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From the Desk of the Chief Editor

I am delighted to announce the release of the latest edition of JIM QUEST, a prestigious bi-annual academic journal that invites outstanding original contributions in various functional areas of management. This issue covers the selected quality research papers presented in the **International Conference On Role of Sustainable Development Goals in Business and Economic Transformation** which is organized on 29th April, 2023 by Jaipuria Institute of Management, Ghaziabad.

JIM QUEST presents an exceptional platform for scholars to keep abreast of the latest developments in the fast-growing field of study and to have their work published in a journal with a strong reach and the potential for significant impact. We welcome high-quality contributions from all areas of management, including marketing, finance, operations, human resources, and strategic management, to name a few.

Our ultimate goal is to publish research that offers novel insights into the theoretical and practical aspects of management and contributes to the advancement of the field. By publishing with JIM QUEST, authors can benefit from the expertise and guidance of our distinguished editorial team, who provide constructive feedback to help authors refine their work and enhance its impact.

In conclusion, JIM QUEST is an excellent opportunity for scholars to showcase their research and contribute to the advancement of management theory and practice. We look forward to receiving your contributions and publishing them in our next edition.

Prof. (Dr.) Daviender Narang
Chief Editor

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Organisational Justice and Employee Engagement for Sustainable Growth of Higher Education Institutes

Arti Negi *
Reena Singh **

Abstract

The word sustainability generally refers to environmental sustainability but is not confined to this. It also includes social and economic aspects. If an organisation focuses on economic aspects only, neglecting the social and environmental aspects it cannot sustain itself in the long run. The meaning of sustainability is that can last for a long without making harm to others. Universities play an important role in the search for sustainable development. This paper focuses on the sustainable growth of higher education institutes, by finding out the relationship between organisational justice and employee engagement among higher education faculty members. Without engaging faculty members in day-to-day activities, one cannot think of the sustainable growth of higher education institutes. Organisational Justice is an important factor affecting the success of higher education institutes. Their success also depends on faculty members working there. Quality education can only be given to students if the faculty members are motivated and feel that they are being treated fairly. They are the torch-bearers of society. This study was carried out among 100 permanent faculty members of public universities from Uttarakhand. Data were collected by questionnaire method. For measuring organisational justice Neihoff & Moorman's (1993) scale was used and for measuring employee engagement Schufali & Baker's (2006) scale was used. Correlation analysis was used to identify the relationship between organisational justice and employee engagement. The results reveal that there is a positive correlation between organisational justice and employee engagement.

Keywords: faculty, employee engagement, organisational justice, sustainability, sustainable growth

1. Introduction

The word sustainability is not confined to environmental sustainability, but also includes economic sustainability and social sustainability. The focus of every business is on the economic aspect. However, a business can't sustain itself in the long run by ignoring social and environmental sustainability. Goods and services which are socially and environmentally friendly are becoming important for organisations, and this can be promoted by creating public awareness about sustainability issues (Casey and Sieber, 2016).

One best way to impart awareness is through education. There is a social responsibility on Higher Education Institutes to educate future leaders and to create sustainability awareness in society (Amaral, Martins, Gouveia, 2015). Universities have to contribute to making a sustainable society by utilizing their potential to educate world leaders and carry out research activities that will help in creating a sustainable future (Amaral et.al, 2015).

This paper focuses on the sustainable growth of higher education institutes, by finding out the relationship between organisational justice and employee engagement among higher education faculty members. Employee engagement has emerged as a key factor for businesses aiming for sustainable growth (Rasool et al., 2021). They are closely related concepts as without engaging employees in day-to-day activities business sustainability cannot be achieved.

Sustainability in business and society can be achieved by engaging employees as it has been identified as one of the most important factors for an organisation's performance (Decuyper & Schaufeli, 2021). For involving employees in business activities, organisational justice plays an important role, as it has a positive effect on employee engagement (Ozer et al., 2017; Roy, and Tiwari, 2020). Nowadays employee engagement has become a significant component of organisations' relationships between individuals and organisations due to the competition they face (Schaufeli, 2013). Considering this, it is crucial to research the elements that affect employee engagement.

