity, end users may face difficulties in accessing financial services or conducting transactions smoothly.
4. **Complex Documentation Requirements:** Some financial services, such as opening bank accounts or applying for loans, may involve complex documentation processes. End users who are unfamiliar with these requirements or lack the necessary documents may face barriers in accessing the services.

5. Delays in Transaction Processing: End users may occasionally experience delays in transaction processing, leading to inconvenience or financial uncertainty. This can be caused by technical glitches, administrative procedures, or connectivity issues.
6. Privacy, Security, and Trust Concerns: End users may have concerns regarding the privacy and security of their financial information when interacting with BCs. Building trust between clients and BCs is crucial for encouraging broader adoption of financial services.

Benefits Derived by End Users: The study also highlighted significant benefits derived by the clients from BCs' financial services:

1. Increased Convenience and Accessibility: BCs provide convenient access to financial services, particularly in remote or underserved areas where traditional banking infrastructure is lacking. This allows end users to conduct transactions and access financial products closer to their homes, reducing travel costs and time.
2. Simplified Account Opening Procedures: BCs often simplify the account opening process, making it easier for individuals, including those without formal identification documents, to open bank accounts. This promotes financial inclusion by enabling previously unbanked individuals to participate in formal financial systems.
3. Flexibility in Transaction Amounts: BCs typically offer flexibility in transaction amounts, allowing clients to perform small transactions based on their immediate needs. This flexibility is particularly beneficial for individuals with irregular income streams or limited financial resources.
4. Access to Credit for Small Businesses: BCs facilitate access to credit for small businesses and entrepreneurs who may struggle to obtain loans from traditional financial institutions. This enables economic growth and entrepreneurship within underserved communities.
5. Financial Literacy and Guidance: BCs play a vital role in improving financial literacy among end users. They provide guidance on financial management, savings, and the benefits of using formal financial services. This empowers clients to make informed decisions about their finances.
6. Social and Economic Empowerment: By providing financial services and products, BCs contribute to the social and economic empowerment of end users. Access to formal financial services enables individuals to save, invest, and protect themselves against financial risks, leading to improved livelihoods and a higher quality of life.

Discussion:

The study emphasizes the importance of addressing the identified challenges to enhance the effectiveness and efficiency of BCs in delivering financial services. Measures such as improving client awareness through targeted financial education campaigns, expanding the network of BCs, enhancing connectivity infrastructure, simplifying documentation requirements, and ensuring data privacy and security are recommended.

Conclusion:

Business Correspondents play a critical role in bridging the financial inclusion gap by extending financial services to underserved populations. While certain challenges exist, the benefits derived by end users through BCs are substantial. By addressing the identified challenges and leveraging the advantages provided by BCs, financial inclusion efforts can be further enhanced, positively impacting the lives of individuals and communities.

“A study on factors affecting career progression of teaching staff in education sector with reference to Bhavnagar region.”

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Abstract

Career progression, quite simply put, is the process of climbing the ladder during your working life. Moving forward, being promoted, finding new challenges, new employers, new opportunities and getting the most out of your career. There are a huge number of aspects and elements that can contribute to successful and efficient career progression and, like most things in life, there are some aspects that we have no control over and that are hard to predict. That said, there are a number of really vital things that we can affect and impact, which can lead to better career progression, promotions in our work and successful career ladder climbing. In this guide, we will explore exactly what these contributing factors are, how we can effectively progress our careers and investigate how we can steer our working life in the right direction. One popular dictionary definition of career progression is ‘the process of making progress to better jobs’ we define career progression not simply as finding better jobs but as staying in current jobs and roles too, while receiving greater responsibility, satisfaction and success (whatever each individual defines ‘success’ to be). Career progression is not simply about finding a new and ‘better’ job, but it’s also about receiving a pay rise, being given additional responsibilities.

Teachers have a proud place everywhere in the world. Since ancient times, the teacher has made full contribution in the society and nation building. Education is lifeless in the absence of a teacher. Scholars have rightly said that "Doctor's mistakes are buried in the grave; Engineer's mistakes are buried in a pile of bricks, stones; Lawyer's mistakes and administration's mistakes die in files, but teacher's mistakes are exposed in front of the nation and society. It cannot be hidden or buried in any way.

Columbus said that "the teacher is such a unique human being who has learned to use himself effectively and efficiently to accomplish the task of educating to others in the society."

Introduction

Organizations in the education sector include traditional colleges and universities as well as companies focused on training and development for clients that range from an individual learner to global corporations to online content delivery. As a whole, the industry is responsible for training individuals of all ages to learn new skills, obtain meaningful employment, and help accelerate the economic growth, by delivering education in traditional classroom settings or via online training over the Internet. The education industry also includes ancillary education services, such as after-school tutoring, charter schools, special or alternative education, educational content suppliers, and the professional development of administrators and teachers.

Education is a human right, a powerful driver of development, and one of the strongest instruments for reducing poverty and improving health, gender equality, peace, and stability. It delivers large, consistent returns in terms of income, and is the most important factor to ensure equality of opportunities. For individuals, education promotes employment, earnings, health, and poverty reduction. The education sector in India was estimated to be worth US\$ 117 billion in FY20 and is expected to reach US\$ 225 billion by FY25. India has over 250 million school-going students, more than any other country. Number of colleges in India reached 42,343 in FY20. For societies, it drives long-term economic growth, innovation, strengthens institutions etc.

The education industry consists of schools, colleges, universities, and various private institutions. The education industry provides its students with the knowledge and skills to adapt to a continually changing working world. The industry consists of an expanding array of organizations that strive to provide lifelong learning to its customers. The education sector can be broadly classified as primary education, secondary education, higher education, and vocational education. The Education industry is crucial to the workforce capability of all other industries, but it also faces unique workforce development challenges of its own.

A literate person is a vital asset to the nation's development. A high literacy rate is important to ensure that people are trained in complex communication and critical thinking skills necessary to thrive in the workplace and a global economy.

India's literacy rate has been rising in recent years, but the country still has a long way to go before its population truly becomes literate. The national average of people who can read, write and communicate has more than doubled since 2001. However, literacy rates vary greatly between different areas of the country.

Why does India's literacy rate matter? It matters because literacy is the foundation of opportunity and development. When you can read and write, you can have access to

information and ideas that will help you improve your standard of living and enable you to better care for your family and yourself. The literacy rate in India is one of the major factors for socio-economic progress in addition to academic achievement.

India's literacy rate has increased dramatically over the past four decades. According to the report published by the National Survey of India, the Literacy Rate of India in 2022 is 77.7 per cent. The literacy rate in 2011 was 73%. There is an increase of 4% compared to the last census data. That's pretty impressive compared to other developing countries, but it still means that nearly one in four Indians remains unable to read or write (compared to about one in eight people worldwide). Kerala is the Most literate state in India. The literacy rate of Kerala is 96.2%. As per UNESCO, India will achieve Universal Literacy in the year 2060.

On 8 September, International Literacy Day is celebrated around the world every year. The global literacy rate is estimated to be 86.5 per cent by UNESCO.

Literacy Rate of India in 2022	77.7%
Male literacy rate of India in 2022	84.7%
Female literacy rate of India in 2022	70.3%

- source :- technofunc.

List of States & Union Territories by Literary Rate 2022

According to National Family Health Survey (NFHS-5) 2019-21 male literacy at India level in 2021 stands at 84.4% & female literacy stands at 71.5%.

Male Female gap at the all-India level is 12.9 percentage points with male literacy at 84.7% and female literacy at 70.3%. The gap between male and female literacy is the smallest in Kerala at just 2.2 percentage points. Andhra Pradesh's literacy rate of 66.4% is the lowest among all states in India, Kerala ranked highest in the list with 96.2%. Delhi stood second with 88.7%. Below is the list of States & Union territories with literacy rates

States & Union Territories	Male Literacy Rate %	Female Literacy Rate %	Average Literacy Rate %
A&N islands	90.11	81.84	86.27
Andhra Pradesh	73.4	59.5	66.4
Arunachal	73.69	59.57	66.95

Pradesh			
Assam	90.1	81.2	85.9
Bihar	79.7	60.5	70.9
Chhattisgarh	85.4	68.7	77.3
Chandigarh	90.54	81.38	86.43
Dadra and Nagar Haveli	86.46	65.93	77.65
Daman & Diu	91.48	79.59	87.07
Delhi	93.7	82.4	88.7
Goa	92.81	81.84	87.4
Gujarat	89.5	74.8	82.4
Haryana	88	71.3	80.4
Jammu & Kashmir	85.7	68	77.3
Jharkhand	83	64.7	74.3
Karnataka	83.4	70.5	77.2
Kerala	97.4	95.2	96.2
Lakshadweep	96.11	88.25	92.28
Madhya Pradesh	81.2	65.5	73.7
Maharashtra	90.7	78.4	84.8
Manipur	86.49	73.17	79.85
Meghalaya	77.17	73.78	75.48
Mizoram	93.72	89.4	91.58
Nagaland	83.29	76.69	80.11
Odisha	84	70.3	77.3
Puducherry	92.12	81.22	86.55
Punjab	88.5	78.5	83.7
Rajasthan	80.8	57.6	69.7
Sikkim	87.29	76.43	82.2
Tamil Nadu	87.9	77.9	82.9
Telangana	80.5	65.1	72.8

Tripura	92.18	83.15	87.75
Uttarakhand	94.3	80.7	87.6
Uttar Pradesh	81.8	63.4	73.0
West Bengal	84.8	76.1	80.5
All-India	84.7	70.3	77.7

Bhavnagar is the city of cultural and educated people. There are so many granted and self-financed secondary and higher secondary Schools and colleges. There are so many male and female academicians with different specialization in education sector. Average literacy rate of Bhavnagar city in 2022 is 84.7 percent of which male and female literacy was 90.15 and 78.85 percent.

Source:- <https://www.findeasy.in/indian-states-by-literacy-rate>

Literature Review

Kammatti Jayaramanna (2001)¹ conducted a study of “Teacher Effectiveness in Relation to Work Orientations and Academic Achievement of Students”. He studied teacher effectiveness giving priority to personal aspect, professional aspects intellectual aspect, teaching strategies and social aspect of teacher effectiveness. He found all the above mentioned factors strongly influenced teacher effectiveness and that teacher effectiveness influenced academic achievement of students. He also reported that work orientation and teacher effectiveness were positively correlated.

Omare, C & Iyamu O.S (2006)² based on their study “Assessment of the affective evaluation of social studies teachers in secondary schools in Western Nigeria” reveal that nature and objectives of Social Studies in Nigerian Secondary schools indicate the affective orientation of the subject. Studies abound on the dominance of cognitive orientation to the teaching and evaluation of the subject in the schools, an indication that the curriculum is poorly implemented. This study assessed the affective evaluation competences of Social Studies teachers in western Nigeria, using the observation methods and rating scale. It was found that the teachers' over-all affective evaluation competences were below the acceptable level and that professionally qualified non-graduate teachers demonstrated more competence than their graduate counterparts. The need to intensify the development of affective teaching skills in Social Studies teacher education was recommended.

Lina Martel (2007)³ through her study discussed that recognizing acquired career progression play a primary role in the creation of a culture of ongoing learning. This culture

makes it possible for all to achieve their goals and continue fine-tuning their competencies and learning throughout life. This is a major issue for the interveners and the leaders in education who are concerned with developing and training the workforce. For teachers in general, the recognition of acquired competencies makes it possible for them to move forward in their ongoing training and continue progressing in their professional development. This article outlines the overall situation regarding recognition of acquired competencies, its basic concepts, and their application in the educational system.

Monica & et. al. (2008)⁴ described that career progression is emerging as a new learning paradigm, where approaches centered on the learner are increasingly important. The process was carried out for the identification of its own generic competencies map explaining its connections between learning outcomes, levels, descriptors, credits, methodology, learning activities and assessment.

Pooja Tripathi et. al. (2010)⁵ contributed in developing a new tool called PAKS(Personality, Ability, Knowledge, Skills) for the performance appraisal in educational institutes. It can help to upgrade the faculty and the institution.

Kanakala Jayaram (2010)⁶ conducted a study on “The Impact of career progression and Creativity on Professional Pleasure”. The aim of the study was to identify the relationship among the three variables creativity, professional competency and professional pleasure. The influence of various socio demographic and professional variables on the above aspects was also analysed. The major findings of his study are (i) there is a significant positive correlation between creativity and career progression (ii) career progression has significant positive correlation with professional pleasure and (iii) Demographic variables like age, sex and locality do not influence career progression.

Putney (2011)⁷ in the journal article “Developing Collective Classroom Efficacy” reported that the collective ‘efficacy’ enabled individual teachers to work effectively in problem situations. Mohammad Nadeem , Musarrat Shaheen Rana, Abdul Hameed Lone, Saira Maqbool,.

Dibapile, Waitshaga Tefo Smitta (2012)⁸ studied “The Response of Botswana Junior Secondary School Teachers on the Teacher’s Sense of Efficacy Scale (TSES)”. The focus of the study was to find out the correlation among teacher efficacy, classroom management Literature Review 53 and instructional strategies. Data collection was done by using survey method taking a stratified random sample of 1006 Botswana secondary school teachers. Pearson product moment correlation was used to analyze the data using statistical package for social sciences (SPSS).For teacher practice items, there was no significant relationship

between positive and negative instructional strategies adopted by the teachers with regard to classroom management.

Elaine Chapman and Marnie O'Neill, (2013)⁹ discussed ongoing challenges in defining and assessing generic competencies in Australian universities. The paper begins with a discussion of factors that led to, and later fuelled, the focus on generic competencies in Australian higher education. Broad constructs that have underpinned research and practice in the field are then discussed. They have also considered the obstacles that have been confronted in efforts to identify the particular competencies that are most important both within and across given discipline areas. The paper concludes with a consideration of the practical issues that emerge in designing tasks to assess generic competencies within specific contexts.

Eva Myrberg, Monica Rosén (2014)¹⁰ The study investigates the influence of career progression on third grade students' reading achievement in public and independent schools in Sweden. The data derive from the Swedish participation in PIRLS 2001. Regression analysis was employed to explore the relative effects of several indicators of teacher quality. Teachers' sex, teaching experience, in-service training and co-operation with colleagues had no significant influence on student achievement. Teacher certification for teaching in early grades, though, was shown to have a strong effect on students' mean reading test scores. This effect was as strong in independent schools as in public schools. Students in independent schools performed better on the reading test than did students in public schools. Though school type had no intrinsic influence it was a mediating factor for parents' education and teachers' education. These effects worked in opposite directions, however. While students in independent schools had better-educated parents, students in public schools had better-educated teachers.

Objectives of the Study

The main objective of this study is to examine existence of demographic profile, investigate impact of career progression, job satisfaction and such factors positively like responsibilities, spending ones, maintenance and attitude shift and negatively like gender gap, safety, discrimination and other major factors to reach top level position of teaching staff at workplace in public and private education sector at Bhavnagar Region.

Following are the main 4 objectives of the present research study

1. To study the demographic profile of teaching staff of higher education sector.
2. To investigate the factors that influence the career progression of teaching staff of higher secondary schools and colleges.
3. To study the job satisfaction of teaching staff of higher secondary schools and Colleges (government, non-government and English medium & Gujarati Medium).
4. To assess the impact of various demographic variables on career progression of teaching staff of higher education sector.

Research Methodology

Sample Size and Data collection

Considering the topic and nature of the research study, survey research method was used in the present research. Survey research was not recognized in the earlier research methods, but since the importance of development-oriented works has increased, since then survey method is getting more importance. In fact, today the concept of research and development has become essential with survey, so we have used survey method in our research work.

Surveys are a flexible method of data collection that can be used in many different types of research.

Selection of Methodology

The researcher is going to study on factors affecting career progression of teaching staff in education sector with reference to Bhavnagar region. Researcher is covering different government and self-financed Schools and colleges of under graduate level and post graduate level in Bhavnagar region.

Data Collection

The researcher is going to collect the primary data through fill-up the questionnaire from the staff in education sector covering different government and self-financed schools and colleges of Bhavnagar region. And secondary data from Different books, journals magazines and organizational heads who are interested to educate researcher for this crucial and social development concept in the area of management and education.

Hypothesis of the study

Two hypotheses as follows will be tested during the course of the study which are as follows

Null Hypothesis:

A. There would be no significant difference in a study on factor affecting career progression of teaching staff in education sector with reference to Bhavnagar region.

B. There would be significant difference in a study on factor affecting career progression of teaching staff in education sector with reference to Bhavnagar region.

Alternative Hypothesis:

A. There would be no significant difference in a study on factor affecting career progression of teaching staff in education sector with reference to Bhavnagar region.

B. There would be significant difference in a study on factor affecting career progression of teaching staff in education sector with reference to Bhavnagar region.

Subjects

The researcher is asked to collect 50 responses through questionnaire by the google form online platform and as a result 31 responses are collected in English and in Gujarati.

The respondents are live in different geographical areas of the Bhavnagar region out of total 31 respondents 18 are males and 13 females who replied in either in English or Gujarati.

Table 1. Participants' Demographics

Education	Number of Participants	Males	Females
PhD / other professional course	9	7	2
Post Graduation	19	10	9
Graduation	3	1	2
Total	31	18	13

Recording and analysis

To collect, record and analyse quantitative data we used Survey Method. This program allowed us to develop an online survey in both languages, and send personalized e-mails, and a google form link to the every participant for survey. In addition, we sent automated friendly reminders on a weekly basis to increase our response rate using the same program.

The qualitative data was collected once the participants responded to the online survey. As we received the completed survey, This information along with the open question responses from the surveys were read and organized under five categories: like basic questions, demographic profile, Influencing factors to teaching staff, job satisfaction and impact of demographic variables.

Results

The data is collected through questionnaire which is divided in 5 sections with 63 questions.

When researcher has sent the questionnaire to no of respondents out of them 31 respondents had registered their views form that we can have some findings as follows.

Table 2. Online survey results Survey Questions (1stObjective related questions)

Sr.	Questions	Results in %		
		Strongly Agree + Agree	Neutral	Strongly Disagree + Disagree
1	To study the demographic profile of teaching staff of higher education sector.	30.00	9.70	61.30
2	Do you believe that gender differences affect selecting the education sector as a career?	49.40	25.80	24.80
3	Do you believe that most men and women are selecting the education sector in comparison to other sectors	80.70	9.70	9.60
4	Do you need to develop certain personality traits further to be better at your job?	83.90	9.70.	6.40

Table 3 Online survey results Survey Questions (2nd Objective related questions)

Sr.	Questions	Results in %		
		Strongly Agree + Agree	Neutral	Strongly Disagree + Disagree
1	To investigate the factors that influence the career progression of teaching staff in higher secondary schools and colleges	80.70	12.90	6.40
2	Do you believe that education attainment for teachers increases their capability for serving in senior-level positions?	71.00	22.60	6.40

	helps you make career progression?			
3	In your institute, do a number of employees use the wrong technique to achieve higher positions?	10.30	22.70	67.00
4	If you find fewer opportunities for career progression, you often think about leaving the institute where you are currently working.	12.90	35.50	51.60

Table 4 Online survey results Survey Questions (3rd Objective related questions)

Sr.	Questions	Results in %		
	To study the job satisfaction of teaching staff of higher secondary schools and Colleges (government, non-government, English medium, and Gujarati Medium).	Very Satisfied + Satisfied	Neutral	Very Dissatisfied + Dissatisfied
1	How satisfied are you with your current job?	82.90	16.10	13.00
2	How satisfied are you with your current work-life balance?	74.20	16.10	9.70
3	How satisfied are you with your institute's benefits?	76.40	22.60	1.00
4	How satisfied are you with your future prospects at your institute?	77.50	19.40	3.10

Table 5 Online survey results Survey Questions (4th Objective related questions)

Sr.	Questions	Results in %		
	To assess the impact of various demographic variables on career progression of teaching staff of higher education sector.	Strongly Agree + Agree	Neutral	Strongly Disagree + Disagree
1	Do you believe that your institute is sympathetic to and appreciative	77.40	22.60	00

	of the employee's point of view?			
2	Do you prefer to work with your present colleagues?	80.60	16.10	3.30
3	Do you believe that your institute is using proper performance appraisal techniques?	76.40	16.10	7.50
4	Do you believe that your institute helps you overcome your weaknesses?	73.20	16.10	10.70

Summary, Findings, & Suggestions

In this chapter, findings and necessary suggestions for “A study on factor affecting career progression of teaching staff in education sector with reference to Bhavnagar region.