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Universities serve as the catalysts for socialization that could cause a more significant transformation. And hence, sustainability they are the most important driver. So, it is imperative to research the ways in how active in their workplaces and organisations. Therefore, the present study aimed at examining the relationship between three types of organisational justice and employee engagement among faculty members.

2. Organisational Justice

Organisational justice is an employee's perception of fairness in the workplace (Greenberg, 1987a). According to Adam (1965), inequity occurs when a person compares his input-output ratio with others and finds it unequal.

With the available literature, it is unclear who has given the term "Organisational Justice". The term "Organisational Justice" was coined by Wendell French in 1964 (Rupp and Aquino, 2009; Ghosh et al., 2014). As cited by Byrne and Cropanzano (2001) the term was given by Greenberg in 1987 in his Academy of Management Review Paper (Greenberg, 1987a).

According to Wan (2016), organisational justice refers to the fairness of a judgment made by an organisation, the process they follow when making decisions, and the interpersonal treatment employees receive. According to Byrne and Cropanzano (2001), justice in organisations is a significant area of psychological research that focuses on practices that are based on equality.

A two-factor model was proposed by Greenberg (1990) which included distributive justice and procedural justice. At a later stage, a three-factor model was proposed by Bies and Moag (1986). They divided procedural justice into procedural and interactional justice along with distributive justice. Interactional Justice is further divided into interpersonal and informational justice (Colquitt, 2001). Distributive Justice is a fair distribution of resources. Procedural justice is concerned with the procedure followed to distribute the resources. Interactional justice is concerned with treating others with dignity, respect, and accurate information. Employees' perception of justice in their organisation affects their behavior such as their intention to stay or leave an organisation, job satisfaction, job commitment, and engagement (Yean & Yusof, 2016). Justice is the glue that molds employees' attitudes and actions to perform more effectively and efficiently as a team (Colquitt & Rodell, 2011; Rupp et al., 2017).

According to a bibliometric analysis (Piotrowski, 2014, 2016), organisational justice is a significant area of study in organisational contexts. Justice perception of employees affects their attitudes and behaviors in an organisation (Cole et al., 2010). Work engagement is one of the many effects that the justice perception of employees has (Mubashar et al., 2022)

3. Employee Engagement

The term Employee Engagement was first used by William A. Kahn in 1990 (Nair, 2015). He defined personal engagement as "the harnessing of organisation members' selves to their work role; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances" (Kahn, 1990). Schaufeli and Bakker (2004) defined work engagement as "Engagement is a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption." Vigor refers to effort, energy, and enthusiasm. Dedication refers to commitment toward one's work. And absorption is being engrossed in one's work. Saks (2006) in his study found that employee engagement relates to employees' attitudes, intentions, and behaviors. According to Saks (2006), employee engagement is a unique term that includes cognitive, emotional, and behavioural components connected to an individual's performance at work. He further distinguished between two dimensions of employee involvement (i.e., job engagement and organisational engagement).

The degree to which employees are mentally present in their work roles is known as job engagement. The level of psychological presence that organisational members have in their capacity as organisational members is known as organisational engagement.

4. Relationship Between Organisational Justice And Employee Engagement-

Ghosh et al., 2014 in their study inferred that distributive, procedural, and interactional justice affects employee engagement. They also found that the most important role in determining organisational engagement is played by distributive justice. Ozer et al., 2017 conducted a study and found that organisational justice and employee engagement were positively correlated. On conducting regression analysis, it was found that procedural justice has the most significant effect on work engagement followed by distributive and interactional justice. According to a large body of research (Abbasi & Alvi, 2012; Ghosh et al., 2014; Javed & Tariq, 2015; Özer et al., 2017; Rasheed et al., 2013), organisational justice plays an important influence on employee engagement. The three elements of justice and employee engagement were also found to be positively and significantly correlated by researchers (Abbasi & Alvi, 2012; Ghosh et al., 2014; Javed & Tariq, 2015; Ozer et al., 2017). However, past studies tended to focus more on the relationship between organisational justice and employee engagement (Mubashar et al., 2022).

RESEARCH OBJECTIVE-

To find out the relationship between organisational justice and employee engagement among higher education faculty members.

HYPOTHESIS-

There is a positive relationship between organisational justice and employee engagement.

METHODOLOGY-

The data was collected from 100 permanent faculty members of public universities from Uttarakhand.

A purposive sampling strategy was used as the faculty members with at least 1 year of job experience within the same organisation were taken because an employee needs some time after being initially recruited to be settled and mentally engrossed in the job and the organisation.

Data were collected through the questionnaire method through personal meetings and google forms. The questionnaire was divided into two parts. The organisational justice scale (Neihoff and Moorman's, 1993) contains 20 items, and the employee engagement scale (Schufali and Baker's, 2006) contains 9 items, which were on a 7-point Likert scale. Statistical analysis was conducted on SPSS 22.0. For data analysis, descriptive statistic methods, validity, reliability, and correlation analysis were employed. To test face validity and content validity experts in the field were consulted. To test the reliability of the scales Cronbach's alpha coefficients were calculated. Correlation analysis was used to identify the relationship between organisational justice and employee engagement.

5. Results And Discussion-

Table 1. Demographics of the respondent's

Gender	Frequency	Percentage
Male	55	55
Female	45	45
Age Group		
Less than 30 years	6	6
30-45 years	58	58
More than 45 years	36	36
Experience in the present university		
1-10 years	53	53
10-20 years	27	27
Greater than 20 years	20	20
Total teaching experience		
1-10 years	34	34

1-10 years	53	53
10-20 years	27	27
Greater than 20 years	20	20
Total teaching experience		
1-10 years	34	34
10-20 years	36	36
Greater than 20 years	30	30
Designation		
Assistant Professor	59	59
Associate Professor	13	13
Professor	28	28
Education		
Graduation	1	1
P.G.	15	15
M.Phil	1	1
Ph.D	81	81
Others	2	2
Marital Status		
Married	87	87
Unmarried	13	13

Table 1. suggests that gender distribution is somewhat balanced with 55% of males and 45% of females. Only 6% of the respondents are less than 30 years of age, a maximum (58%) belong to the age group of 30-45 years and 36% are more than 45 years of age. The majority (53%) of the respondents have 1-10 years of experience in the present university, 27% have 10-20 years of experience and 20% have more than 20 years of experience in the present university. 34% of respondents have 1-10 years of total teaching experience, 36% have 10-20 years of total teaching experience, and 30% have total teaching experience of more than 20 years. More than half (59%) of the respondents are Assistant Professors, followed by Professors (28%) and Associate Professors (13%). 81% of them are Ph.D. holders followed by P.G. (15%), 1% are M.Phil., another 1% are graduates, and the remaining 2% with other qualifications. As far as their marital status is concerned 87% are married and only 13% are unmarried.

Table 2. Organisational Justice and Employee Engagement mean scores and std. deviation

Scale	No. of items	Reliability	Mean	Std. deviation
Organisational Justice	20	0.938	5.229	1.525
Distributive Justice	5	0.905	5.272	1.544
Procedural Justice	6	0.952	5.013	1.657
Interactional Justice	9	0.846	5.349	1.797
Employee Engagement	9	0.951	5.753	1.386
Vigor	3	0.867	5.533	1.478
Dedication	3	0.957	6.107	1.479
Absorption	3	0.801	5.62	1.441