1. In 21st century, there is no any difference between male and female employee inside the organization. Thus, as a employer should provide career advancement equally to each gender of the organization. It helps to increase satisfaction level of all teaching staff towards their schools and colleges at Bhavnagar Region.
2. Teacher or Lecturer training program should be object oriented. It facilitates to develop skills and competencies and to remove fear of most of teaching staff for improving their performance and also increases chances of promotion in education sector at Bhavnagar Region.
3. Sometimes, teaching staff may face pay inequality due to lack of knowledge and awareness of institutional policy especially in private schools and colleges. But, it can be avoided by more involvement and participation of teacher or lecturer in top management.

Conclusion:

The Study was Conducted in various schools and colleges in 2 languages to reach at great extent. The results of the study showed the following teachers' demographic profile. There are more male teachers(59%) than female teachers at (41%). This study will be based on primary data like questionnaire; psychological factors of respondent will also be effect on the feedback of this research.

Here, researcher has investigated two factors at the same time with using survey technique.

As per research review, there was finding both admittance and barrier to teaching staff in education sector at Bhavnagar Region.

Limitations and Future Research Directions

This study will be based on primary data like questionnaire; psychological factors of respondent will also be effect on the feedback of this research. So, it can't be effectively measured.

Only ratios will be used. Other tools are not used for effectiveness of a study on factors affecting career progression of teaching staff in education sector with reference to Bhavnagar region.

It is micro based study and not applicable to other sector and region instead of education and Bhavnagar.

Appropriateness of sampling technique may be question of researcher for data collection.

Disclosure statement: The authors declare no conflict of interest, financial or otherwise.

Data availability: Available on reasonable request.

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A Review “Introducing New Techniques seismic resisting systems for beam-column Connection of RC structures”

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Abstract

The behaviour of reinforced concrete moment resisting frame structures in recent earthquakes all over the world has highlighted the consequences of poor performance of beam column joints. Numerous researches carried out to understand the complex mechanisms and safe behaviour of beam column joints has gone into recommendations. This paper presents techniques for upgrading reinforced concrete beam–column joints. For reduce of seismic effect on structure and various updating seismic resisting system. These techniques included composite of fibre-reinforced polymeric (FRP) for strengthening, concrete jacketing of beam column connection and apply addition of external steel elements etc. Each method of repair or strengthening is reviewed. Relative advantages and disadvantages of each method are discussed.

Keywords: Upgrading, Concrete, Jack, Techniques

1. Introduction

Beam-to-column connections form an important part of the moment-resisting frame of reinforced concrete structures. This section must be properly designed and specified for lateral loads. Joint failure, primarily due to lateral loads, is governed by joint fracture and shear mechanisms, which are inherently fragile. (Mukesh 2022) During seismic activity, the overall response of the structure is mainly controlled by the behavior of the nodes.

Generally exhibits ductility if the joint exhibits ductile behavior, whereas the structure exhibits brittleness if the joint exhibits brittle behavior. (Liyong 2002) Older detailed, non-seismic structures have joints that are more defenseless and do not perform well under lateral loads.

In any type of concrete structure, the common section of beams and columns at their intersection defines a beam-column connection.(Bindu 2009) Due to the finite strength of their constituent materials, connection has a limited ability to resist forces. Once the force applied is greater than the force caused by the earthquake, the joint can severely fracture. Broken seals are difficult to repair, so damage should be avoided. (Prem pal 2016) Therefore, the design of the beam-to-column connection must be able to preserve the effects of lateral loads.

Under lateral loads, beam-to-column loads experience large shear stresses in the junction area. This unit shear stress area produces moments and shears of opposite signs at the ends of the elements on either side of the nodal core. Therefore, high bond stresses are also mandatory when the bars enter the joint. Axial compressive and nodal shear stresses inside the column result in principal and compressive stresses.(Izi 2008) Due to this tension and compression in the joint area, oblique cracking or concrete crushing occurs in the joint core. These problems are compounded by the damage seen in recent devastating earthquakes in many countries. (Genesio and Eligehausen 2011) Some earthquake photos of this major earthquake are given below.



Figure 1: Turkey Earthquake, 1999 (Genesio and Eligehausen 2011)



Figure 2: Kutch (Bhuj), Gujarat on 26 January, 2001

Seismic behavior of beam-to-column connections

Unlike joints designed for gravity loads only, the performance characteristics of joints due to factored seismic loads are unique and severe in seismic regions. Most international codes (ACI 318-05, NZS 3101 1995, EC8 2003) prescribe standards, design formulas and design factors primarily for bending frames under seismic loads. Although some codes attempt to explain the design of loads, little attention has been paid to the design of reinforced structures. It seems that after evaluating the operating stresses of adjacent parts of building elements, most designers generally consider that the conditions inside the joint (which is usually slightly larger than the dimensions of the elements it joins) are unimportant. The growing acceptance of the concept of extreme stage design has revealed the weakness of this

assumption. In fact, joints are often the weakest link in a structural system due to seismic loads. The need for seals is largely influenced by the type of inside, outside or corner of the load path and the type of loading system.

The forces on a joint under gravity loading will be as shown in Figure 3(a). The hundreds of axial stresses and compressions from the ends of the beams and columns will be transferred directly by the connections. In the case of lateral (or seismic) loading, equilibrium forces develop from beams and columns, as shown in Figure 3. Diagonal tensile and compressive stresses between joints are shown in Fig 3(b). In the joint and on the joint plane where the beams form the joint, the crack develops along the diagonal A-B perpendicular to the frame. Compression strut area units are indicated by dotted lines and tension band area units are indicated by solid lines. Concrete with lower tensile strength resists the units of sensitive reinforcement zone provided in such a way that they cross the failure plane to resist the diagonal tension.

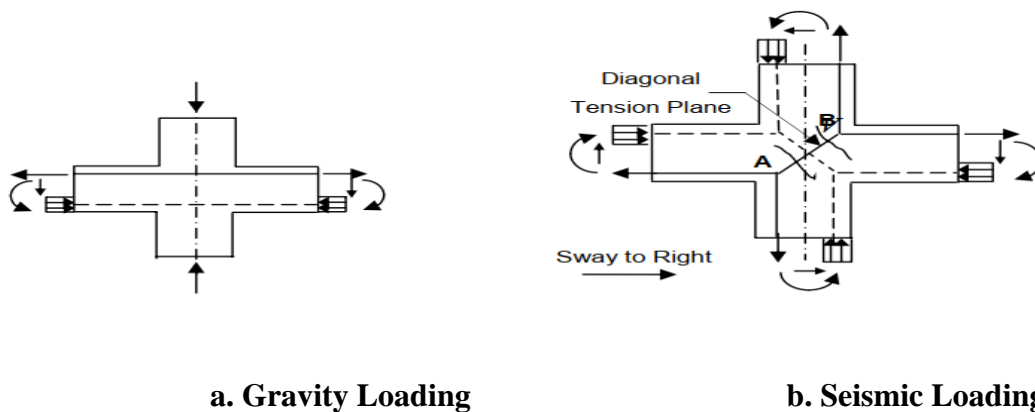
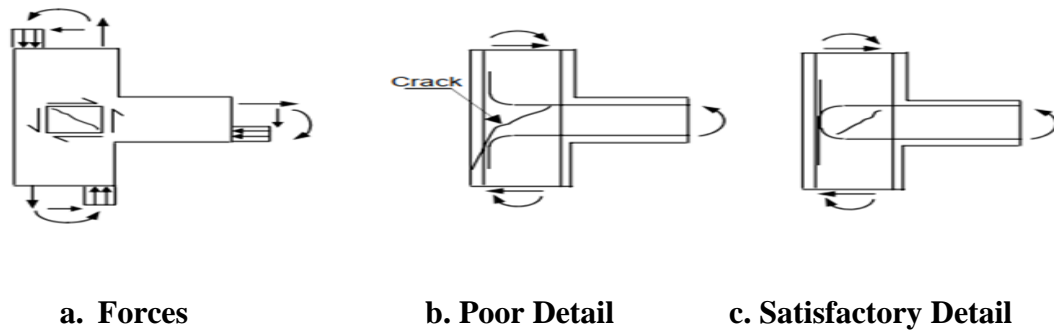
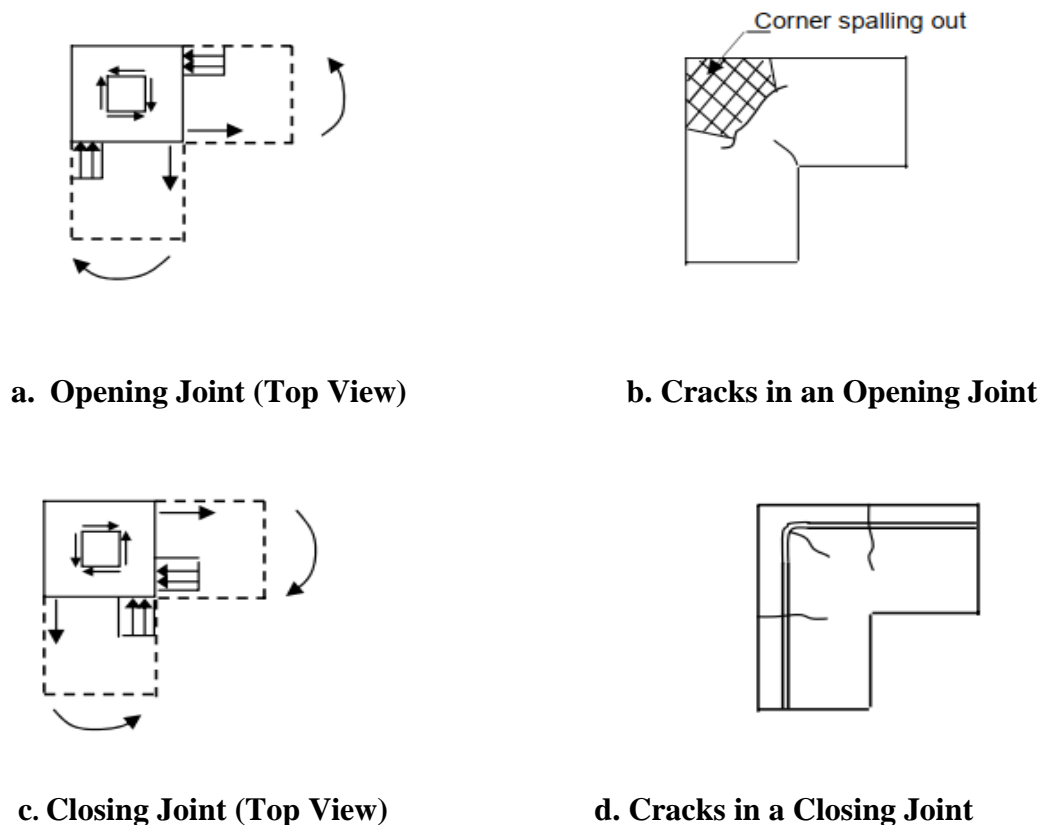


Figure 3: Interior joint

The forces acting on external joints of the relevant class can be idealized as shown in Figure 4. The shear force in the joint causes oblique cracks, so the joint must be reinforced. The specialization pattern of the longitudinal reinforcement has a significant effect on the strength of the joint. A detailed pattern of some of the outer seams is shown in Figure 4(b) and Figs. 4(c). Bent rods withdrawn from the joint core (Fig. 4(b)) ended up being 45 times more effective, while those anchored through and into the joint core showed 85–100 times greater strengths. However, stirrups must be provided to confine the concrete core within the joint.

**Figure 4: Exterior joint**

The forces in a very angular joint with a continuous column at the top of the joint (Fig. 5c) will be understood in the same way as the forces in an external joint of associated degrees, in terms of reflection on the direction of the loading. Masonry corners form another type of joint in which an applied moment tends to close or open the corner. (Sreelatha 2013) This joint can also be called knee joint or L-joint. Stresses and cracks develop in such a seam as shown in Figure 5

**Figure 5: Corner joints**

Opening corner seams tend to develop new cracks at the entry corners, and failure is characterized by the formation of diagonal tensile cracks. The description of the longitudinal reinforcement can significantly affect the performance of such joints. The forces developed in closed welds are exactly the opposite of those developed in fillet welds. The main cracks are oriented diagonally at the corners. These joint have higher strength than gap joint.

So, the failures of joint region is cannot be completely solve but it can be reduce up to some amount. Out of this, one failure result is shown in below Fig 6.

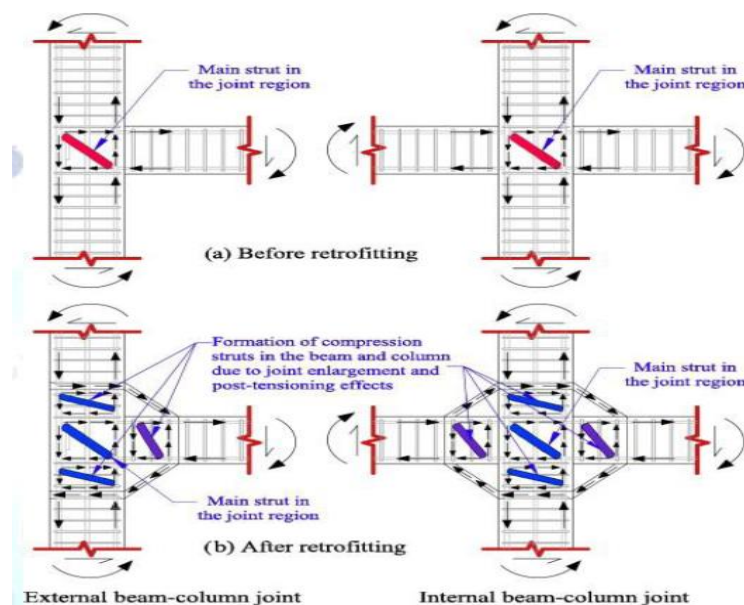


Figure 6: Beam-Column joint Reaction Before and after resisting systems

New technology anti-seismic system

Joint repair and reinforcement studies including epoxy repair, removal and replacement, steel casing and/or addition of external steel members, and fiber-reinforcing polymer (FRP) composite applications. Each technique requires varying degrees of artistic detail, with considerations for labor, cost, disruption of building occupancy, and scope. The primary objective of Study was to establish strength levels between columns, beams and joints so that seismic resistance and ductility requirements could be met through ductile beam hinge mechanisms rather than a column hinge or shear failure of fragile joints. In structures designed for gravity loads, beams are usually stronger than columns, and column reinforcement is usually insufficient on its own, due to lack of transverse reinforcement, insufficient discontinuous reinforcement for beams, connections becoming the next weakest

link or some other impossibility Stretched details. Therefore, the gliding ability and effective joint restraint should be improved. Various failure of joint and relevant solution is given in below diagram.

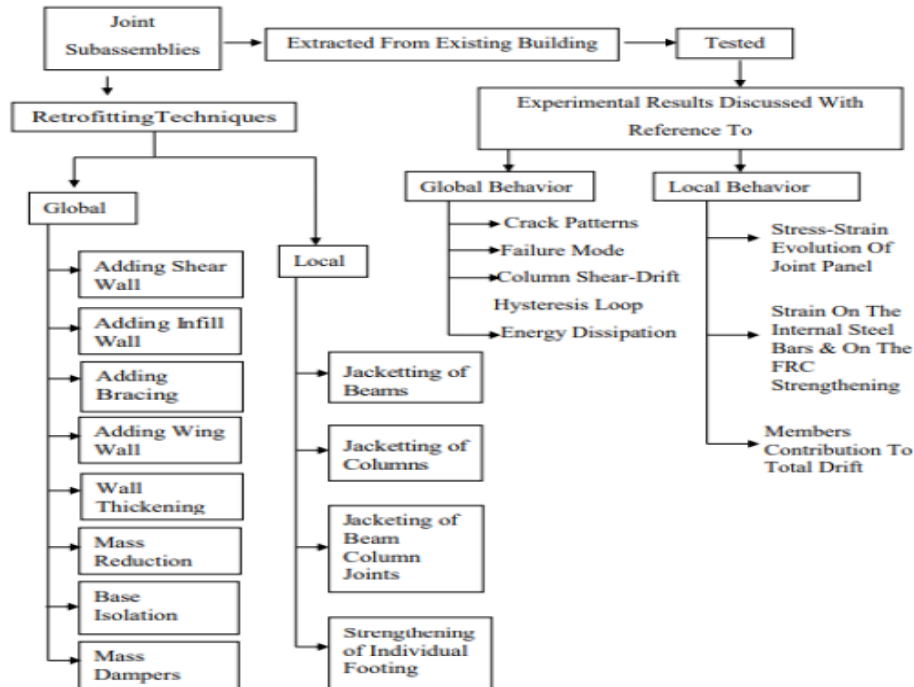


Figure 7: Various failure and its solution techniques

Fiber Reinforced Polymer

Fiber Reinforced Polymers (FRP) is generally made of continuous high tensile strength fibers oriented in a desired direction in a specialized resin matrix. These continuous fibers are bonded to the outer surface of the element to be reinforced in the direction of the tensile forces, or according to a stress normal to its axis. FRP can improve the shear strength, bending strength, compressive strength and ductility of failed components. The most common type of fiber used in most commercially available FRP is fiberglass. In structural applications, FRP systems are often used. FRP reinforcement is a fast, gentle, effective and aesthetic technique for repairing prestressed reinforced concrete structures. FRP systems are subject to physical and chemical degradation or higher mechanical action than steel plates.

Fiber Reinforced Polymer (FRP) composites consist of high tensile strength fibers in a polymer matrix such as epoxy resin. FRP composites are used in many applications such as

airplanes, helicopters, spacecraft, satellites, ships, submarines, automobiles, chemical processing equipment, sporting goods and civil infrastructure (Sreelatha (2013)).



Figure 8: Strengthening by fibre reinforced polymer

The performance of beam-to-column joints (BCJ) significantly affects the performance of RC framed structures during earthquakes. The lack of ductile detail in RC beam-to-column connections designed before earthquake resistance leads to greater damage in nonlinear rotation. The modernization allowed greater flexibility in reinforcing damaged beam-to-column connections. However, the limitations of the renovation materials and the degree of initial damage to the RC top post connections affected the performance of the renovation. Therefore, an experimental study was carried out to evaluate the effectiveness of Ultra-High Performance Hybrid Fiber Reinforced Concrete in reinforcing and the effect of initial damage on park and joint damage performance. An impact rating model was used to define initial damage as complete, severe, moderate, and minor. The initially damaged external BCJ was then adjusted using UHP-HFRC. Test results show that the UHP-HFRC modification outperforms the modified BCJ control sample in terms of load carrying capacity, energy dissipation and ductility. (Raju Sharma, Prem Pal Bansal (2018))

Study on lack of joint restraint in most reinforced concrete (RC) framed structures before 1970 leading to weakening of connection between columns and roof and the collapse of the roof as a whole. The main objective of this study is based on four interrelated tasks: (1) the design and development of innovative techniques for the repair and modernization of reinforced concrete (RC) beam-to-column connections using advanced FRP composite laminates and pre-cured composite assemblies, (ii) Experimental evaluation of different techniques using comprehensive tests. (iii) Behavioral comparisons between the as-built sample and different renovation samples, and (v) conclusions and recommendations for future research. The experimental results confirmed the superiority and success of the

proposed reinforcement protocol, not only in terms of restoring the resistance capacities of the cheeks, but also of improving the global semi-mechanical properties of the defective joints evaluated in this study, in particular the resistance and extensibility. For example, the use of wet-laid carbon/epoxy composite laminates resulted in significant increases in strength and ductility, up to 1.34 and 3.04 times, respectively, over as-built specimens.