Cronbach’s alpha analysis yielded alpha values of $\alpha=.905$ (distributive justice), $\alpha=.952$ (procedural justice), and $\alpha=.846$ (interactional justice). The overall Cronbach’s alpha value for the organisational justice scale is $\alpha=.938$. Cronbach’s alpha value for sub-dimensions of employee engagement is $\alpha=.867$ (vigor), $\alpha=.957$ (dedication), and $\alpha=.801$ (absorption). The overall Cronbach’s alpha value for the employee engagement scale is $\alpha=.951$. The alpha value ranged from .801 to .957,

which shows that all the scales are reliable. We see in Table 2, the mean for Organisational justice (5.229) and Employee engagement (5.753) is high. The respondent’s perception of interactional justice (5.349) is high followed by distributive justice (5.272) and procedural justice (5.013). Faculty members of public universities are highly dedicated as reflected by a mean score of 6.107 which is then followed by absorption (5.62) and vigor (5.533).

Table 3. Correlations between sub-dimensions of Organisational Justice and sub-dimensions of Employee Engagement

Variables	Distributive Justice	Procedural Justice	Interactional Justice	Vigor	Dedication	Absorption
Distributive Justice	1					
Procedural Justice	.600**	1				
Interactional Justice	.592**	.842**	1			
Vigor	.709**	.490**	.488**	1		
Dedication	.701**	.490**	.471**	.911**	1	
Absorption	.578**	.384**	.391**	.756**	.854**	1

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

The correlations between all variables are significant at the $p < 0.01$ level.

Table 4. Correlations between sub-dimensions of Organisational Justice and overall Employee Engagement

Variables	Employee Engagement
Organisational Justice	.587**
Distributive Justice	.702**
Procedural Justice	.481**
Interactional Justice	.476**

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

The results of the study reveal that there is a significant positive relationship between organisational justice and its components with different aspects of employee engagement and this is supported by Ghosh (2014). Table 3, shows that distributive justice is highly correlated with vigor. All the sub-dimensions of organisational justice are correlated with each other. Table 4, reflects a strong positive correlation between distributive justice and employee engagement followed by procedural justice and interactional justice respectively. The correlation values support the hypothesis that there is a positive relationship between organisational justice and employee engagement. The high positive correlation between

distributive justice and employee engagement is supported by (Ghosh et al., 2014 and Roy, and Tiwari, 2020). This study shows that employee engagement increases with an increase in organisational justice. Employees' higher perception of organisational justice will reflect a higher engagement level (Saks, 2006). Employees' work engagement increases with increased organisation justice perception (Ozer et al., 2017).

The results can be utilized as a foundation for understanding the primary predictor of employee engagement, which is organisational justice. The findings can be used by management to uphold fair procedures, a fair system of performance evaluation, and award rewards and compensation, and promote faculty members based on their performance (i.e., to ensure procedural and distributive justice). Additionally, the management's decisions should be communicated to the faculty members with the justification for the decision (to ensure interactional justice). By encouraging employee involvement with the company, these justice-based policies may ultimately help the organisation become sustainable in the long run.

6. Limitations-

The sample size is small due to the time constraint. The faculty members, only from the public universities of Uttarakhand were included in this study. The self-reported questionnaire is used so it may lead to biases.

7. Conclusions-

This study helps in understanding the relationship between organisational justice and employee engagement among higher education faculty members. As distributive justice is highly correlated with employee engagement it should be taken care of while distributing the responsibilities, workload, and rewards. The procedure for the distribution of resources should be transparent and fair enough for every faculty member. Interactional justice should also be given due consideration. If faculty members feel that they are not being treated fairly they will lack engagement with their work and organisation. Similarly, if they feel justice prevails in their organisation, they will be more involved in their duties and responsibilities assigned to them, thereby, increasing their engagement. And ultimately, helping them to perform their responsibility to educate people and create a sustainable society. Quality education can only be given to students if the faculty members are motivated and feel that they are being treated fairly. They are the torch-bearers of society. If justice is being done with the faculty members, they will be more engrossed in their work, leading to a sustainable university and, ultimately, a sustainable society.

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A Study of Perception of Indian Customers towards Coworking Space

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Abstract

The growth of co-working spaces in India is attributed towards changing perception of young workforce of the country, and increasing accessibility of opportunities in professions i.e., consultants, freelancers, and start-ups. The Gen Z and millennials are constantly looking for professional opportunities that offer flexibility and work-life balance. The changing perception of professionals in India had been pronounced during the pandemic that restricted workforce to travel long distances and help them in maintaining flexible work schedule. Furthermore, it has been observed that the millennials and Gen Z will be the most crucial customers for coworking spaces and the sharing economy in the future. The other such benefit of coworking space is providing full time service of an office to the professionals at an affordable cost and with limited liability.

However, pandemic had imposed several restrictions to coworking space concept, in 2021 the pandemic came as a blessing in disguise to the companies as this concept enabled more flexibility and affordability to the professionals. The key players prevailing in the industry are constantly revamping their business efforts towards aligning them with personal objectives of the professionals in India. The companies are providing various products or solutions based on the technology. For instance, WeWork had introduced an 'office on demand' product after COVID-19, that offered customers with a solution to rent or lease desks at its location on a real time basis. This product is similar to what a cab booking mobile application looks like, offering more ease of use to the customers. The companies are also providing tools that enables the customers to have seamless collaboration between meeting rooms, and could further allow the users to use various other applications i.e., Webex, Zoom, and MS Teams through one platform.

COVID-19 has further fuelled the demand for coworking space in India, as many people went back home and continued working from home till date. The smart works in India in the present scenario is expanding and as a result the cities such as Jaipur, Indore, and Ahmedabad are also observing increasing number of coworking spaces. The companies which had not considered flexible workspaces earlier are observing coworking spaces as an option to look at various solutions. The coworking spaces is not limiting its advantages to the customers the companies can also gain significant advantage with the model. The companies previously working on leasing office model can adopt flex workspace contracts, that enables them to maintain shorter commitments and thus leaving ample space for reconciliation in the near future.

The study has analyzed the factors that are influencing the perception of Indian customers towards coworking spaces. The data had been collected from 210 respondents of coworking spaces in India, and a multi-logit model was used to analyze the customer perceptions. Amongst the various factors considered for analyzing customer perception towards coworking spaces, convenient location, ambience, and cost-effectiveness gained highest ranking among other factors. Additionally, independence, cohesive work environment, networking, and social influence are other factors having significant impact on the perception of Indian customers towards coworking space. Coworking spaces are designed to promote activities that enhances collaboration thereby creating positive outcomes amongst the professionals. Such collaborative spaces enhance knowledge sharing, engagement, exploring, correlating, brainstorming, and actively communicating with other professionals and thereby leading to favourable growth for the individuals. The paper provides in-depth knowledge and updates to the service providers, researchers and various business organizations to stimulate extensive participation in coworking spaces.

The future of the coworking space in India looks bright with business entities emphasizing more upon expanding productivity of their employees and professionals laying more emphasis towards work life balance. It is estimated that coworking space will thrive the market in the near future owing to ever-expanding millennial workforce in the country, and increasing real-estate developers' projects.

Keywords: Sharing Economy, Coworking Spaces, Customer Perception, Workplace, Mixed-Logit Model, Collaborative Space

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1. Introduction

Coworking space is a space in which working individuals gather in a place to create wisdom through communication, value by sharing information, and further cooperating with other individuals by their choice. It has been observed that in coworking space the attributes are not confined to a specific job, organization and occupation, and the workplace is physically shared by them. Additionally, coworking space is a concept where freelancers, small-scale entrepreneurs, organization members etc. having separate jobs share work place, work in a cooperative environment and mutually communicate with each other in any condition. (Xu, 2020) (Uda, 2013)

Coworking space are observed to provide similar amenities as that of a traditional office, and provides flexibility to the user as it eliminates the need to sign long-term lease in a coworking space. COVID-19 had caused major transformation in the global business model owing to several restrictions in communication and to further avoid contact with each other. It was observed that all the business organizations had found a way to adjust to the prevailing market conditions. Furthermore, in the present scenario it has been observed that remote and hybrid working is an option adopted by several companies and working professionals, and several companies are blending their work towards remote working. This provides the working professional flexibility, convenience to stay near their family, cost effective, knowledge sharing, and to work at their ease. Coworking spaces are offering several opportunities i.e., establishing a female only workspaces, and virtual coworking spaces.