In addition, the proposed technique to improve the shear strength and bond slip of high strength carbon/epoxy FRP composite laminate members and hybrid composite connection (HCC) joints has achieved remarkable results. The newly proposed technique increases the shear strength of the joint by a factor of 2.5 compared to that of the control defect sample. The experimental results show that the FRP composite system proposed in this study successfully improves the strength, stiffness and ductility of RC beam-to-column connections resistant to seismic faults. The test configuration was able to capture the shear failure behavior of the beam-to-column connection and the improvement in its behavior after modernization. (K Khaled Allam, Ayman S Mosallam, Mohamed A Salama (2019))

Carbon Fibre-Reinforced Polymer

Carbon Fiber Material Properties, Carbon fiber is a very fine fiber with a diameter of $7\mu\text{m}$, which has excellent structural properties such as high strength, high elastic modulus, light weight and durability high. However, carbon fibers are very brittle, as shown in Figure 9, very expensive compared to steel. Therefore, some thought is required to overcome these weaknesses.

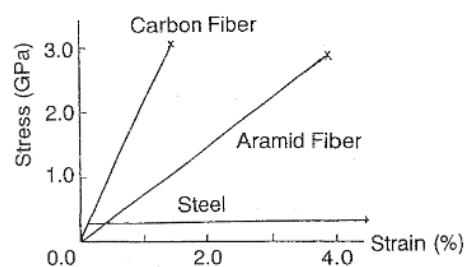


Figure 9: Stress Strain Relationship of Carbon Fiber

Is a carbon fiber bundle composed of 12,000 carbon fiber filaments, or a carbon fiber sheet composed of carbon fiber bundles arranged in the same direction, which is a convenient unit for practical applications. The carbon fibers independently load the filaments, resulting in

stress concentrations on the filaments. Because carbon fiber is brittle, a filament with concentrated stress can easily break before the stress is shared with any other filament. Therefore, carbon fiber reinforced plastics are usually produced by impregnating epoxy resin into carbon fibers. The impregnating resin embeds the carbon fiber filaments into the CFRP, reducing stress concentrations. On the other hand, resins lead to a loss of durability and fire resistance. However, these problems are solved because buildings often require recessed elements to be finished for architectural reasons. Surface treatments reduce UV rays which reduce the durability of epoxies. Finishes with a protective coating function as insulation in the event of a fire.

CFRP is strong but brittle, like carbon fiber itself. Therefore, CFRP cannot be used as a very important energy absorbing material in the current seismic design of buildings. For reinforced concrete structures, carbon fiber fabric cannot be used for the longitudinal reinforcement in the plastic hinge area where the longitudinal reinforcement acts as an energy absorber. However, CFRP can be used for transverse reinforcement when no plastic deformation is required, as well as for longitudinal reinforcement when areas of large plastic deformation are not required.

In the case of new construction, carbon fiber is inferior to concrete and steel, because in this case the cost of the material occupies a not insignificant percentage. But in the restoration project, carbon fiber is not inferior, because the material cost ratio is low and the labor cost ratio is high. If carbon fiber saves labor cost due to its light weight and good flexibility, carbon fiber can be widely used. In fact, this is why CFRP restorations are often used in Japan.

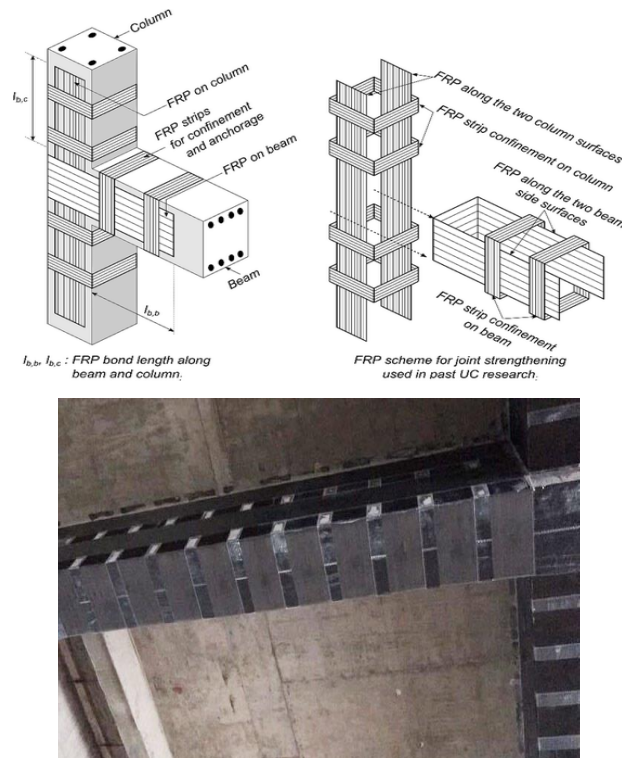


Figure 10: Carbon Fibre-Reinforced Polymer

Carbon fiber reinforced polymers (CFRP), carbon fiber reinforced plastics (CRP) or carbon fiber reinforced thermoplastics (CFRTP) are extremely strong and lightweight FRPs containing carbon fibers. In this case, the carbon fibers impart strength and stiffness to the CFRP, increasing the ultimate stress and modulus of elasticity, respectively. Unlike isotropic materials such as steel and aluminum, CFRP has directional strength properties. The performance of CFRP depends on the arrangement of the carbon fibers and the pattern of the carbon fibers relative to the polymer. The advantages of CFRP include high tensile strength, high strength-to-weight ratio, low weight-to-volume ratio, excellent fatigue properties and faster application (Naveeena and Ranjitham (2016)). Therefore, CFRP composites are able to strengthen beam-to-column joints in terms of shear capacity and ductility.

Retrofitting with Steel Jacket

Steel Jacketing (SJ) of beams and columns is widely used as a renovation technique to provide additional deformation and strength capabilities to existing reinforced concrete (RC) frame structures. These are often not designed with seismic loads in mind or provide insufficient seismic detail. The use of SJ is generally associated with significant costs,

depending on the amount of structural engineering and fabrication and non-structural materials.

Jacketing is ideal for columns, but may not be as effective for beams or slabs. Existing beams, posts or joints can be wrapped with a new reinforced concrete, steel or fiber shell liner. New materials must be designed and constructed to form a composite with the existing concrete. When a reinforced concrete lining is used, details to improve ductility should be provided in the design. Column repair is often essential to the seismic performance of the structure. During an earthquake, the column should never be the weakest member of the building structure to prevent the mechanism from deepening. In building structures, a column's response is affected by a combination of its axial load, deflection, and shear. Therefore, the column wrap can be used to increase the shear strength and bending strength of the column so that the column is not damaged. For the jacket, Fiber Reinforced Composite (FRC) was used during the transformation of the columns.



Figure 11: Concrete column beams strengthening

Strengthened with Steel Bars

Experimental and analytical studies have been carried out on high strength concrete beam-to-column connections using high-strength steel bars in the beam-to-column connections. A parametric study was performed by finite element analysis to investigate the effect of various parameters on the strength, bond state, and energy dissipation capabilities of the sample. The shear behavior of the joints and the bond strength of the specimens were further investigated, and the validity of the design requirements of ACI 318 and NZS 3101 for high tensile steel bars was examined. All specimens used in this study exhibited a ductile failure mode, and it

was concluded that the use of high-strength concrete and the application of axial compressive loads could improve the bond conditions of the specimens. Axial compression loading significantly increases energy dissipation, while the use of HSS reinforcements results in lower energy dissipation capacity. The use of higher grades of stringer reinforcement resulted in a slight decrease in bond strength in the connection area (Alaee & Li, 2017).

In order to understand the behavior of external beam-to-column connection subassemblies with transverse reinforcement as detailed in IS 456 and IS 13920, specimens were tested under two different axial loads to assess the effect of axial loading at the the link . The seismic analysis and design conforms to IS 1893 and the latest revision of IS 13920 with all modifications. Experimental studies have shown that the use of rectangular helical reinforcement significantly improves the seismic performance of external beam-to-column connections. Test results showed that recent revisions to the joint design ensured that beam failure occurred before joint failure. Improvements in the performance of beam-to-column connections as detailed in load reversal according to IS 13920 have also been observed (Bindhu et al., 2009).

Investigating overcrowding of beam-to-column connections due to excessive reinforcement of beam-to-columns of rigid-frame railway bridges. In this study, an attempt was made to prevent buckling by reducing shear elements and longitudinal elements in beam-to-column connections of rigid frame railway bridges using steel fibers. The effect of steel fibers on the performance of beam-to-column connections in terms of reducing the amount of reinforcement was also studied. Specimens with reduced reinforcement and added steel fibers should perform comparable to or better than control specimens. The experimental results of the specimens were compared in terms of crack mode, load-displacement relationship, ductility, energy dissipation ability and stiffness degradation, and the results showed that after reducing the amount of reinforcement, the performance of the steel fiber specimens was comparable. Specimens without reduced reinforcement (Niwa et al., 2012).

Strengthened with Steel Reinforced Polymer System (SRP)

Experimental work was done on SRP to determine its strengths and weaknesses. SRP exhibits better tensile and adhesion properties, and when applied to reinforcement or flexural restraint, it provides equal or greater improvements in structural performance in terms of load carrying capacity and displacement. Despite its long-term durability, the shear strengthening of RC

beams and their application in masonry deserves further study. Studies to date have shown that SRP is an effective and cost-effective solution for structural restoration (De Santis et al., 2016).

A simple method dedicated to the study of the adhesive behavior of masonry structures reinforced with SRP/SRG systems. Based on experimental evidence and theoretical considerations, the method mainly consists in deriving an approximate bond-slip stress law for the reinforcement/support interface layer, capable of reproducing the local bond stress transfer mechanism. A finite element (FE) analysis is then developed using the bond stress-slip law obtained by the method proposed with reference to the experimental tests available in the current literature. The derived results demonstrate the reliability of the proposed method to simulate the bond behavior of masonry elements reinforced with SRP/SRG (Grande et al., 2013).

An experimental study of the application of reinforced polymer composites (SRP) to reinforce under-sheared external beam-to-column connections in reinforced concrete frames subjected to seismic loads. Under quasi-static cyclic loading applied to the ends of the beams, tests were carried out on specimens supplied with SRP panels in differently arranged joint regions to obtain high levels of inelastic deformation similar to those encountered during strong earthquakes. earth, in order to simulate the experienced condition. Specimens reinforced with SRP plates exhibited higher levels of strength, ductility, and energy dissipation and exhibited more desirable failure modes than shear failed joint specimens. Anchoring of externally bonded SRP rebars is essential and can be adequately provided by orthogonal SRP casings. The study concluded that diagonal SRP plates at joints are more effective than horizontal and vertical plates as they help to overcome diagonal cracking and shear failure at joints under cyclic loading (Izi et al., 2008).

Ferrocement

Reinforced concrete is currently the most widely used construction material. Reinforced concrete can be considered as the origin and the first application of reinforced concrete. Ferrocement, also known as ferrocement, was invented by Frenchman Joseph Louis in 1848. At the time, Joseph essentially wanted to make urns, bowls, and planters without the cost of firing in a kiln. Reinforced cement is thin reinforced concrete consisting of a large number of small-diameter metal mesh and cement mortar evenly distributed over the entire section.

Iron-based cement is a very versatile form of reinforced concrete with unique maintenance and strength properties unmatched by any other lightweight building material. Although it was the oldest and the first of its kind, the use of barbed wire was limited and not widely accepted. One of the reasons it was not widely used was that the production techniques available at the time (19th century) were not efficient in producing small diameter wires and mesh. There was a backlash as it was more expensive to produce there compared to larger diameter iron rods. During the world wars, reinforced concrete was used to make ships due to the shortage of materials, especially steel. Because barbed wire requires more steel (volume) than reinforced concrete, its function has been completely forgotten. In the 1940s, the original concept of Ferrosement was reintroduced by the famous Italian architect Luigi Nervi, who invented Ferrosement to manufacture components of materials with near-uniform mechanical properties and high impact resistance. Over time, the durability and suitability of Ferro cement was established and eventually began to gain acceptance.

Ferro-cement is mainly composed of cement, sand, wire mesh and various additives. The main difference between reinforced concrete and reinforced concrete is the scale. Reinforced concrete uses larger size steel bars compared to reinforced concrete wire/mesh. Compared to reinforced concrete, the metal part of reinforced concrete is smaller in volume. It does not contain large aggregates used in reinforced concrete, only cement mortar is used. Sometimes, depending on the requirements, the reinforced cement can be made of large-scale steel bars and grids. The number of layers of wire mesh supplied depends on the application in which it will be used. Typical barbed wire diameters are shown in Fig. 12.

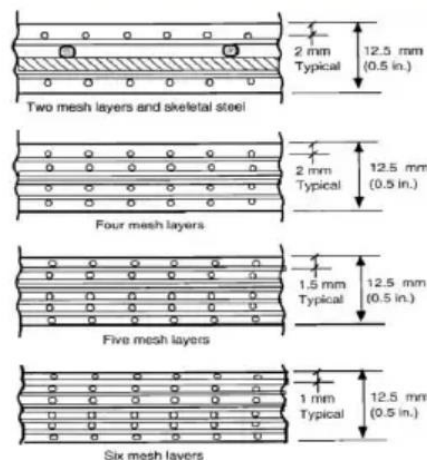


Figure 12: Ferrocement

Ferrocement consists of several layers of fine steel reinforced wire mesh with a protection rate of 3 to 8%, fully protected by a base of high strength cement mortar (15 to 30 MPa) (thickness of 10 to 50 mm). Pass the mortar in layers 1-5 mm thick through the threads step by step. The mechanical properties of reinforced concrete depend on the properties of the mesh. Barbed wire is suitable for inexpensive homes because it is inexpensive and can be put in place without skilled labor. The mesh helps limit cracking of masonry units, increasing the likelihood of inelastic deformation of the wall.

The ultimate load carrying capacity of reinforced concrete column and confinement tensile specimens using welded mesh as the confinement material. For the prestressed specimens, the results show that the restraint increases the load capacity by 33%. The ductility of the samples has also been increased. The stresses increased the ultimate load capacity to 28% and 15% for specimens with strain values of 60% and 80% of the ultimate load capacity, respectively. After confinement, the column specimens failed in a ductile manner compared to the brittle failure of the control specimen. (R. Hafiza, S. Sameen, T. Rahman (2015))

Reinforced concrete is the oldest form of reinforced concrete, dating back two centuries. It consists of mortar and galvanized steel wire. It is used in a wide range of applications including the construction of ships, tanks, floors and roofs and tunnel linings. Reinforced concrete is a well-known and widely used material today, while reinforced concrete has limited applications. Properties such as a high strength-to-weight ratio and good resistance to cracking and impact loading have brought barbed wire back into the limelight. New applications have been developed in recent years, such as low cost residential construction and reinforcement of various structural elements. (Ornela Lalaj, Yavuz Yardım, Salih Yılmaz (2015))



Figure 13: Ferrocement technique

Epoxy Injection

Grouting is a commonly used reinforcement technique because it does not alter the aesthetic and architectural character of the existing building. The main purpose of grouting is to maintain the original integrity of the wall after construction and to fill voids and cracks present in the masonry as the slabs will prevent punching shear cracks.



Figure 14: Application of the epoxy resin & cement grout injection in beam–column joint

Conclusion

In this paper, various techniques used for upgrading reinforced concrete beam–column joints are studied. There is various method use for upgrading of connection likes, Ferrocement, Strengthened with Steel Reinforced Polymer System (SRP), Strengthened with Steel Bars, Retrofitting with Steel Jacket, Carbon Fibre-Reinforced Polymer, Fiber Reinforced Polymer etc. Out of All methods are effective and capable of restoring or even upgrading load-carrying capacity and initial stiffness of damaged joints but for this CFRP are more than other methods. Therefore, CFRP composites are able to strengthen beam-to-column joints in terms of shear capacity and ductility.

If we are use steel fiber in of structure, it can be showed that after reducing the amount of reinforcement, the performance of the steel fiber specimens was comparable. Also with using Ferrocement Techniques on connection, Column ultimate load carrying capacity is more in brittle manner compare to ductile.

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Challenges faced by International Students in Indian Higher Education Institutions

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Abstract

The recent National Education Policy (NEP) 2020 of India has amassed considerable attention among the central and state governments of India, educators, policy makers as well as the higher education community worldwide. India is taking strides towards a progressive education system based on the pillars of foundational pillars of access, equity, quality, affordability and accountability. It underlines the importance of internationalization of higher education calls for promoting India as global study destination providing affordable quality education.

As per the All India Survey on Higher Education (AISHE 2021) by the Indian Ministry of Education, there are 1113 universities, 43796 colleges and 11296 stand-alone institutions registered with AISHE catering to 41.3 million students that makes it one of the largest higher education systems of the world. According to the Association of Indian Universities (AIU), the policy framework allows Indian higher education institutions to admit 15% of the sanctioned intake under the foreign category which includes international students, Non Residential Indians, Overseas Citizens of India and Persons of Indian Origin. At present, the total number of foreign students enrolled in Indian HEIs is 48,035 from 163 countries (AISHE 2021) which is far less than the sanctioned figures.

The Prime Minister of India in his speech on August 15, 2014 in New Delhi encouraged policy makers to think proactively on several fronts, one of them being “India as an exporter of education”. India is taking various steps to attract foreign students. One such initiative is the *Study in India* project which is the flagship program of the Ministry of Education, Govt. of India, launched in 2018 with the aim of promoting India as a prime education destination for foreign students. In order for India to emerge as a preferred study destination for international students, it is important to understand the experiences of international students currently enrolled in Indian higher education institutions and whether or not their expectations are met. Considering the vision of the NEP 2020 and the slow increase in the international student enrollment in India, it is expected to understand the needs of

international students. In line with this, the research work was undertaken to identify some of the challenges faced by international students enrolled in higher education institutions in India. Identifying the challenges and addressing them timely will help in increasing the student satisfaction levels leading to an increased the student inflow to Indian higher education institutions. The findings will act as useful market intelligence and information for higher education policy makers and university administrators that seek to attract higher number of international students.

Keywords: Indian Higher education, Challenges, International students, International education.

International student mobility in the pre-COVID era

With rapid globalization and its impact, universities across the world are experiencing increased numbers of student flow from beyond national borders. Factors such as greater demand for higher education, limited capacity of quality higher education institutions in the home country, human capital need, higher affordability, personal and professional ambitions of students play a role in whether or not they seek higher education outside of their home country. The number of international students crossing borders to pursue higher education have more than doubled in the last twenty years and touched 5.6 million in 2018 and the yearly average growth is 4.5 percent (UNESCO 2020). In 2013, there were 4.1 million internationally mobile higher education students with the United States, United Kingdom, China, France and Australia ranking as top five destination countries accounting for two-thirds of all international students followed by Russia, Canada and Germany. International students in the United Kingdom and Australia comprise over 20 percent of their total higher education population while in the USA they comprise a little over 5 percent. In 2020, Canada made it to the top five destinations pushing France to the sixth position.

Looking at the outbound mobility from Asia to the United States, in 2015-16, Asian students accounted for 66 percent of the total international students in the USA with China being the top sender (328,547 students) followed by India (165,918 students). 6% of the international student population in the USA were South Korean students. However, a general decline of about 18 percent was observed in the trend of South Korean students going abroad to pursue higher education from 2011 to 2015 which was possibly due to the South Korean employment market preferring students with domestic degrees who are perceived to quickly adjust to the work culture and also due to the relatively inexpensive education as compared to the United States. In 2020, Indian and Chinese students made up more than 50% of the

international student population in the US, Canada and Australia (Open Doors 2020) and more than 25% in the UK (Project Atlas 2020).

Mobility of international students in India

Taking a look at the international mobility situation in India, international student recruitment that been prevalent in the developed countries for the last two decades is gaining impetus in India which has been highlighted by the Association of Indian Universities in the Mysore Statement and in the National Education Policy 2020 that envisions to promote India as a global study destination attracting foreign students from across the world. International exchange and academic mobility in India stretch back to the 7th century, when Indian universities such as Nalanda and Takshshila drew foreign students and academicians from all over the world. The All India Survey on Higher Education (2020) by the Ministry of Higher Education, Govt. of India reports 1043 universities or university level institutions, 42,343 colleges and 11,779 standalone institutions catering to 38.5 million students which certainly makes the Indian higher education system one of the largest higher education systems of the world with the largest number of students pursuing higher education. India is the largest sender of students to universities abroad. With an average yearly growth rate of 9.4 percent, the number of Indian students travelling overseas to seek higher education has increased by 5.2 times, from 66,700 in 2000 to 3,05,000 in 2017. According to the Association of Indian Universities, the policy framework allows Indian higher education institutions to admit 15 percent of the sanctioned intake under the foreign category, which includes International students, Non Residential Indians, Overseas Citizens of India and Persons of Indian Origin. According to this, India should have had 4.85 million students in the foreign category, but India has attracted only approximately 30,423 international students in the year 2016 and that has increased to 49,348 international students in 2019-20. Indian students studying abroad account for 6% of the total internationally mobile students whereas, the foreign students studying in India account for less than 1%. Therefore, it is evident that India spends a huge amount money in sending its students abroad while earns in pennies while receiving foreign students. This is a matter of concern for policy makers. India is home to a large number of world-class educational institutions, including the Indian Institutes of Technology (IITs), the Indian Institutes of Management (IIMs), and many other top-ranked universities.