There are several benefits provided by coworking space i.e. decreasing expenses of the users, socialization, opportunity to interact with small business owners and professionals. Many users also lay huge emphasis towards the ambience of the coworking space that provides inspiring and thematic atmosphere. Previously, in India freelancers and start-ups were significantly using this concept, however in the present scenario almost all the large enterprises as well are providing work from home and hybrid working opportunity to their employees. This opportunity is drastically enhancing the motivation amongst the employees to work as it is convenient for them and provides flexibility, and a working environment based upon their choice.

Coworking space also provides an opportunity to the working professionals to form their community that supports, encourage, and help each other to learn from each other as working from home could be highly monotonous and frustrating at many times. Furthermore, being surrounded by other professionals improves productivity, provides enhanced networking opportunities, continuous learning opportunity, improved mental wellbeing, and comfortable work environment.

However, the users are having certain negative perspective related to coworking space as the users are believing that these spaces are over promising and under delivering, along with this overcrowded space. Overcrowded space is the major challenge observed amongst the customers of coworking space in India.

The study is an attempt to understand the concept of coworking space and will aim at analyzing the perception of coworking space amongst Indian working professionals, that will further enable the service providers for devising a desirable strategy to create prospective business opportunity with this concept aligning with the needs of the customers. (Sorokina, 2023) (Wizu, 2019)

2. Literature Review

Perree, Koevering (2018) "Analysing user preferences for coworking space characteristics" the authors have analyzed user preferences for co-working space characteristics. Amongst various parameters, main motivations to work in a co-working space is people are looking for workplace outside their home that allows them to work in an inspiring work environment along with affordable accommodation. The findings of the study suggest that most co-workers are looking for workspace outside their home which is affordable, provides dynamic working atmosphere and provide them with an opportunity to do social interactions. (Perree, 2018)

Authors have used various parameters in this study that has helped them to analyse the user's preferences towards coworking space. The main motivational factors for co-workers to work in a coworking space is that they search for a space or workplace outside their home premises that enables them to work in an affordable and inspiring work environment. Moreover, interior/atmosphere and good accessibility by public transport and car are the crucial parameters for workers while choosing a coworking space

Saini, Melita, Putri (2019) "Analysis of Indonesia's Consumer Preferences in Choosing a Co-Working Space" as per the results of this paper interior is ranked highest in terms of consumer preferences for choosing a coworking space. Furthermore, the results suggest that layout of the space, accessibility, modern interior, closed layout and accessibility through private transportations are crucial factors influencing the preference of coworking space amongst the users in Indonesia. (Sanny, 2019)

Inggar K, Hayati, Faqih (2018) "Co-Working Space Preference Based on Interior Design: The Case of Surabaya Co-Working Space" the authors have analyzed users in Surabaya were choosing coworking with a motivation to have an atmosphere that comprises of interior design with minimalist style of Scandinavian. The case study further suggests that the coworking space developers in Surabaya has to develop their business and emphasize upon innovation for coworking development management. (Inggar K, 2018)

Meulenbroek, Perree, Orel, Gauger (2020) "User preferences for coworking spaces; a comparison between the Netherlands, Germany and the Czech Republic" the study highlights the preference of users towards amalgamation of places and openness to concentrate on work and for meetings, the users also provide high importance to accessibility and the type of rent contract of the coworking space. Additionally, the users have positive attribute towards coworking space owing to diversity of users, varieties of facilities, and space design. (Meulenbroek, User preferences for coworking spaces; a comparison between the Netherlands, Germany and the Czech Republic, 2020)

SEO, Lysiankova, Ock (2017) "Priorities of Coworking Space Operation Based on Comparison of the Hosts and Users' Perspectives" the authors in the study had adopted AHP Model where they had surveyed both the users and the hosts. Before the survey took place, the authors had categorized various levels of management i.e., membership management (service diversity and price plan, promotion and public relations, and alliance and partnership), coworking management (networking event, relationship facilitation, and community communication), and supporting management (space and interior, facility, devices solution, and mentoring/education). Amongst various factors facilitation and costs are two most crucial factors amongst the users, as a result host must emphasize upon efficiency through investment, development policy, and managerial procedure. (Seo, 2017)

Meulenbroek, Perree, Orel (2020) User preferences for coworking spaces; a comparison between the Netherlands, Germany and the Czech Republic The authors have highlighted that the users of coworking space have similar demands as that of traditional office spaces i.e., combination of place that provides openness and area to concentrate, meet, highly accessible, and type of rental contract. The coworking users are diverse and providing variety of facilities and space design provides would provide additional benefits to the coworking space. Furthermore, the crucial motivating factors for coworking spaces comprises of separating work from private life and vibrant atmosphere. (Meulenbroek, User preferences for coworking spaces; a comparison between the Netherlands, Germany and the Czech Republic, 2020)

Sharma, Mehta (2022) A Study on the Role of Co-Working Spaces as Knowledge Centres The study suggests that coworking environments are becoming informal, that characteristics of the coworking space will be realised and would facilitate the education space user to learn at the coworking space. It has been founded that the learning and training at the coworking space are considered to be more successful as that of traditional methods of improvement and expansion. (Sharma, 2022)

Howell (2022) Coworking spaces: An overview and research agenda The authors in this study have highlighted that the most crucial aspect of coworking i.e., accelerators, maker spaces, and incubators and other entrepreneurship support organizations. The founders are able to get help from community related to solve problems, provide feedback and new ideas, provide friends and social support. The study further suggests that coworking space is providing an opportunity to the entrepreneurs to establish communities with each other and this interact and learn from their peers. (Howell, 2022)

3. Research Methodology

3.1. Measurements

To examine the research model, a total of 15 questions were formed to measure 6 constructs in the questionnaire. All of the parameters were adopted from literature review and had been used for this study to measure the perception of Indian customers towards coworking space. The questionnaire was developed for the respondents who had already used coworking space or are either aware about the concept. Furthermore, these questions measured the perception of customers, that could assist the entrepreneurs to identify the influencing factors stimulating the demand and could make coworking space as a prospective business opportunity in the near future. All the independent variables were rated on five-point Likert-type scales.

3.2. Data collection and process

In order to obtain data validating the proposed research model, all of the data was collected by using Google form and the questionnaires were distributed with smartphones and PC. Data was collected from a total of 210 respondents who had already used coworking space or are either aware about the concept, using convenience sampling method and purposive quota sampling method, to reflect the features of the actual population. For data analysis IBM SPSS version 22 was used in this study.

3.3. Data Collection and Sample Characteristics

In this study, in order to attain data for validating the proposed research model and hypotheses, questionnaires were distributed through PC and smartphones. Additionally, this study collected questionnaires from around 210 respondents who were users and non-users (but were aware about coworking space). Of the total respondents, 139 were male and 73 were female. Furthermore, various parameters were analyzed based upon the current occupation of the working professionals to study their perception towards coworking space.

4. Results

The data has been analyzed using multinomial logit model, where each independent variable has a single value for each instance and data are assumed to be case-specific. Additionally, the multinomial logistic model makes the assumption that the

dependent variable cannot always be accurately predicted from the independent factors. The below table 1 highlights, the current occupation and of the sample in the study. Amongst 210 respondents, 92 were into business, 92 in jobs, and remaining in other occupation.