Impact of COVID on international student mobility

COVID-19 pandemic has drastically disrupted the landscape of education across the globe, and student mobility has also shifted. Student recruitment in most of the leading countries in the 2020-2021 academic year declined.

If we consider the international student enrolment in 2020 in the major destinations, the USA experienced a 46 percent drop in the number of new international student enrolment as compared to the previous year with China and India being the leading sources followed by South Korea, Canada and Saudi Arabia. Australia saw a 23 percent decline, so did Germany. UK was the only exception with a 4 percent increase in student enrolment in 2021, but with a shift in international student composition from the leading sending countries. There was a 27 percent increase in the Indian students entering the UK, whereas the Chinese students fell by 5 percent. The increase in Indian students choosing UK as a destination could be because of the decreased demand for Australia as a higher education destination owing to border restrictions and primarily because of the new post-study work rights in the UK. The impact of Brexit that has resulted in a 56 percent decline in the number of students from the European Union in 2021-22 could be one of the reasons why the UK may be particularly interested in increasing international recruitment from countries like India.

Today international students in an institution are directly related to the institutional quality, national competitiveness, social relevance, prestige, potential for innovation and a potential source of revenue generation. Trends have always shown a mobility from global south to global north. However, with new players emerging in student recruitment, VISA and immigration policies and with the effect of pandemic, the market is becoming varied and competitive. QS 2021 reports show about 70% of international students studying abroad have suffered from anxiety which was mostly due to the students being locked out of their destination countries, uncertainty, or other circumstances under which they were pursuing their education. Students are considering a wider range of destinations than in the past, which includes factors such as affordability, availability of in-person classroom teaching, work permit after graduating, entry-exit restrictions, vaccine availability to name a few. New players such as the UAE as an education hub with world-class infrastructure, 48.6 percent inbound mobility ratio and generous visa policies is changing the international student recruitment scenario with it becoming less traditional and more competitive.

Since overseas education comes with a premium fee attached to it, prospective international students are seeking value on their investment. Therefore, it is critical for higher education institutions to not only strengthen their outreach activities with the changing landscape but more importantly also work towards providing value to global talent and retaining it.

Conclusion

International students studying in Indian higher education institutions face a range of challenges. Some of the most common challenges are:

- Cultural differences: International students may experience culture shock when they first arrive in India. This can include differences in language, food, social customs, and education systems.
- Language barriers: Many international students may struggle with language barriers as English is not their first language. This can make it difficult for them to understand lectures, communicate with professors and classmates, and complete assignments.
- Academic challenges: International students may struggle to adapt to the Indian education system, which can be more theoretical and exam-oriented than what they are used to. This may result in poor grades and a lack of motivation.
- Financial constraints: International students may face financial constraints such as high tuition fees, living expenses, and travel costs. This can impact their ability to fully participate in campus life and extracurricular activities.
- Social isolation: International students may feel isolated and lonely as they may not have any friends or family in India. They may also find it difficult to integrate into the local community due to cultural differences.
- Administrative hurdles: International students may encounter administrative hurdles such as obtaining visas and permits, registering for courses, and dealing with bureaucratic procedures.

Overall, these challenges can make it difficult for international students to fully enjoy their academic and social experiences in India. However, with the right support and resources, many of these challenges can be overcome.

The Indian government has been taking steps to attract more international students to the country. The government has launched initiatives such as the Study in India program, which aims to promote India as a preferred destination for international students. The program provides scholarships and financial assistance to students from select countries, and also helps them navigate the admission process. In addition, many Indian universities have been actively reaching out to international students through their own marketing efforts. They offer various programs and courses that cater to the needs of international students, including English-language courses, cultural exchange programs, and opportunities for internships and research.

Overall, the mobility of international students in India is on the rise, and the Indian government and universities are taking steps to ensure that this trend continues.

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A Novel Approach for Traffic Classification in Software Defined Networks

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Abstract

Traffic classification is used in network management, service measurements, network architecture, security monitoring, and advertising. SDN (software defined networks) is a new technology that can help current networks solve problems by streamlining network services, allowing network programmability, and providing a global view of the network. In recent years, SDN has opened up new opportunities for traffic classification. Traffic segmentation strategies have been explored, proposed, and developed in the SDN. We developed a fresh method for Traffic Prediction in Software Defined Networks in this paper, and we determined that either a benchmark dataset or a custom-created dataset is insufficient to categorize traffic classes, therefore we opted to mix the two datasets. On the created dataset, we presented the processes for training and testing the ML model. Some pre-processing techniques must be applied to the dataset before it may be divided. Along with the proposed approach, we've identified a number of tools for simulating, creating, gathering, and analysing traffic.

Keywords: Machine Learning, Software Defined Network, Traffic Engineering, Traffic Classification

I. Introduction

In a Software Defined Network, traffic classification has numerous advantages. However, along with the benefits, there are other issues connected with appropriately classifying traffic. As a result, it is critical to comprehend all of the benefits and drawbacks of traffic classification in SDN. Entropy-based, Machine Learning-based, Traffic pattern analysis-based, Connection rate-based, and SNORT and OpenFlow integrated-based techniques are all common methodologies for traffic classification based on SDN. In SDN, networking flow and port information can be obtained and then analysed to extract specific traffic classes. There are a few network utilities that assist us in gathering unique traffic variations.

The first issue is Wide Scale Traffic Classification, which refers to the massive bandwidth consumed between different hosts during communication in Gigabits per second. Large amounts of traffic are more difficult to classify in terms of bits. The second issue is fine-grained traffic classification, which means that an increasing number of protocols are carrying diverse application data. Traditional networks employed the coarse-grained traffic classification idea, in which a certain protocol is linked to a specific type of traffic. However, fine-grained classification makes it difficult to distinguish between different types of traffic. The third issue is internet traffic appearance and new future protocols, which implies that new traffic types are added to networks every day, as well as newer and newer protocols, making traffic classification challenging.

The network traffic investigation data provides the network administrator with useful information for dynamic and optimal resource allocation. IoT data development is massive thanks to a combination of networking developments, such as distributed computing. The problem is managing the resources for the growing requirement. Fast assistance delivery, flexibility, User experience (QoE), and adjusted service level agreements are the current assumptions for clients (SLAs). The purpose of the specialised cooperative is to increase benefit by distributing resources and various tools in order to achieve QoE and SLAs while lowering operational costs. The complexity of classification in the traditional framework for network traffic is in the code, however in Artificial Intelligence (AI), the complexity is in the network follows obtained and the learning algorithm used.

Learning capacity is the most important factor in machine learning (ML) computations. This ability is developed via practise and refinement. The network's factual properties, such as packet duration, packet length, and packet interval presentation time, are novel for different

types of network traffic. With the help of the preparatory informative collecting guide, the machine achieves this uniqueness in network architecture. The example in the network data captured can be determined using machine learning calculations. The identification of various applications, such as real-time video, document movement, email, and browsing, are major issues. For optimal network resource utilisation, a powerful network management device is required to deal with the rapid growth of network traffic.

For management, maintenance, optimization, and ease of use, intelligence should be integrated into networking devices. Machine learning for gadget control is tough to include because of the networking framework's scattered behaviour. The SDN allows for the incorporation of knowledge into networking devices. The diverse behaviour of devices connecting to the network poses a management, maintenance, optimization, and organisational issue. One good approach is to embed intelligence into network equipment. The advancement of infrastructure, such as GPU and structures for data handling, such as Hadoop and Spark, as well as machine learning libraries, such as TensorFlow and scikit-learn, has provided an opportunity for incorporating knowledge in networking devices.

Machine learning (ML) techniques have made significant progress in a variety of application areas. Unsupervised Machine learning (USL), Supervised Learning (SL), as well as Reinforcement Learning (RL) are three types of machine learning algorithms (RL). RL algorithms figure out how to pick the optimal set of activities to advance a specified target (for example, reward) function, whereas USL and SL algorithms concentrate on classification and regression problems tasks. The ability of ML to oversee perplexing issues is one of its most substantial advantages; as a result, it is natural to exploit ML in the entire network, where unpredictable challenges are common. In the sense of steering, RL outflanks other ML processes, hence it appears to be generally encouraging in the Network Traffic Engineering area.

Ii. Overview of Existing Work

Entropy-based, Machine Learning-based, Traffic pattern analysis-based, Connection rate-based, and Sniffer and OpenFlow integrated-based techniques are all common methodologies for traffic flow prediction based on SDN. With SDN, networking flow and port information can be obtained and then analysed to extract specific traffic classes. There have been some network services that assist us in gathering unique traffic variations.

The process of building a dataset and applying an ML model to it is broken down into three parts [1].

1. Data Collection
2. Data pre-processing for generating dataset
3. Model construction and validation

The sampling fields of a training and testing data are shown in Figure 1. The 'label' column is added to the training dataset, with labels of '1' for 'HTTP' traffic, '2' for 'email' traffic, and '3' for 'streaming' traffic. The training dataset has 45 properties, the first eight of which are displayed in Figure 1.

Sl.No	srcip	srcport	dstip	dstport	proto	total_fpackets	total_fvolume	total_bpackets	label
1	10.0.0.1	55628	10.0.0.2	80	6	6	426	6	1
2	192.168.229.139	38992	74.125.24.27	25	6	13	605	12	2
3	10.0.0.1	49690	10.0.0.2	5004	17	81	109836	0	3

Figure 1 Example of a dataset for traffic classification

A supervised machine learning traffic classifier is being trained and tested. Because there are two or even more kinds of traffic flows, the ML traffic classifiers should be based on those classes.

Case 1: A two-class based on supervised traffic classifier is trained and tested [26]

The needed train and test process that culminates in a classification algorithm is depicted in Figure 2. As previously stated, the best way to train a supervised machine learning algorithm is to give previously classified instances that matches the type of traffic that one desires to recognise later in the network.

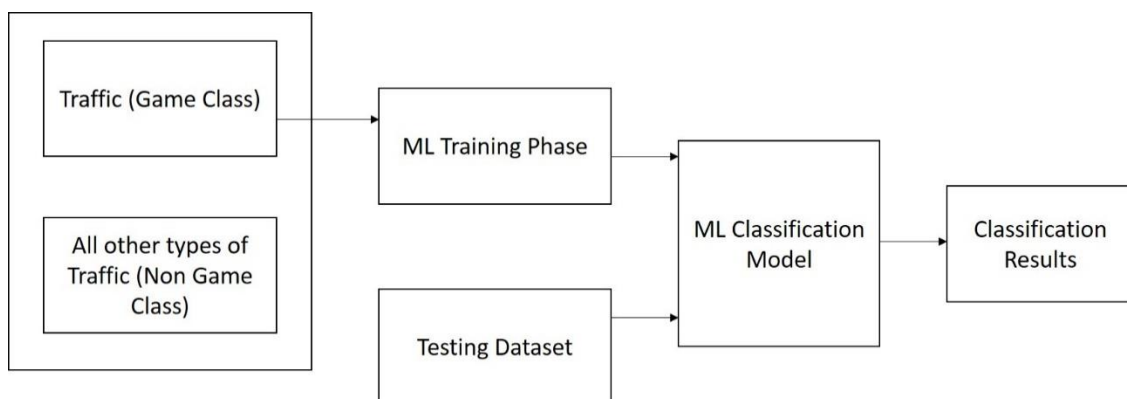


Figure 2 Two-class supervised ML traffic classifier

Case 2: Supervised machine learning traffic classification

The series of events required to train a supervised ML traffic analyzer is depicted in Figure 3. First, a collection of 'traffic traces' is gathered, which includes both occurrences of the service of relevance (e.g. online video game traffic) and occurrences of other conflicting applications (e.g. HTTP, DNS, SSH, and/or peer-to-peer file sharing). As a preliminary to generating features, the 'flow statistics processing' stage entails computing the statistical aspects of these patterns (such as mean packet inter-arrival time, average packet length, and/or flow duration).

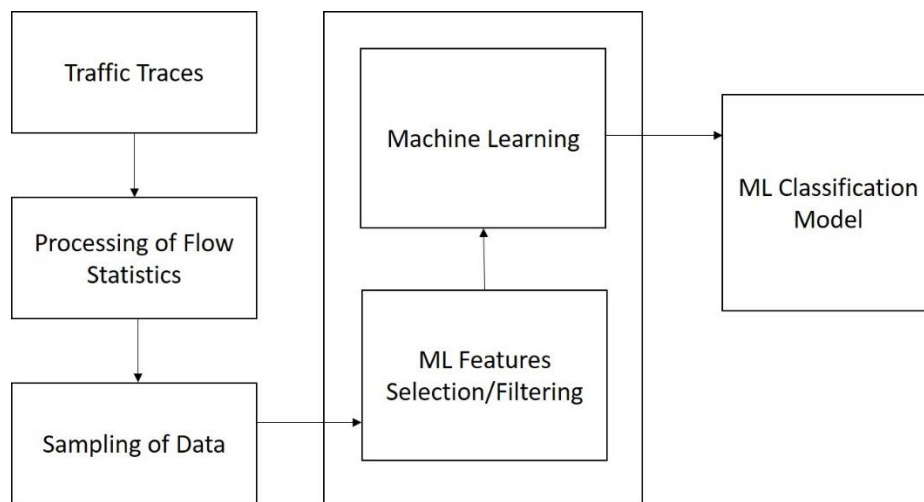


Figure 3 Supervised ML traffic classifier

III. Proposed Work

3.1 ALGORITHM OF PROPOSED WORK

In proposed work, step-by-step process of dataset creation is given as per following algorithm.

Title: Algorithm to create dataset for Traffic Classification in SDN based network

Input: Flow and Port statistics at switches at regular intervals.

Output: Dataset for Traffic Classification in SDN based network.

Initialization: Various classes of traffic packets per flow, Packet Count, Flow Count

- 1: Extract the flow and port statistics for each flow.
- 2: For each flow 1 to n, do
- 3: Extract the flow and port statistics from the switches into a file to create the dataset.
- 4: Mark traffic as per Traffic Class in dataset. (E.g., 1,2,3 for three different classes)
- 5: For End

6: return created Dataset.

In an SDN topology, all flowing and port information are retrieved for every flow from SDN-based switches. Each SDN-based switch has a request and reply handler, which stores information about each flow. To access all flow-related information, two techniques named OFPFlowStats Request as well as OFPFlowStats Reply are used. To get all port-related information, another technique called OFPPortStats Request is used. All of this data will be saved in a CSV file during the entire topology's running flow state, and a dataset will be formed.

3.2 STEPS OF PROPOSED WORK

Figure 2 depicts the procedures involved in creating a dataset. Various machine learning algorithms will be trained and evaluated on the dataset after it has been created and marked.

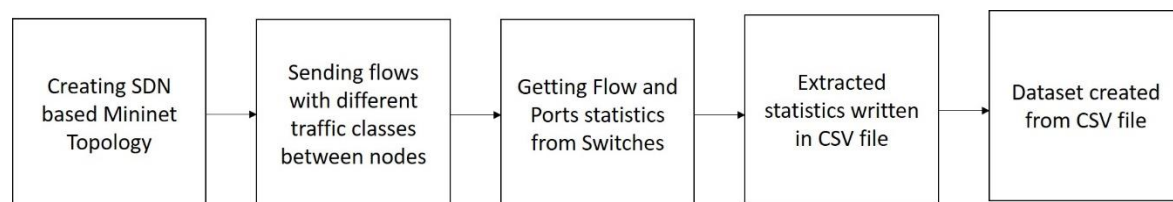


Figure 2 steps for dataset creation

According to a research study, either a benchmark dataset or a custom-created dataset is insufficient for classifying traffic classes, hence in this study, it was decided to mix the two datasets.

On the created dataset, Figure 3 depicts the steps for training and testing the ML model. Some pre-processing techniques must be applied to the dataset before it may be divided.

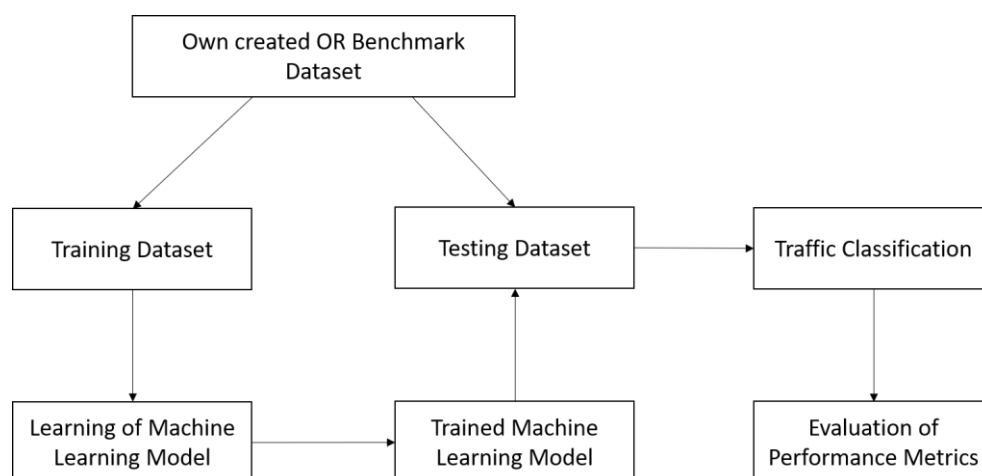


Figure 3 Training and Testing of Machine Learning model

IV. Summary of Machine Learning Algorithms

For correct and efficient traffic categorization, a traffic stream classification algorithm is critical. In traffic classification, many machine learning-based algorithms are frequently utilised. Following are some common machine learning algorithms that are currently employed in traffic classification approaches, as well as their benefits and drawbacks.

Naive Bayes is a probabilistic algorithm that is based on Bayes' theorem, which states that the probability of a hypothesis (class label) given some evidence (input features) is proportional to the probability of the evidence given the hypothesis, multiplied by the prior probability of the hypothesis. Naive Bayes assumes that the input features are conditionally independent given the class label, which is often a strong and unrealistic assumption. However, this assumption allows the algorithm to make predictions based on relatively small amounts of data and with high computational efficiency.

KNN is a non-parametric algorithm that makes predictions based on the majority class label of the k nearest training examples to a given test example. KNN does not make any assumptions about the underlying probability distribution of the data, and it can be sensitive to the choice of the value of k and the distance metric used. However, KNN is flexible and can be used with a wide variety of data types and is simple to understand and implement.

K-means is a clustering algorithm that groups similar data points together into k clusters. It works by iteratively finding the mean of each cluster, and reassigning data points to the cluster with the closest mean. The algorithm stops when the cluster assignments no longer change. K-means is a simple, efficient, and widely used algorithm for unsupervised learning tasks such as anomaly detection, market segmentation, and image compression.

Decision Tree, on the other hand, is a supervised learning algorithm that is used for classification and regression tasks. It works by recursively partitioning the data into smaller subsets based on the values of the input features, and creating a tree-like structure where each internal node represents a feature and each leaf node represents a class label or a predicted value. Decision Trees are simple to understand, interpret and visualize and they can handle both numerical and categorical data.

SVMs are a type of linear classifier that is particularly effective in high-dimensional spaces. They work by finding the hyperplane that maximally separates the different classes in the data. They are also effective in cases where the number of dimensions is greater than the number of samples.

Random Forest, on the other hand, is an ensemble learning method for classification and regression. It creates multiple decision trees and combines them to improve the overall performance and prevent overfitting. Random Forest is less prone to overfitting than a single decision tree and usually better when the data has a lot of features.

Logistic Regression is a simple yet powerful algorithm that is easy to implement and can be used for a wide range of classification problems. It is especially useful in cases where the relationship between the independent and dependent variables is not linear. It also provides a probability score for the predictions which can be used for further analysis.

V. Categories of Datasets related to Traffic Classification

As mentioned in Fig. 4, we can classify datasets related to traffic classification.

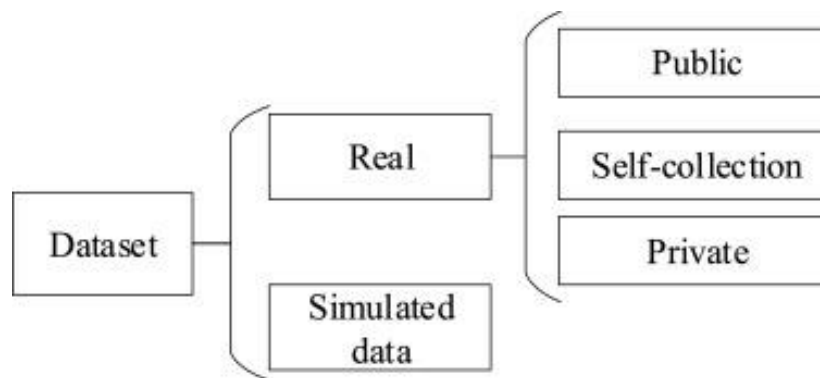


Figure 4 Category of Datasets

Traffic classification dataset can be broadly classified in two categories:

(1) Real Dataset

Real dataset can be used for analysis from the various sources it is derived. Real dataset is created from real networking environments and real scenarios. There are several real datasets like CAIDA [30], UNIBS [31], MAWI [32], ISCX [34] and many more. Real Datasets are also categorized in three types:

1. Public Datasets

Public datasets are available publicly on some websites for free download. These datasets are created and shared on internet for others to use it.

2. Self-collection Datasets

Self-collection datasets are created by own by capturing real network flows of our network. These datasets are created for our own use and sometimes shared publicly on demand basis.

3. Private Datasets

Private datasets are also created by own by capturing real network flows of our network. These datasets are created for our own use and not shared publicly.

(2) Simulated Datasets

Simulated datasets are created by using some simulation tools like NS2, NS3, Mininet etc. This type of dataset is not real but gathered through simulation tools.

Following is the summary of publicly available real datasets.

CAIDA (Cooperative Association for Internet Data Analysis) [30] is an organization that collects, curates, and distributes large-scale Internet measurement data to researchers worldwide. They have several datasets available for download.

UNIBS [31] dataset includes data about several applications. Dataset contains packet level information about various application.

The MAWI (Measurement and Analysis of the Wide-area Internet) dataset [32] is a large-scale, long-term dataset of Internet traffic that was collected by the Cooperative Association for Internet Data Analysis (CAIDA). It provides a detailed view of Internet traffic at the level of individual packets and flows, and it can be used to study a wide range of Internet-related topics, such as traffic characterization, network performance, and security.

The Cambridge mProbe project [33] is a research project led by the University of Cambridge, which aims to understand the characteristics of modern mobile networks and the traffic they carry. The project uses a combination of active and passive measurement techniques to collect data from mobile networks.

The ISCX dataset [34] is a collection of network traffic data that is commonly used for research and development of intrusion detection and prevention systems. It was created by the Information Systems Security Laboratory (ISSL) at the University of New Brunswick in Canada. The dataset includes both normal and malicious traffic, and is intended to be used for evaluating the performance of different intrusion detection techniques. It is one of the most widely used datasets in the field of network security and is publicly available for research purposes.

An IP trace dataset [35] is a collection of data that includes information about the source and destination of Internet Protocol (IP) packets. This information can include the IP addresses, timestamps, and other details about the packet's journey through the network. This type of dataset is commonly used in network security research, as well as in incident response and forensics investigations. It can be used to analyze network traffic patterns, identify potential security threats, and trace the origin of malicious activity.

KDD Cup 99 dataset [36] is a widely used dataset for evaluating and comparing the performance of intrusion detection systems. The dataset was created by the Knowledge Discovery and Data Mining (KDD) research group at MIT Lincoln Laboratory, and was used as the basis for the KDD Cup 1999 competition. The dataset contains nearly half a million-network connection records and includes a wide variety of normal and attack scenarios. The data was collected from a military network environment, and includes a wide range of attacks, including both well-known and novel ones. The dataset is publicly available and commonly used in research on intrusion detection, network security, and machine learning.

Digital Corpora [37] dataset contains distributed RAW image format and advanced file format network traffic and available publicly.

NetOp [38] dataset contains information for anomaly detection in network packet transfer and available publicly.

The GTA UFRJ (Ground Truth for Algorithm Evaluation) dataset [39] is a collection of labeled network traffic data that is commonly used for research and development of intrusion detection and prevention systems. It was created by the Computer Science Department of the Federal University of Rio de Janeiro (UFRJ) in Brazil. The dataset includes both normal and malicious traffic, with the goal of providing a ground truth for the evaluation of intrusion detection algorithms. The dataset contains a mix of network traffic from both local and global sources and can be used for testing and evaluating various intrusion detection techniques, such as anomaly-based and signature-based. The dataset is publicly available for research purposes.

The KAIST dataset [40] is a collection of network traffic data that is commonly used for research and development of intrusion detection and prevention systems. The dataset was created by the Korea Advanced Institute of Science and Technology (KAIST) in South Korea. The dataset includes both normal and malicious traffic and is intended to be used for evaluating the performance of different intrusion detection techniques. The dataset contains a mix of network traffic from both local and global sources, and it is well balanced between normal and attack traffic.

Snu dataset [41] contains information about normal traffic datasets of CBR (Constant Bit Rate) and VoIP (Voice over IP).

The LBNL (Lawrence Berkeley National Laboratory) dataset [42] is a dataset of power consumption of buildings collected by the researchers at Lawrence Berkeley National Laboratory. The dataset contains data from over a thousand buildings, and it includes

information on building characteristics, such as size and location, as well as data on energy consumption, such as electricity and natural gas usage.

The SIGCOMM 2008 dataset [43] is a dataset of Internet traffic that was collected by researchers at the University of California, Berkeley, as part of the ACM SIGCOMM 2008 conference. The dataset contains traffic data from a variety of sources, including data from a campus network, data from an ISP, and data from a residential network. It includes information on network traffic characteristics such as packet headers, payloads, and timestamps. This dataset is commonly used for research on network traffic analysis, and it has been used in a number of studies and publications on topics such as traffic classification, anomaly detection, and network security. The data is publicly available to download from the website of the University of California, Berkeley.

The NLANR (National Laboratory for Applied Network Research) dataset [44] is a dataset of Internet traffic that was collected by researchers at the National Laboratory for Applied Network Research (NLANR) and the Cooperative Association for Internet Data Analysis (CAIDA). The dataset includes data from various sources including major backbone links, regional networks, and end-user links. It includes information on network traffic characteristics such as packet headers, payloads, and timestamps. This dataset is commonly used for research on network traffic analysis and provides a large-scale, long-term view of Internet traffic, it's been used in a number of studies and publications on topics such as traffic characterization, network topology, and anomaly detection. The data is publicly available to download from the website of NLANR and CAIDA.

The DARPA (Defense Advanced Research Projects Agency) dataset [45] is a dataset of network traffic that was collected by researchers at the Defense Advanced Research Projects Agency (DARPA) as part of the DARPA Intrusion Detection Evaluation Program (DARPA IDS Evaluation). The dataset includes data from various sources including simulated network traffic and real network traffic data. It includes information on network traffic characteristics such as packet headers, payloads, and timestamps. This dataset is commonly used for research on network security and intrusion detection, and it has been used in a number of studies and publications on topics such as traffic classification, anomaly detection, and performance evaluation of intrusion detection systems. The data is publicly available to download from the website of the MIT Lincoln Laboratory.

VI. Tools to be used for implementation

Following tools to be used for implementation of proposed approach.

(1) Mininet Simulation Tool

Mininet is a virtualized testbed for developing and testing network technologies and protocols. With a single command, Mininet may create a realistic network on any sort of machine (VM, cloud-hosted, or native). As a result, it provides a low-cost solution with simplified development in line with production networks. Mininet is great for research, education, and research because it is easy to set up and use using the CLI or GUI. Mininet was built as an OpenFlow2 as well as Software-Defined Networking testbed (SDN). However, we're only interested in modelling a simple network environment without SDN-based devices in this scenario.

(2) OpenV Switch

OpenV Switch is an Open-source Virtual Switch located below OpenFlow (Southbound) interface and capable of programmable automation with protocols and interfaces. Port (s1-ethX) on the switch works as a virtual bridge to set up connections between different hosts and the switch, where s1 is the switch and s1-ethX is the name of the interfaces. OpenVswitch was chosen for this project because it is the most popular and frequently used interface for software defined networks. Because the proposed method is a hybrid of machine learning and data mining methodologies, the logic and approaches are written in Python.

(3) sFlow-RT

sFlow-RT, which is open-source software, has OpenFlow controller embedded in it. It allows flow insertion to Open Flow switches and monitors flows to the switches. Besides, it can handle events of interest, apply traffic rules to a particular controller and can also raise triggers.

(4) Iperf Tool

Iperf is a traffic performance tool for the internet which can be used to generate and analyze the collected data.

(5) hPing3 Tool

Hping3 is a packets and traffic generator for TCP/IP networks that is mostly used for network testing.

(6) Python packages

We also require Numpy and Sklearn python package Installation to carry out machine learning tasks.

(7) MiniEdit GUI Tool

We'll deploy the topology using the application MiniEdit in order to present topology in GUI form. MiniEdit is a basic Mininet GUI network editor.

Conclusion

Software-Defined Networks (SDNs) make it easier to send and distribute applications by lowering infrastructure costs and overhead. During this time, SDNs are used to gradually reorganise the network to meet the needs. As a result, Machine Learning tools can be used to monitor virtual flow of data in networks. We can also define preferences using Machine Learning instruments, such as controlling data transmission, limiting access based on time, screening for security problems, declaring a bug, recovering the issues as needed, and a lot more complex capacities, all while reducing human effort. Traffic categorization in SDN is a significant difficulty. There are various sorts of traffic classes, and many efforts have been made to categorise them in SDN, however when new traffic classes emerge, it becomes more difficult to classify them using statistical data or fixed rule-based solutions. Entropy-based, Machine Learning-based, Traffic pattern analysis-based, Connection rate-based, and Sniffer and OpenFlow integrated-based techniques are all common methodologies for traffic based on SDN.

Past traffic classification studies in terms of datasets will be employed in this work, and automated newest traffic classification patterns will be determined to classify traffic patterns using Machine Learning approach in artificial intelligence. The key justification for selecting this technique is because it can be utilised for all sorts of traffic classification, as well as new strains of traffic classification.

According to the proposed approach, either the benchmark dataset or the user-created dataset is insufficient for accurately classifying traffic patterns, hence in this study, both datasets are combined.

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Application of Business Intelligence in Human Resource Management

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Abstract

When it comes to establishing a successful business, the most valuable asset is the people within the organization. However, many organizations are starting to use business intelligence (BI) in many areas of their businesses and make substantial gains; they have taken little advantage of this in the Human Resources (HR) management area. The paper explores the implementation of a Human Resources Information System (HRIS) impacts on the decision making regarding feedback and review, including promotions, salary rates, attrition and retention, and training and development by Human Resources Managers through the use of business intelligence (BI) tools such as reports, analysis, dashboards and metrics or measures. The methodology approach is qualitative based on the results of a survey from researchers and the method used is review of other research paper. Human resource management departments are increasingly looking to data analytics to inform their key people decisions, and thanks to evolving artificial intelligence and machine learning, HR professionals now have even more data available to help inform these decisions. BI and data analytics in the design of HRM protocols and database strategies they can attract develop and retain high performing employees and succeed in the local and global business competition.

Keywords: Artificial Intelligence, Business intelligence, Human Resources Information System, Machine learning,

Introduction

One of the key elements influencing an industry is technology. In the production department, robots have taken the place of workers since the 19th century. The third industrial revolution started in the 1970s, when personal computers and the internet were introduced into the workplace and human labour was supplanted by machines.

Digital technologies like machine learning (ML) and artificial intelligence (AI) are now spreading day-to-day workplace operations and will drive company change. "An ideal intelligent" machine is described as a flexible agent that senses its environment and acts to increase the likelihood that it will succeed in achieving a particular goal.

Artificial intelligence based on "machine learning" technology promises to revolutionise human resources departments at various levels, including recruitment, training, career management, mobility, compensation, and benefits in order to attract talent and high potential, treat and evaluate nominations as quickly as possible, check the suitability of the profile and position, and predict potential problems before they arise.

Losing one or more of its successful employees to one of its rivals is one of the most challenging situations for any business that wishes to be modern and competitive. By analysing internal data and comparing it to external market data and, in particular, competition, HRDs are able to establish performance indicators for their human resources.

The outcomes of these analyses will allow us to map the current profiles in accordance with the efficiency and productivity of each employee. This technology, which is undergoing a technical boom and is rapidly producing convincing results among the industry's titans, is inspired by how the human brain functions (Apple, Facebook, Google, Microsoft ...)

Materials and Methods

Literature review of the theme

Following are the role of artificial intelligence in human resource management;

Recruitment: According to the study (Amla & Malhotra, 2017), just 40 percent of businesses and sectors use artificial intelligence. Digital technologies are being used by companies like SAT, Facebook, and GE to screen, interview, and identify fresh talent for the corporate

recruitment process. Through AI, hiring managers may review applications and respond quickly to candidates.

Screening and Interview Process: The research paper title, Recruitment through artificial intelligence: A Conceptual Study. The researcher has narrated the role of AI in recruitment where artificial intelligence is played integral role in recruitment process.

Artificial intelligence helps in screening the candidates, auto-generated messages to candidates, employee's relations, scheduling the interviews etc. (Jarrahi, 2018) Using word or voice patterns tests, artificial intelligence can automate the interview process. Digital interviews can be conducted using AI software, and AI also helps to enhance the candidate experience.

Reduce Administrative burden: In an organisation, HR must perform multiple tasks, and corporations use technology and artificial intelligence to lighten the load. AI offers solutions to issues and boosts an organization's HR department's effectiveness. (Jhansi,2022)

Selecting: The researcher (Rajesh, Kandaswamy, & Rakesh, 2018) investigated that through AI human resource managers can be able to trace the right candidate in short time of span and technology will aid in identifying the suitable - In an organisation HR have to play multitasking roles where using technology and Artificial intelligence companies try to reduce workload. AI offers solutions to issues and boosts an organization's HR department's effectiveness.

Reduce Discriminations: AI is now being utilised to lessen bias and will aid in boosting workplace transparency. The organisation will then be able to choose the resume. Job descriptions can be analysed using AI software (Rathi, 2018).

Boost Efficiency: According to Buzko et.al (2016) “Artificial Intelligence in human resource development paper revealed that the application of artificial intelligence in HR facilitates organizations to work effectively and it also provides accurate data”. Artificial Intelligence will help to decrease personnel duplication at the workplace. To improve productivity at work, many robotic tasks have been implemented. Data collection, report filing, data copying, data identification from existing data, processing, data collection for HR and payroll systems, etc. are all examples of robotic tasks.

Enhance workplace learning: These days, digital technologies and computers can play a hidden function in business. Industries may manage data analysis, provide real-time feedback

during training, and change the course of action based on progress and responses that industries received thanks to computers and contemporary technology (Riebli, 2018).

To save a time companies used Microsoft 365 which helps employees to work and increase the efficiency at workplace. AI tools like Engazify (To Provide feedback), Obie and Niles (For knowledge sharing), Wade&Wendy (For Career advancement), and Duolingo (Learning domain) are used. (Amla & Malhotra, 2017).

Artificial Intelligence required for more Human Resources Function

Personalized employee experiences: It's common for new hires to be unsure about where to go in order to meet individuals and learn more about the company. They might speak with their desk neighbour. An AI may, for instance, propose training exercises or give names, addresses, and phone numbers of people the user should try to interact with on their initial few days.

Cognitive-supporting decision-making: Typically, the HR team members would be responsible for these duties:

(1) **Requests for vacation** - Employees who wish to request time off are informed that their request is unlikely to be granted because so many other people have already reserved time off during that period.

(2) **Mood assessment** - A worker answers a client contact. Following the call, the employee is advised to take a break before his meeting because he appears worried.

(3) **Team training** - Team managers are given a list of training possibilities for team members when an organisation wants to take a more systematic approach to employee training.

(4) **Hiring procedures** - A hiring manager is informed that the company's recruiting strategy is ineffective because it conducts too few interviews with applicants. In addition to other things, cognitive solutions can assist firms in gaining access to various data sources and revealing fresh insights that can be used to construct applicant profiles.

Automating "Repetitive, Low-Value Add Tasks": AI offers HR the chance to automate "Repetitive, Low-Value Add Tasks" and put greater emphasis on more strategic work. Saving time in those areas can assist HR teams in refocusing on "value-add activities like mentorship and on-going feedback." HR spends time processing the stages of on boarding a new

employee (allocating space, provisioning a laptop, etc.). When routine HR duties, such as benefits administration and answering frequently asked questions, are automated by AI tools, HR teams will be "free to undertake more of the creative and strategic work that has a significant impact on the success of their companies."

Analytics for smarter people: Businesses have been gathering data about their clients for years in order to glean insights and forecast future behaviour. In terms of utilising these people analytics, HR departments still have a long way to go. AI will be able to play a bigger role in HR after it is decided what data to track, examine, manage, and secure. Companies will search for creative ways to attract top people in the never-ending war for talent. Companies will be able to stand out from one another with the use of technologies that improve the candidate experience and satisfy the candidate's digital expectations.

Getting rid of biases: Employers that want to be inclusive could unconsciously favour applicants who are most like them. This is known as "unconscious bias." The Implicit Association Test (IAT), a psychological technique that demonstrates that people's unconscious word associations reflect bias, has shown yet another bias, language bias. "These prejudices creep into résumé evaluations and job descriptions.

In order to improve their employment communications and welcome diverse applicants, companies can now utilise AI to discover and eliminate these bias patterns in their language using algorithms, according to HRPB researchers. AI may also provide managers prospects that were previously passed over because of the propensity of humans to select individuals with similar characteristics or skill sets. Since the algorithms developed by HRPB researchers are free of these inclinations, managers are able to depend less on their gut instincts and more on data-driven judgements.

Pay Equity: The goal of such laws is to end the continuation of long-standing pay practises that are discriminatory based on gender, race, and ethnicity. There are technologies available that make it simple to develop a user-friendly experience and to analyse, comprehend, and convey data, he noted. Technology may be especially useful to monitor employee remuneration for inconsistencies based on protected categories. You are no longer limited to using an Excel spreadsheet.

Chatbots: Using certain technology, like chatbots, employees can obtain crucial information on policies and processes whenever and wherever they want. Chatbots can be beneficial for

providing typical employee inquiries with text-based responses. For transactional queries, employees are more at ease using chatbots than traditional methods of interaction.

Recruitment: we frequently go with our instincts. According to one survey, the majority of hiring managers decide on a candidate within the first 60 seconds of seeing them, frequently on the basis of appearance, handshake, dress, or speech. Do we actually understand the qualities, backgrounds, degrees, and personality traits that make someone successful in a particular role? Not at all.

Managers and HR professionals spend billions on assessments, tests, simulations, and games to find new employees, but many admit to making mistakes with 30–40% of their picks. AI-based algorithms can sort through resumes, identify qualified employees, profile top performers, and even decode video interviews to provide us with signals about which individuals are most likely to succeed.

Employee growth and learning: We are not very good at "training" people. The majority of learning specialists tell us that at least half of the \$200 billion worldwide L&D market is squandered (forgotten, applied improperly, or simply squandering people's time). However, we are unsure of which part this is! Do you personally know what you "need to learn" in order to improve at your job? We all have a pretty good notion, but what if we had algorithms that tracked and researched the abilities, mannerisms, and pursuits of the best team members and then simply instructed us on how to emulate them? According to research, the typical worker has fewer than 25 minutes per week for training and education; if we make that time more relevant everyone will perform better.

Management and leadership: We conduct management and leadership like Zen masters. We read books, attend workshops, imitate our favourite bosses, and extol the virtues of the current crop of prosperous leaders. Are we really experts in the field of leadership? Numerous management and leadership qualities have been found to characterise success, and each of us brings a particular and distinctive blend of them to the table. With AI, this can now be decoded. Three manufacturers have created coaching solutions that are "AI-based," or systems that solicit feedback from team members and employees, read comments, and infer mood. In order to provide managers and supervisors with "nudges" on how to perform better, they use this data to compare the problems with these individuals and teams to those of higher performing teams.

Fraud and compliance: It present enormous opportunity. Employees who steal or commit crimes are "contagious" to their coworkers, according to one study (people who work with them pick up bad habits). Artificial intelligence (AI) may analyse organisational network data (email traffic, sentiment of comments), detect stress points, potential ethical lapses, and many other compliance risks, and then flag the "red areas" for HR or compliance professionals to address before bad behaviour takes place.

Employee engagement and well-being: AI is currently utilised to identify habits that lead to subpar work performance. In safety AI can identify behaviours and experiences that lead to accidents. A new breed of survey tools can identify patterns of stress and bad behaviour and alert HR or line managers.

Employee self-service and candidate management: A new breed of intelligent chatbots can make interactions intelligent and easy.

Result and Discussion

AI consists of a variety of algorithms and machine learning technologies that can quickly ingest data, find patterns, optimise, and predict trends. It is not some mystical computerised avatar. The systems are capable of comprehending speech, recognising images, and using pattern matching to detect signals indicating emotion, sincerity, and even personality. Although these algorithms lack the "intuition" of humans, they are speedy, analysing millions of pieces of data in a matter of seconds and instantly correlating them with patterns.

By drawing curves representing potential outcomes and then optimising choices depending on a variety of factors, statistically speaking, AI systems may "predict" and "learn." Therefore, you could see an AI system that "predicts" a candidate's performance on the job based on all relevant demographic data, employment history, and interview questions.

These are all brand-new uses, and despite how fascinating they may seem, there are several dangers to consider. The greatest is that AI need "Training data" in order to function. Or put another way, algorithms pick up knowledge from the past. If your existing management procedures are unfair, punitive, unduly hierarchical, or biased, you can end up institutionalising everything you despise. We require "tuneable" AI that is transparent so that we can check the algorithms' actions to make sure they are correct. Our early algorithms will require "bumpers" and "tuning knobs" as early autos didn't always drive straight and we will need to learn how to improve them.

Bias may be institutionalised by the systems. Imagine that your company has a low percentage of African American engineers and has never employed any women in engineering. The AI hiring process would logically deduce that women and minority engineers had lower managerial aspirations. It will take time to effectively remove this kind of bias from the algorithms, which must be done cautiously.

Summary of analysis and Interpretation

Data exposure and unintentional exploitation are both possible risks. Think about a typical use of analytics where we attempt to foretell the possibility that a high-performer will leave the firm. If we warn managers that a certain employee is likely to leave, we risk encouraging the wrong behaviour—the manager might ignore the employee or treat him or her differently.

We must carefully study how to use behavioural economics. Today, AI is a "tool" for recommendation and improvement rather than a self-contained system of making decisions.

The necessity to develop "interpretive" and "transparent" AI systems was explored by leaders in the field at Entelo. To put it another way, anytime the system decides something, it should explain why it did so that people may assess if the criteria it employed are still valid. This is one of the most crucial requirements for new technologies, but sadly, the majority of AI systems are now a total mystery.

Future scope and Direction of Research

What if AI provides the incorrect advice regarding a candidate, a pay raise, or a managerial intervention? How will we know? Can we make a diagnosis? Will we be alert till it is already too late? We still have a lot of work to do before we can instrument and "train" our management-based AI systems to function effectively.

The buzz surrounding AI is at an all-time high right now. Every vendor of HR software wants you to think they have a machine learning team and the best AI solution available. Yes, these talents are crucial to this sector, but don't buy into the marketing hype.

The effectiveness of an HR tool will depend on a number of factors, including the completeness and accuracy of its algorithms, the usability of its systems, but more importantly than all, it will depend on its capacity to offer "narrow AI," or extremely precise solutions that address your concerns.

Only when the vendor gets enormous amounts of data (to train its system) and they receive a tonne of feedback on how well it functions can this be accomplished. Therefore, rather than merely having outstanding engineers, I think the obstacles to entry will be focused business strategy and close client relationships.

And unless you can conclusively demonstrate it in your business, avoid purchasing a system that is a black box. We must take the time to test these technologies in the real world and fine-tune them for best use because management and hiring decisions in every firm are frequently based on culture. For instance, IBM has invested years in tailoring its AI-based career and pay solutions to the needs of its business model.

Now that they are supplying these tools to business clients, they have discovered that each application teaches IBM new things about the algorithms that improve them for that particular sector, culture, or organisational requirement. Despite these difficulties and dangers, there is a tremendous advantage. Payroll accounts for 40–60% of a company's revenue, and management decisions based on intuition account for a large portion of this massive expense.

I think productivity, performance, and employee health will significantly increase as AI technologies in HR get smarter, more reliable, and more laser-focused on certain issues. All we need to do is wait, watch, and be prepared to put money into it.

Conclusion

The industrial sector has seen phenomenal expansion in today's competitive world. One challenge that industries must overcome is managing continuous improvement. The majority of industries are implementing new technology to increase speed and for routine labour. The majority of researchers and professionals also advise firms to use digital and artificial intelligence tools. Many businesses use artificial intelligence and machine language in their human resource departments, where it plays a crucial role in hiring, firing, performance analysis, data collection about personnel, real-time information, and correct information.

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Exploring the Rise of Over-The-Top (OTT) Platforms in India: A Study of customer Growth

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Abstract

The "A Study of customer Growth" intends to explore the expansion and influence of Over-The-Top (OTT) platforms in India, with a particular focus on their customer base. The research aims to examine the driving forces behind the growth in customer and the effect of these platforms on the Indian media and entertainment sector.

The research methods employed in these studies consist of an examination of existing research materials, reports, and statistics related to OTT platforms in India, including industry reports and government data.

The findings of the study are expected to provide insights into the rate of growth of OTT platforms, the factors driving the increase in customers, and the impact on the media and entertainment industry. The study will also provide recommendations for stakeholders in the industry on how to maximize the potential of OTT platforms in India, such as investing in original content, improving user experience, and leveraging data analytics. Understanding the growth and impact of OTT platforms in India is critical for the media and entertainment industry **to remain competitive and meet the changing demands of consumers.**

Keywords: - *OTT, influence, growth, stakeholder*

Introduction:

The OTT (Over the Top) market is experiencing significant growth worldwide as consumers shift towards internet-based video content services as a substitute for traditional distribution methods such as cable, DTH, and cinema. OTT refers to video content streamed via the internet rather than broadcast or cable television, and includes a range of services such as subscription-based, free and ad-supported, and pay-to-watch streams (Deloitte, 2017). The flexibility and convenience of OTT services have driven their widespread adoption and have been further amplified by the COVID-19 pandemic and the shift towards remote and online entertainment. The market has seen the entry of several international and national companies in India, such as Star India, Netflix, Viacom18, Amazon Prime Video, and Reliance Jio, who have capitalized on the increasing availability of high-speed internet and mobile internet users (Economic Times, 02 Mar, 17). Despite this growth, the key success factors in the OTT market remain the availability of high-quality, compelling content and a seamless user experience.

The growth of OTT is being driven by advancements in technology, the widespread availability of high-speed internet, and changes in consumer behavior, as people are increasingly turning to online platforms for their entertainment needs.

The growth of OTT entertainment and the quality of internet connections are closely related. As more people adopt OTT platforms, the demand for fast and reliable internet will continue to increase, driving the continued development and expansion of the internet infrastructure.

Overall, OTT has revolutionized the way people consume media and is set to play a major role in the future of television and entertainment.

OVERVIEW OF OTT MARKET IN INDIA

The Indian OTT market is expected to reach ₹12,000 crore by 2023 at a compound annual growth (CAGR) of 36% (from ₹2,590 crore in 2018), according to Media Partners Asia (MPA). The market is driven by factors such as increasing internet penetration, affordability of smartphones, and the availability of high-speed data services. Some of the major players in the Indian OTT space include Netflix, Amazon Prime Video, Hotstar (now Disney+ Hotstar), Zee5, SonyLIV, ALT Balaji, and MX Player. These platforms offer a wide range of content in various languages, including movies, TV shows, web series, documentaries, and live sports events. (Source: Media Partners Asia (MPA))

Literature Review:

1. **(Mishra, 2022)** The continued rise of these platforms is being influenced by a variety of variables, including viewing patterns, rural client preferences, and preferences for local and regional programming. The exponential growth of telecom companies, affordable mobile data plans for everyone, increasing finance for spending in Wi-Fi, binge watching attitude of audience, low data plan strategy for monthly and yearly subscription and demographic factors are another factor supporting this growth. Digital and video entertainment currently account for over 21% of online consumption, and by 2024, that percentage is predicted to have increased significantly by 2.5 times.
2. **(MAGAN, 2022)** The Ormax OTT Audience Sizing Report 2022 states that the Indian OTT audience universe currently comprises 424 million people, with 119 million being active paid OTT subscriptions in India. The Indian OTT universe grew by 20% from 2021, even though cinemas have reopened. Ormax Media reported that 3 out of 10 Indians watched online videos at least once in the last month. The annual report is important for the OTT industry to understand their audience base growth and its sources.
3. **Parikh, N. (2020).** Video streaming is a successful avenue for content consumption in India, with Hotstar leading the market and Xiaomi being the most popular Smartphone brand among OTT users. Traditional TV stations should prepare for a paradigm shift brought on by OTT platforms and focus on creating high-quality content to compete with OTT material. While television is still the largest sub-segment within the entertainment and media industry, digital platforms provide a big opportunity for marketers to reach consumers both in urban and rural India. The Indian youth will drive digital media consumption, and VoD services will continue to evolve to find the right business model for success.
4. **Nagaraj et al. (2021).** India's OTT base grew by 20% to 424 million people, but growth was skewed towards lower NCCS segments, small town and rural India. SVOD audience grew by 18% to 130 million, comprising only 31% of India's total OTT universe, with a sizable section of audience watching only free content on YouTube. The road ahead for premium pay platforms in India is challenging, as the country is not accustomed to paying for premium content, and even the theatre-going population is under 150 million.

5. **(Kapoor, 2023)** India's OTT base grew by 20% to 424 million people, but growth was skewed towards lower NCCS segments, small town and rural India. SVOD audience grew by 18% to 130 million, comprising only 31% of India's total OTT universe, with a sizable section of audience watching only free content on YouTube. The road ahead for premium pay platforms in India is challenging, as the country is not accustomed to paying for premium content, and even the theatre-going population is under 150 million.
6. **Nijhawan et al. (2020)** Watching content on any platform is a matter of habit, and Indians have long desired diverse content. The COVID-19 pandemic allowed young people to explore new types of content on personal devices like smart phones and tablets, increasing the adoption of OTT services in urban areas. Despite the current 40 OTT platforms and limited regional content, there is immense potential to expand in regional markets. COVID-19 has also played a role in increasing the duration of video content consumption, and OTT platforms are becoming an aspirational medium for content consumption across age and demographic groups.
7. **Sujata et al. (2015).** Telecom technologies, especially radio access, have advanced significantly. It has moved from early GSM and CDMA to more advanced Third and Fourth Generation technologies, providing users with faster data rates. The higher data rate is due to the increasing popularity of bandwidth-intensive OTT services like video calls and Video on Demand, evident in the widespread use of video OTT players like Netflix in developed countries. The transition from feature phones to smartphones has also enabled data streaming and improved the user experience, leading to the development of more innovative OTT services.
8. **Jain, M. (2021).** The growth of OTT platforms has been greatly influenced by the increasing use of the internet in the entertainment industry. Consumers in India are well-informed and familiar with new technology and trends in the sector, which has contributed to the popularity of OTT platforms such as Netflix, Amazon Prime, Disney+ Hotstar, and Zee5 among the salaried and youth market. The article highlights the rise of OTT, the factors contributing to its success, and the major players catering to the target audience in India. The expansion of the OTT industry has proven to be profitable for the entertainment sector.
9. **Sharma et al. (2023).** This research found seven strong ways for Over-The-Top (OTT) services to succeed, including offering competitive low prices, improving the customer experience, introducing innovative service plans, collaborating strategically,

localizing content, being flexible with technology adoption, and promoting sales proactively. By using these strategies, people started using OTT services more often. People prefer OTT because it's convenient, easy to access, offers quality and varied content, has affordable prices, and lowers the risk of getting COVID-19. Additionally, the study showed that people have different experiences with OTT services.

- 10. Sadana, M., & Sharma, D. (2021).** Empirical findings and discussion suggested that there are five elements that influence customers' entertainment choices, including content and viewing habits, service costs, adjustments caused by incentives or offers, convenience, and connectivity. The strength of these variables, which made content and watching habits, service costs, and convenience the three most crucial variables, was confirmed by logistic regression.
- 11. Nagaraj et al. (2021).** The study identified fourteen reasons why people subscribe to a service and eleven reasons why they do not. By analyzing the data, five main factors were found to influence people's decision to subscribe, including content, convenience, features, price, and quality. A logistic regression analysis was conducted to test the effect of these factors and demographic factors such as age, education, and occupation on subscription decisions. All five factors had an impact on consumer decisions, and price had an opposite effect. The main factors that influenced subscription decisions were household structure, age, occupation, and education.
- 12. Sundaravel, E., & Elangovan, N. (2020).** The Indian streaming industry has seen the rise of local services such as Hotstar and Jio Cinema, as well as the growth of global players such as Netflix and Amazon Prime. This research paper investigates the development, benefits, and potential of streaming services in India through analytical research. As viewers shift towards digital media, marketers are adapting their budgets accordingly, and digital platforms now offer a significant opportunity to reach consumers across both urban and rural areas of India.
- 13. Sujata et al. (2015).** Over time, there have been significant advancements in telecom technologies, particularly in radio access. These advancements have progressed from the early stages of GSM and CDMA to the more recent Third Generation technologies such as WCDMA, TD-SCDMA, and CDMA2000, and even more advanced Fourth Generation technologies such as TD-LTE, FD-LTE, and LTE-A. As a result of these advancements, end-users now have access to data rates that were once considered unimaginable just a decade ago.

14. **Mulla, T. (2022).** Consumers today are demanding personalized content on-demand from anywhere and anytime, which has led to a shift in the media industry towards direct-to-consumer (D2C) models. This change is largely driven by the increasing popularity of over-the-top (OTT) streaming platforms that bypass traditional distribution channels. A literature review conducted from 2007 to 2021 identified twelve factors that influence the adoption of OTT platforms, including content, price, flexibility, convenience, perceived usefulness, perceived enjoyment, desire for freedom, entertainment value, socialization, cultural inclusion, binge-watching, and self-efficacy. This review is the first of its kind to identify influencing factors across streaming platforms in the domain of over-the-top media.
15. **Prasad, S. S. (2022).** The internet has allowed OTT media to become very popular and influential, but no one has studied how it affects society, families, and people. This paper looks at how OTT media impacts people and provides some evidence.
16. **(Series, 2022)** Consumption of OTT content in India was highest among viewers aged 15-34, with men in the age group of 15-24 consuming the most, according to the Indian Over-the-Top Platforms Report 2021. Digital subscriptions grew by 49%, and online gaming by 18%, while traditional media verticals reported negative growth, with 29 million subscribers paying for 53 million OTT video subscriptions.
17. **Shim et al. (2022).** This study highlights that OTT firms in Korea face stiff competition, but they can achieve sustainable growth by identifying profitable niche segments through understanding user behavior and analyzing usage patterns. By applying market segmentation theory and the latent class regression model to survey data, the research identified three submarkets of Korean OTT users, with the third segment being a profitable niche market. The study suggests that bundling content is an effective strategy to convert free users into paying customers within the profitable niche segment. By leveraging these insights, OTT firms can develop content strategies that align with the preferences and behaviors of their target audience, resulting in sustained growth.
18. **Madnani, et al. (2020).** Analyzing the impact of COVID-19 on over-the-top media platforms in India. *International Journal of Pervasive Computing and Communications*, 16(5), 457-475. This study highlights the impact of the COVID-19 lockdown on the usage and viewership of OTT platforms, with increased hours spent and willingness to pay for the service. The findings also emphasize the importance of content quality and the ability to watch with family as key drivers of customer

satisfaction. Moreover, the study underscores the significance of demographic factors in determining the usage of OTT platforms. These insights can guide OTT platform providers in designing effective strategies to enhance user experience and sustain growth in this highly competitive industry.

- 19. Sharma, R., & Mishra, P. (2023).** The rapid growth of digital technologies has made them an integral part of billions of people's daily lives worldwide, facilitated by advancements in telecommunications and enhanced devices. This growth has led to the emergence of over-the-top (OTT) services that provide content directly through a stable internet connection. Consumers, especially those in the 16-34 age groups, are increasingly spending time on the internet, making OTT usage an essential part of their lives. To sustain and succeed, a combination of ad-based and subscription-based models appears to be viable for OTT players. The authors of the study sought to identify the main factors responsible for the adoption of OTT services among Indian consumers.
- 20. Shin, S., & Park, J. (2021).** This study focused on the satisfaction level of consumers and the impact of marketing mix on consumers of OTT platforms. The sample size for the research was 200, and data were analyzed using the Frequency test, Correlation, regression, and ANOVA test. The study found that Amazon, Netflix, Hotstar, Voot, and Sonyliv are popular among a wide range of audiences, including youth, homemakers, working individuals, businessmen, and kids. The content of these platforms was found to be appealing and was driving demand and growing popularity.
- 21. Ribeiro et al. (2018).** In this paper, researcher talk about the challenges that make it difficult to create research and technology that includes everyone and is responsible. We introduce a new problem called "societal alignment," which means making sure research and technology are in line with what society wants. This issue is often ignored in the field of science and technology policy. We suggest that we need to think more about societal alignment to create more responsible research and technology.
- 22. Patnaik et al. (2022).** Present study emphasized on the challenges posed for the adoption of this rapidly preferred media platform. On the analysis of the data collected from the respondents in the twin city of Odessa (Cuttack and Bhubaneswar), the findings revealed three prime factors such as ‘user behavior’, ‘technological flexibility’ and ‘customer-centric content’ to be the significant influencers of OTT

content. The insights of this study can help the regulatory authorities as well as OTT media players in promotion and strategy formulation.

Need of the Study

The study of "Exploring the Rise of Over-The-Top (OTT) Platforms in India: A Study of Customer Growth" is important for several reasons:

- 1. Understanding Market Trends:** The study aims to examine the growth of OTT platforms in India, which is a rapidly growing market for digital content. This will provide valuable insights into the trends and patterns of media consumption in India, and help to understand why OTT platforms are becoming increasingly popular among Indian consumers.
- 2. Identifying Drivers of Growth:** The study will seek to identify the factors that are driving the growth of OTT platforms in India, such as technological advancements, changing consumer preferences, and increased availability of high-speed internet.
- 3. Examining Customer Behavior:** By examining the behavior of OTT platform customers in India, the study will provide insights into their motivations, preferences, and satisfaction levels. This information can be useful for OTT platform providers as they look to attract and retain customers in this highly competitive market.
- 4. Improving Customer Engagement:** By understanding the factors that contribute to customer satisfaction, OTT platforms can improve their offerings and increase customer engagement. This can lead to increased customer loyalty and repeat business.
- 5. Facilitating Future Research:** The findings from this study can also serve as a foundation for future research on OTT platforms, both in India and in other markets around the world.

Overall, the study of the rise of OTT platforms in India has the potential to provide valuable insights into media consumption trends and customer behavior, which can inform the strategies of OTT platforms and other media providers, and lead to improved customer experiences.

Objective of the Study

This paper, titled "Exploring the Rise of Over-The-Top (OTT) Platforms in India: A Study of Customer Growth," aims to look at the different factors that have helped OTT platforms to be successful in India. It mainly focuses on how these platforms are getting more users and

keeping them interested. The paper will also talk about the problems these platforms may face and the opportunities available to them in India. It tries to give a complete picture of the fast-changing OTT market in the country.

Methodology

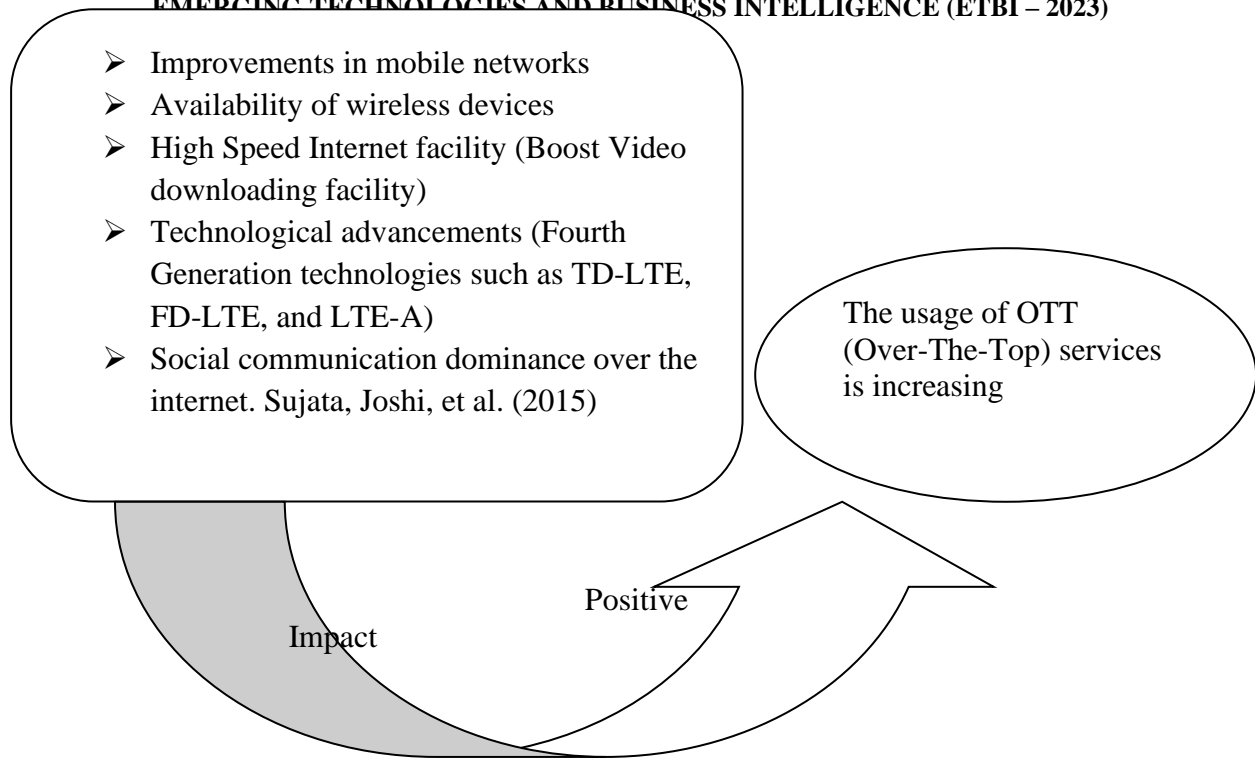
The topic is broadly trying to understand the observed phenomenon of Rise of Over-The-Top (OTT) Platform in India, as mentioned in the Literature Review was conducted on the subject. Study of Customer Growth". This has been derived from a variety of sources, including academic research papers, industry reports, and media articles. However, it is important to note that the specific findings of the literature review will depend on the scope and focus of the review, as well as the sources that were analyzed. For selecting an article to include in the study, the following criteria were followed. Only studies that were done on these two themes were considered, (I) Growth of Over-The-Top (OTT) Platforms in India (II) Factors that influence willingness to purchase OTT subscription

Scope of the Study

- **Customer behaviour and preferences:** What are the factors that drive Indian consumers to subscribe to OTT platforms? What types of content do they prefer to watch? How do they access OTT content? What payment models do they prefer?
- **Strategies for OTT platforms and content creators:** How are OTT platforms and content creators acquiring and retaining customers in the Indian market? What localization strategies are they using? What types of content are they creating? How are they marketing and promoting their content?
- **Challenges and opportunities in the Indian OTT market:** What are the key challenges and opportunities facing OTT platforms in India? How are they addressing these challenges? How can they capitalize on these opportunities?

Major Findings:

Finding - 1: The growth of OTT platforms in India is positively correlated with the increase in the availability of high-speed internet and technological advancements.



(Flow diagram 1: Factor that create positive impact)

According to Deloitte, the Indian OTT market currently stands at ₹10,500 crore, inclusive of subscription revenues¹. Projections indicate that this figure is poised to reach ₹12,000 crore by the fiscal year 2024 and a substantial ₹30,000 crore by fiscal year 2030, demonstrating an impressive 20 percent year-on-year growth. The growth of OTT platforms in India is linked to high-speed internet, smart phones, and technological innovations, as well as other factors like pricing, regional, and original content, Jain, M. (2021). This is based on various studies and a report in Business Today that also shows how OTT services increase the revenue of telecom operators

Finding -2: The factors that drive the growth of OTT platforms in India have a significant impact on media consumption patterns and trends in the country.

Based on various literature reviews, the factors that drive the growth of OTT platforms in India are:

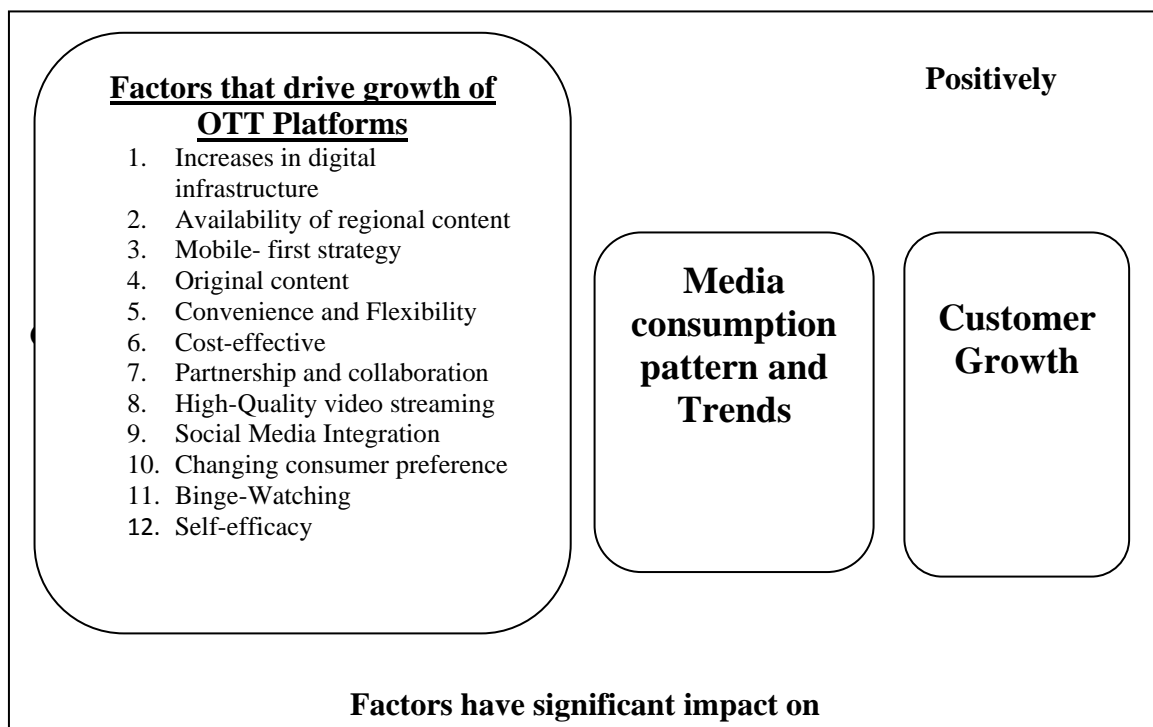
1. Increase in Digital Infrastructure: The expansion of digital infrastructure, such as high-speed internet and the availability of mobile devices, has provided access to the internet to a significant proportion of the Indian population, making it easier for them to access OTT platforms. Mohr et al. (2017)

2. Availability of Regional Content: The diverse Indian audience has a taste for regional content, and the availability of such content on OTT platforms has increased their popularity. Malewar, S., & Bajaj, S. (2020).
3. Mobile-First Strategy: The majority of the Indian population uses mobile devices to access the internet. The mobile-first strategy of OTT platforms, including the design of user interfaces, has increased the popularity of OTT platforms in India. (Kaur, 2022)
4. Original Content: The creation of original content that is not available on traditional television has increased the popularity of OTT platforms. The quality of content has been a significant factor in driving subscriber growth. Shin, S., & Park, J. (2021).
5. Convenience and Flexibility: OTT platforms offer the convenience of watching content anytime, anywhere, and on any device. Additionally, the availability of subtitles and dubbing in various languages makes it easier for non-English speakers to access content. Sharma, K., & Lulandala, E. E. (2023).
6. Cost-Effective: OTT platforms offer cost-effective subscription plans compared to traditional cable and satellite TV networks. Sharma, K., & Lulandala, E. E. (2023).
7. Partnerships and Collaborations: Partnerships and collaborations with telecom operators and other platforms have helped OTT platforms to increase their reach and visibility. Ahmad et al. (2016).
8. High-Quality Video Streaming: The availability of high-quality video streaming has increased the popularity of OTT platforms, as viewers can now watch their favorite content without buffering or interruptions. Nagaraj et al. (2021).
9. Social Media Integration: The integration of social media into OTT platforms has made it easier for viewers to share and recommend content to others, thereby increasing the reach of the platform. Bhattacharyya et al. (2022).
10. Changing consumer preference: The behavior of OTT platform customers in India, including their motivations, preferences, satisfaction levels, and media consumption, is influenced by their demographic characteristics and reflects changing consumer preferences and behaviors towards media consumption in the country. Sujata et al. (2015).
11. Binge-watching - It has become increasingly popular with the rise of OTT streaming platforms that provide access to entire seasons of TV shows at once. Binge-watching is one of the factors that can influence the adoption of OTT platforms, as it allows

viewers to indulge in their favorite shows at their own pace and on their own schedule. Menon, D. (2022).

12. Self-efficacy - In the context of OTT streaming, self-efficacy can influence the adoption of these platforms by giving viewers the confidence to use and navigate the platform effectively. If viewers believe that they are capable of using the platform and finding the content they want, they are more likely to adopt it and use it regularly. Self-efficacy can also be enhanced through the availability of user-friendly interfaces and the ease of finding and accessing desired content on the OTT platform. Mulla, T. (2022).

Overall, the above factors have contributed to the growth of OTT platforms in India, making them a popular entertainment option for millions of Indians. These factors have created a favorable environment for the growth of OTT platforms in India, and their popularity is expected to continue to rise in the coming years.



Finding 3: The behavior of OTT platform customers in India, including their motivations, preferences, and satisfaction levels, is influenced by their demographic characteristics, such as age, gender, income, and education.

The following findings can be derived from various literature reviews:

1. Younger age groups are more likely to use OTT platforms in India, with the highest usage seen among individuals aged 18-24 years. Sahu et al. (2021). Counterpoint

Research's India OTT Video Content Market Consumer Survey, which was released on Wednesday, revealed that 89% of users of OTT video content platforms in India are under the age of 35. (Mathur, 2019)

- Gender plays a role in OTT platform usage in India, with males having a slightly higher usage rate than females. TM, Singh et al. (2021). Among these users, the age groups of 16-24 and 25-35 contributed equally to the market, and 79% of users were male. The survey also showed that 55% of users were from the top five metros, while 36% were from Tier I cities. (Mathur, 2019)

(Table -1: Nine types of OTT Audience in India)

Sr. No	Types of Audience	Their Demographics	Proportion of No. of Users	Preferences on OTT
1	Young Global Citizen	73% Males, Median Age 25.4 Yrs, Metro City	16.1% of the Regular OTT Audience in Urban India (73 cities) = 4.4 Million	Netflix, Prime-Video & YouTube
2	Trying through Thrillers (T3)	63% Males, Median Age 28.5 Yrs, 10L City	33.3% of the Regular OTT Audience in Urban India (73 cities) = 3.7 Million	Disnep+ Hotsatar, Netflix & YouTube
3	Lust Swears and Daring (LSD)	77% Males, Median Age 27.4 Yrs, Hindi Speaking Market	11.5% of the Regular OTT Audience in Urban India (73 cities) = 3.2 Million	Netflix, Prime-Video & ALT BALAJI
4	Price Conscious Casual	64% Males, Median Age 29.5 Yrs, Spread Across India	11.4% of the Regular OTT Audience in Urban India (73 cities) = 3.1 Million	YouTube & Disnep+ hotsatr
5	Any time any where Addicts (AAA)	72% Males, Median Age 24.8 Yrs, Metro City	11.2% of the Regular OTT Audience in Urban India (73 cities)	Netflix, Prime-Video & YouTube

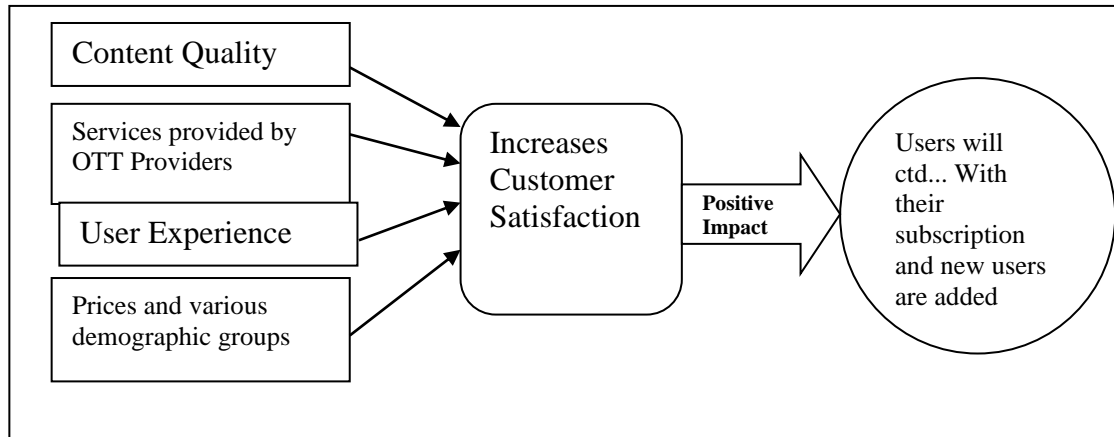
			= 3.1 Million	
6	The Catch up Crowd	60% Males, Median Age 33.2 Yrs, Non-Metro Cities and Small Town	11.2% of the Regular OTT Audience in Urban India (73 cities) = 3.1 Million	YouTube, Disnep+ hotsatr & Jio
7	Merely for Movies	63% Males, Median Age 30.8 Yrs, Non-Metro Cities and Small Town	8.9% of the Regular OTT Audience in Urban India (73 cities) = 2.5 Million	YouTube, Prime-Video & Jio
8	Laugh out Locals (LOL)	61% Males, Median Age 28.8 Yrs, Non-Metro Cities and Small Town	8.6% of the Regular OTT Audience in Urban India (73 cities) = 2.4 Million	YouTube, Prime-Video & Disnep+ hotsatr
9	Youthful Urban Psyche (YUP)	65% Males, Median Age 24.4 Yrs, Hindi Speaking Market	7.9% of the Regular OTT Audience in Urban India (73 cities) = 2.2 Million	YouTube, Prime-Video & TVF

Source:

file:///C:/Users/DELL/Desktop/rashmi/RK%20Phd/Research%20paper%202/Data/OTT_AudienceSegments_OrmaxMedia__1_%209%20types%20of%20Audiance.pdf

- Income and education level are also significant factors influencing the adoption and usage of OTT platforms in India, with higher-income groups and more educated individuals having a higher usage rate. Asrani et al. (2022). Users are willing to spend an average of Rs 100-300 per month on OTT platforms. Madnani, et al. (2020).
- Preferences for content vary among different demographic groups in India, with younger age groups being more likely to prefer streaming services for movies and TV shows, while older age groups prefer traditional TV and movie theaters. Shin et al. (2016). Action and comedy are the most preferred genres. While preference for action was highest among male users, drama and romantic genre content was found to be most popular among female users. (Mathur, 2019)

5. Customer satisfaction levels are influenced by various factors Sharma, R., & Mishra, P. (2023), including content quality, Services provided by OTT providers, user experience Shin, S., & Park, J. (2021), and pricing, and differ among different demographic groups which increase willingness to continue and subscribe in India. Parihar et al. (2021).



(Flow diagram 3: Consumer satisfaction increase customer base)

Overall, the findings suggest that demographic characteristics such as age, gender, income, and education play a significant role in influencing the behavior of OTT platform customers in India, including their motivations, preferences, satisfaction levels, and media consumption. The usage of the OTT platform is influenced by factors such as age group, occupation, city, and income groups. Madnani, et al. (2020). These findings can be helpful for OTT platform providers to better understand their customer base and tailor their services to meet the needs of different demographic groups in India.

Finding- 4: The challenges and opportunities facing OTT platforms in India are influenced by the growth of the industry, competition, and changes in customer behavior and preferences.

The following findings can be derived from major literature reviews:

1. The OTT industry in India is rapidly growing, with the market expected to reach a value of USD 16.2 billion by 2025. (Mishra, 2022)
2. Currently, in India, Disney+ Hotstar, Amazon Prime Video, and Netflix are the leading OTT platforms with the most users. However, there are various local OTT players, supported by production houses, like Sonyliv, Voot, Zee5, ErosNow, and ALTBalaji that are vying for a share of the market and competing with the global

players. (IBEF, 2020) The market is highly competitive, with both local and international players vying for a share of the market. Fitzgerald, S. (2019).

3. The changing behavior and preferences of customers in India are creating opportunities for OTT platforms to offer innovative and localized content that resonates with local audiences. Baldry et al.(2014)
4. There are several challenges facing OTT platforms in India, including issues with content regulation and censorship, limited availability of high-speed internet in some areas Moochhala, Q. (2018)., and the need to offer affordable and flexible pricing plans. Nijhawan et al. (2020).
5. Other challenges include difficulties in monetizing content, maintaining subscriber engagement, and keeping up with the rapidly evolving technological landscape. Sujata, et al. (2015).
6. Misunderstanding your audience Patnaik et al. (2022) and managing expectation are also other challenges and pitfall of OTT services provider industry. (Gal, 2021)

Overall, the findings suggest that the challenges and opportunities facing OTT platforms in India are influenced by a range of factors, including industry growth, competition, and changes in customer behavior and preferences. These findings can be helpful for industry players to better understand the market landscape and develop strategies to address challenges and leverage opportunities to grow their businesses.

Other Findings:

1. **(Rakheja, 2023)** As per a recent report by the Confederation of Indian Industry and Boston Consulting Group, India's media and entertainment industry has returned to pre-pandemic levels and is anticipated to expand to \$55-70 billion by 2030 at a compounded annual growth rate of 10-12%. This growth will be primarily driven by the robust expansion of OTT, gaming, animation, and VFX. Currently, OTT holds a market share of 7-9% in India's \$27 billion M&E industry. However, its market share is projected to increase to 22-25% by 2030. In contrast, the market share of television is expected to decline from approximately 35% to 24%.
2. The rise of OTT platforms has led to a shift in viewing habits, with more and more people in India choosing to consume media and entertainment online. **Varghese, S., & Chinnaiah, S. (2021)**
3. OTT platforms have been successful in capturing the attention of younger generations, particularly the millennial and Gen Z populations. **Rashi et al. (2021).**

4. OTT platforms have also had an impact on traditional media industries, such as cable and satellite TV, and have disrupted the traditional distribution model of media and entertainment. **Baccarne et al. (2013).**
5. The OTT platforms in India offer a wide range of content genres, such as drama, comedy, thriller, horror, romance, action, and more. Some of the most popular and critically acclaimed shows and movies on OTT platforms in India are Sacred Games, Mirzapur, Scam 1992, Delhi Crime, Paatal Lok, The Family Man, Ludo, The White Tiger, and more.

Limitation of the Study

These findings could have come from university research papers, business reports, and media publications, among other sources. It is crucial to keep in mind that the literature review will depend on the scope and focus of the review, as well as the sources that were analyzed.

Conclusion

The OTT market in India is a rapidly growing and dynamic sector that offers a variety of content and services to consumers across different age groups and regions. The literature review shows that the growth of OTT platforms in India is influenced by multiple factors, such as internet penetration, smartphone affordability, data availability, viewing patterns, rural preferences, regional and original content, and the COVID-19 pandemic. Content localization and original programming have played a crucial role in attracting and retaining customers. However, the industry also faces challenges such as content regulation, competition, low willingness to pay for premium content, and varying consumer preferences. The literature review suggests that the OTT market in India is not a homogeneous entity, but rather a complex and evolving phenomenon that requires further research and analysis. The OTT market's future in India appears promising, with projections indicating it could reach ₹12,000 crore by 2023 and opportunities to capture a growing share of the media and entertainment industry.

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A Novel Approach for Cluster based Energy Efficient Routing Protocol for Mobile Ad hoc Networks

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Abstract

The Mobile Ad-Hoc Network (MANET) has the potential to build clusters, in which multiple nodes can work together to manage themselves. However, due to MANET's limited power capacity, the primary node that serves as the cluster head loses power earlier than the other nodes, causing the cluster to re-form and a new cluster head to be chosen. In MANET, the Cluster Based Routing Protocol (CBRP) is used to create and manage clusters, although one of the protocol's flaws is that it lacks an energy-saving mechanism. Due to message forwarding during cluster construction and management, this protocol consumes a significant amount of energy. There is a need to suggest an efficient way to reduce the protocol's energy costs. As a result, in this research, we offer an energy-efficient solution in the form of an algorithm based on various energy levels of nodes as well as their signal intensity in order to reduce energy consumption during cluster formation and increase overall system performance. In our proposed approach, we will concentrate on energy-efficient cluster head formation and maintenance operations, as well as preventing cluster head death by selecting another cluster node as cluster head when the power level falls below a predetermined threshold value.

Keywords: Mobile Ad-hoc Networks, CBRP, Routing, Cluster, Cluster Head, Energy efficiency, Battery Power Level

I. Introduction

MANETs are peer-to-peer networks made up of multiple mobile nodes connected by multi-hop wireless links. Because no pre-configured setup for such a network exists, MANETs are created dynamically. Because every node in the network can move in any direction, it is necessary for it to update its linkages every time it moves, resulting in frequent topology changes. Traffics in MANET are forwarded by neighbouring nodes because there is no established infrastructure available.

The creation of a routing protocol for MANET presents a number of challenges. Because the nodes are mobile, MANET has a dynamically changing topology. This behaviour favours dynamically discovered routing techniques over traditional distance vector routing protocols such as DSR (Dynamic Source Routing), ABR (Associativity Based Routing), TORA (Temporally Ordered Routing Algorithm), and so on. Second, IP subnetting is inefficient due to the lack of structure in MANET. Third, node power depletion owing to a large number of messages delivered during cluster formation and battery power limitations. At times, MANET links may be asymmetric. The size and connectedness of a network may be severely constrained if a routing protocol exclusively uses bi-directional links; in other words, a protocol that uses uni-directional links can dramatically minimise network partitions and increase routing performance.

Because MANET topologies were initially built as flat networks, routing techniques such as reactive and proactive routing protocols were created to adapt to these topologies. Based on various tests and simulations, it has been discovered that as the number of nodes in the flat network grows, the throughput drops dramatically. Furthermore, a flat topology is difficult to scale due to different constraints such as routing overhead and unanticipated topology changes. The clustering concept was created to address the flat network's scalability concerns.

In clustering techniques, mobile nodes are organised into clusters based on certain criteria, and each cluster has a cluster head node in charge of allocating resources to its cluster members. Because communication between nodes of different clusters is limited to the cluster heads backbone, routing overhead in the underlying network can be greatly reduced with clusters. Clustering strategies can also lower node energy consumption. In a uniformly deployed clustering MANET, on the other hand, the unequal load distribution commonly generates the energy-hole problem, in which some nodes exhaust their energy faster than

others. Because energy is a limited resource in MANET. As a result, the basic issue statement for this study endeavour is to improve the network lifetime by maximising node energy consumption through even load distribution in a clustered network. The goal of our research is to increase clustered MANET routing efficiency and reduce cluster formation and management message flooding. Cluster formation and maintenance should not be expensive in terms of resources required, such as signal strength, battery power, and so on; otherwise, the goal of clustering will be defeated. So, in this work, we propose an algorithm that leads to power efficient and signal efficient cluster maintenance and cluster formation, which efficiently uses MANET resources.

Ii. Overview of Existing Work

Cluster Based Routing Protocol (CBRP)

By merging nodes within a 2-hop diameter, the Cluster Based Routing Protocol (CBRP) [21] divides the network into tiny groups of mobile ad hoc nodes. Clusters can be made up of discrete or overlapping sets of objects. A cluster head is chosen from among the cluster's nodes. A cluster head keeps track of things like cluster membership.

Cluster links can be used to discover inter-cluster pathways in real time. CBRP is particularly effective in minimising flooding traffic during route discovery and also makes the routing process go faster. It also uses unidirectional links for routing in addition to multidirectional links.

Cluster hierarchies are created to improve routing efficiency. The following are some of the most common characteristics of CBRP:

- Node unidirectional links are explicitly managed.
- During the route discovery procedure, there is less flooding traffic.
- Operation that is completely distributed
- It is possible to fix broken routes without having to rediscover them locally.

Terminology used in CBRP

- 1) Node ID: Each node in a cluster has a unique identifier. The nodes' respective IP addresses are utilised as node IDs.
- 2) Cluster: A cluster is a collection of nodes with a single node serving as the cluster head. The cluster head's ID is used to identify a cluster. The cluster nodes and their cluster associate nodes have a bidirectional link. Clusters are groups that are either

overlapping or disjunct. Each node in a cluster is aware of its head ID and thus of the cluster to which it belongs.

- 3) Cluster Node/Member: A cluster node is not a cluster head or a cluster gateway.
- 4) Cluster Head: The cluster's coordinator, in charge of data transmission and routing.
- 5) Cluster Gateway: It is a non-cluster head node with inter-cluster wireless connectivity, allowing it to communicate with nearby clusters and deliver data between them.

Conceptual Data structures used in CBRP

1) Cluster Adjacency Table (CAT) [22]:

The Cluster Adjacency Table is maintained by CBRP's Nearby Cluster Discovery method and stores information about adjacent clusters. Format of it is as shown in Fig. 1. Each item in the cluster adjacency table comprises the following information:

- The ID of the nearby cluster head
- The gateways to neighbouring clusters.
- The role of the neighbours (a cluster head or a member) as well as the status of the link between gateways and their neighbouring cluster head, whether bidirectional or unidirectional (bidirectional or unidirectional).

ADJACENT_CLUSTER_ID	GATEWAY	LINK-STATUS
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Figure 1 Format of Cluster Adjacency Table

2) Neighbour Table (NT) [22]:

It is used for cluster formation and wireless link condition sensing. It is utilised for cluster formation and wireless link condition sensing. Format of it is as shown in Fig. 2. It has the following fields:

- The ID of the neighbour with whom it is connected;
- The neighbour's role.
- The state of the link.

NEIGHBOR_ID	LINK-STATUS	ROLE
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Figure 2 Format of Neighbour Table

Adjacent Cluster Discovery in CBRP

The primary goal of nearby cluster identification is to find all of a cluster's bidirectional wireless links. Every node maintains a Cluster Adjacency Table (CAT) to keep track of its nearby cluster heads' records. Because they are always two hops distant, they can be found by analysing received HELLO messages.

Its constituent nodes' Cluster Adjacency Table (CAT) is updated on a regular basis based on hello packets received. A member node locates and inserts into its CAT a cluster head that is exactly two hops away. If the cluster head of the sender of the hello packet supports bidirectional links, the receiver node adds an entry of the cluster head recently discovered into its CAT, indicating the sender node as a gateway if the identical item is not already accessible, upon receiving a hello packet from a node.

Route Consideration in CBRP

Source routing is the foundation of CBRP. There are two phases to it. The first is route discovery, and the second is packet transfer. During route discovery, a two-hop diameter cluster structure reduces flooding traffic. The actual packet transfer is done based on the route discovery results.

(1) Route discovery: When a node has to send certain packets to another node, it must first request a route to the destination. It is performed by flooding the cluster head of a nearby cluster/s.

The destination address is specified in a Route Request (RREQ) sent by the source node. It assists its neighbouring cluster head entries with its host cluster heads and adjacent cluster head entries (from CAT), with the appropriate Gateway Node Address being either the host cluster head itself or the gateway node of the next cluster. This is the first Route Request (RREQ) that is sent out.

Each cluster head only forwards the RREQ once, and only if it hasn't previously been recorded in the pre-recorded list. In CBRP, an RREQ will always take a route to its destination that looks like this:

S, R1, R2, R3, R4,, D

where, R1, R2, R3, R4 ... are the recorded nodes, S is Source and D is the destination.

(2) Route Reply: When a destination node receives a RREQ, it sends an RREP message to the source in the following format:

D,, R4, R3, R2, R1

D retrieves each cluster addresses from the RREP's associated list. Cluster addresses provide extensive information about the chain of clusters that RREP must travel to reach the source node. Because each cluster head knows how to reach its neighbours, the Route Reply (RREP) packet will finally be routed to the source node utilising IP loose source routing.

(3) Routing: The source routing is used to determine the actual routing.

(4) Local route repair: If a broken link is discovered while forwarding packets to the next hop, a route error message is sent to the source. The forwarding node uses the same mechanism as before to find a new route, and the source route header is eventually updated.

III. Proposed Work

The fundamental disadvantage of the CBRP routing protocol, as previously stated, is the cluster head's shorter life expectancy. Due to excessive power dissipation, the cluster head dies.

The proposed algorithm's main goal is to avoid the cluster head from dying by appointing another node as the cluster head when the power level falls below a specific threshold. When signal strength or power level hits a particular minimum threshold value, the proposed algorithm takes care of cluster head formation and keeps it alive after initial cluster formation, avoiding re-election of cluster head. During cluster maintenance, there is no need for explicit message passing. For each cluster head, the proposed algorithm maintains two tables: a 'Cluster Head Table' and a 'Routing Table,' as well as one 'Neighbour table' for each node in the cluster.

(1) Hello Packet Data Structure's Proposed Modification:

Every HELLO INTERVAL seconds, all MANET nodes broadcast HELLO messages; each node's HELLO message contains its 'Cluster Adjacency Table' and 'Neighbor Table.' From time to time, a node sends out a triggered HELLO message in reaction to an event that necessitates immediate action. 'Figure 3' depicts the new modified HELLO packet message format, which adds two new fields to the existing data structure: 'Signal Strength' and 'Battery Power Level,' which will aid in cluster formation efficiency.

Node ID	Node Status	Signal Strength	Battery Power Level
.....
Neighbor ID	Neighbor Status	Link Status	Adjacent Cluster ID
.....

Figure 3 Modified Message Format of Hello Packet

(2) Head Table Data Structure's Proposed Modification:

The signal strength and power level of each node in the cluster head's neighbourhood are kept in tabular format, therefore a new data structure for the head table is proposed, where information about signal strength and power level is stored for each node in the cluster head's surroundings.

Node ID	Signal Strength	Power Strength
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Figure 4 Modified Format of Head Table

Cluster Formation in Proposed Algorithm

Each node transmits a HELLO message to the remainder of the cluster during cluster formation, specifying its ID, signal strength, and current power level. Each node will compare its signal strength to that of other nodes after receiving the HELLO messages. The header is the node with the strongest signal, and it broadcasts a decision message with its ID. The nodes will make a unanimous conclusion. After the initial cluster building and cluster head election, our job is to keep the cluster head alive and avoid re-election when the battery power level or signal strength falls below a certain threshold.

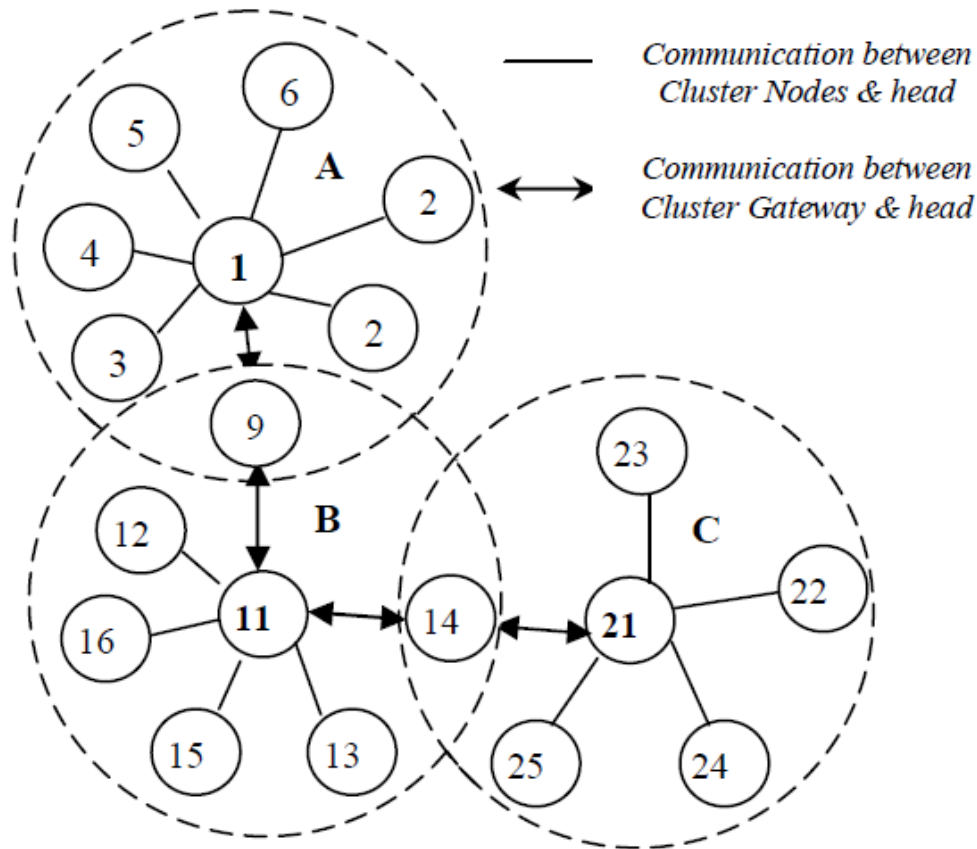


Figure 5 Cluster Formation in MANET

Cluster heads 'node 1', 'node 11', and 'node 21' for clusters A, B, and C, respectively, are depicted in Figure 5'. 'Node 9' and 'Node 14' are cluster gateways, whereas the remainder of the nodes are cluster nodes. The cluster head is in charge of communication between two nodes within a cluster; for example, cluster head 'node 1' is in charge of communication between 'node 2' and 'node 4'. Inter-cluster communication takes place between two nodes via a cluster gateway, which is administered by the two cluster heads. For example, communication between 'node 5' and 'node 13' takes place via cluster gateway 'node 9', with the help of cluster heads 'node 1' and 'node 11'.

Tables with cluster information are present in the cluster heads, cluster gateway, and member nodes, as shown in 'Figure 6'. The cluster head node's head table stores the signal strength and power strength, which assists cluster head election.

Node 1s Head Table		
Node ID	Signal Strength (%)	Power Strength (%)
<u>1</u>	80	89
6	71	80
4	70	72
9	65	70
2	60	68
5	56	62
3	45	32

Node 11s Head Table		
Node ID	Signal Strength (%)	Power Strength (%)
<u>11</u>	90	90
16	87	80
13	78	80
15	70	68
14	71	51
12	60	50
9	46	43

Node 21s Head Table		
Node ID	Signal Strength (%)	Power Strength (%)
	(%)	
<u>21</u>	65	70
24	60	68
20	56	62
23	65	70
14	60	50
22	46	43

Node 11's Neighbor Hood		
Neighb or Hood ID	Neighbor Status	Link Status
9	member	Bi
13	member	Bi
12	member	Bi
16	member	Bi
15	member	Bi
14	member	Bi

Node 1s Adjacency Table		
Adjace nt Cluster ID	Gateway	Link Status
11	9	Bi

Node 11's Adjacency Table		
Adjace nt Cluster ID	Gateway	Link Status
1	9	Bi
21	14	Bi

Figure 6 Tables maintained by Cluster Nodes (examples)

Proposed Algorithm

The suggested technique assigns the cluster head, 'CH,' to the node with the smallest ID and stores its information in the first item of the Head table, 'HT,' which comprises three fields: node id, signal strength, and node power level. The signal strength and power level of the nodes are stored in lowest to highest in the HT. The Head Table is reviewed and sorted on a regular basis. The Cluster Head's routing table is set up. Signal strength and power level threshold values are described as ss_th and pl_th, respectively.

When the power level falls below a specified threshold value, the process for cluster head construction and cluster head maintenance avoids the cluster head from dying by replacing it with another cluster node:

Proposed Algorithm:

1. Initialize the variables N, ss_th, pl_th, and CH. N is the number of neighbors, ss_th and pl_th are thresholds for signal strength and power level, and CH is the node with the smallest ID.
2. Create two arrays, HT and RT. HT will be used to store information about the nodes, and RT will be used to store the routing table.
3. Set the first row of the HT array to the ID, signal strength, and power level of the CH node.
4. Iterate through all other nodes and set their respective IDs, signal strengths, and power levels in the HT array.
5. Initialize the RT array and the ss_th and pl_th variables.
6. Check if the signal strength or power level of the CH node is below the respective threshold. If so, set CH to the node with the second smallest ID and update the HT and RT arrays.

The suggested algorithm in this study should only be for cluster formation and cluster maintenance; MANET routing will follow the CBRP [8] specifications. When the signal strength of a cluster node as from base station starts to fall below a defined signal threshold 'ss_th' or the drained battery power level falls below a required power threshold 'pl_th,' the proposed algorithm evades re-election of the cluster head by selecting a further cluster head as from head table.

A "Signal and Energy Efficient Clustering" algorithm is included in the proposed method. The primary idea behind this technique is that it keeps the head alive at all times and prevents cluster head re-election, therefore protecting the cluster head by retaining both battery power and signal strength. The proposed algorithm is practicable in the real world, with an increased network lifetime and lower energy consumption. Our next step will be to evaluate the proposed method and look for more efficient algorithms as answers to the cluster head upkeep scenarios.

IV. Tools to be used for implementation

Network Simulator 2 (NS2) will be used for implementation of proposed approach. NS2 stands for Network Simulator Version 2. It's a free, open-source event-driven simulator designed for studying computer communication networks. NS2 is a simple event-driven

simulation software that has proven beneficial in understanding the dynamic dynamics of communication networks. NS2 can be used to simulate wire and wireless operations and standards (e.g., TCP, UDP, routing protocol). In general, NS2 allows users to specify network protocols and simulate their behaviours.

Since its inception in 1989, NS2 has maintained its prominence in the network research community due to its versatility and modular nature. Since then, multiple revolutions and updates have defined the tool's maturation, thanks to significant contributions from the field's players. The University of California and Cornell University, for example, developed the REAL network simulator, which is the basis for NS. Through the Virtual Inter Network Testbed (VINT) initiative, the Defense Advanced Research Projects Agency (DARPA) has sponsored the development of NS since 1995. The National Science Foundation (NSF) has now joined the development team. Last but not least, the community's network of academics and developers is always trying to maintain NS2 robust and versatile.

Conclusion

The Mobile Ad-Hoc Network (MANET) has the ability to form clusters, where numerous nodes collaborate to manage themselves. However, due to MANET's limited power capacity, the cluster head's primary node loses power before the other nodes, causing the cluster to re-form and a new cluster head to be picked. The Cluster Based Routing Protocol (CBRP) is used in MANET to construct and manage clusters, despite the fact that it lacks an energy-saving strategy. This protocol uses a lot of energy during cluster building and management because of message forwarding. The fundamental disadvantage of the CBRP routing protocol, as previously stated, is the cluster head's shorter life expectancy. Due to excessive power dissipation, the cluster head dies.

As a result, we presented an energy-efficient solution in the form of an algorithm based on various energy levels of nodes as well as their signal intensity to reduce energy consumption during cluster formation and improve overall system performance in this study. We will focus on energy-efficient cluster head formation and maintenance activities, as well as preventing cluster head mortality by picking another cluster node as cluster head when the power level falls below a predefined threshold value in our suggested strategy.

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