Table 1: Sample Size with current occupation

Case Processing Summary			
		N	Marginal Percentage
Current Occupation	Business	92	43.8%
	Job	92	43.8%
	Others	6	2.9%
	Student	20	9.5%
Valid		210	100.0%
Missing		0	
Total		210	
Subpopulation		30 ^a	

a. The dependent variable has only one value observed in 27 (90.0%) subpopulations.

In table 2 below, the final model is a significant improvement in fit over the null model, which is $p < 0.01$. A null model is a type of random object that matches one particular object in some of

its features or, more generally, satisfies a collection of constraints, but which is otherwise taken to be an unbiasedly random structure.

Table 2: Model Fitting Information

Model Fitting Information						
Model	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC	BIC	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	400.468	410.509	394.468			
Final	293.553	363.842	251.553	142.916	18	<.001

In below table 3, goodness of fit $p < 0.001$ signifies model fit the data well.

Table 3: Goodness of Fit

Goodness-of-Fit			
	Chi-Square	df	Sig.
Pearson	268.782	69	<.001
Deviance	243.016	69	<.001

In below table 4, likelihood ratio tests highlight overall contribution of each independent variable to the model. Using $\alpha = 0.05$ threshold, we can observe that convenient location, cost-effectiveness, aesthetics/ambience, inclusive environment is statistically significant.

Table 4: Likelihood Ratio Tests

Likelihood Ratio Tests						
Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	297.248	357.495	261.248	9.695	3	.021
Convenient location	311.260	371.508	275.260	23.708	3	<.001
Knowledge sharing	298.604	358.852	262.604	11.051	3	.011
Cost-effective/Affordable	311.432	371.680	275.432	23.880	3	<.001
Aesthetics/Ambience	312.312	372.559	276.312	24.759	3	<.001
Inclusive environment	357.113	417.361	321.113	69.560	3	<.001
Safety	287.842	348.090	251.842	.289	3	.962

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

In below table 5, the three occupation job, other professions, and students are highlighted and each parameter has been highlighted with their level of significance. It has been observed that convenient location, cost-effective, and ambience are significant predictors in all the three

categorization, and will have positive perception amongst the customers with high ranking. Furthermore, inclusive environment and safety could be other parameters creating positive perception amongst the customers towards coworking space.

Table 5: Parameter Estimates

		Parameter Estimates						95% Confidence interval for Exp (B)	
Current Occupation ^a		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
Job	Intercept	5.592	1.974	8.025	1	.005			
	Convenient location	-1.741	.416	17.472	1	<.001	.175	.078	.397
	Knowledge sharing	.648	.228	8.061	1	.005	1.912	1.222	2.990
	Cost-effective/Affordable	-1.305	.315	17.195	1	<.001	.271	.146	.503
	Aesthetics/Ambience	-1.685	.549	11.788	1	<.001	.152	.052	.445
	Inclusive environment	3.112	.639	23.721	1	<.001	22.467	6.422	78.603
	Safety	.140	.355	.157	1	.692	1.151	.574	2.306
Others	Intercept	-62.728	.000		1				
	Convenient location	-3.193	34372.067	.000	1	1.000	.041	.000	b
	Knowledge sharing	-1.408	19775.068	.000	1	1.000	.245	.000	b
	Cost-effective/Affordable	21.633	18178.185	.000	1	.999	2484507881.0	.000	b
	Aesthetics/Ambience	-.612	23614.063	.000	1	1.000	.542	.000	b
	Inclusive environment	-20.275	18637.035	.000	1	.999	1.565E-9	.000	b
	Safety	7.908	28782.590	.000	1	1.000	2718.626	.000	b
Student	Intercept	5.312	2.524	4.430	1	.035			
	Convenient location	-1.271	.549	5.366	1	.021	.280	.096	.822
	Knowledge sharing	.875	.353	6.137	1	.013	2.400	1.201	4.796
	Cost-effective/Affordable	-1.218	.414	8.664	1	.003	.296	.131	.666
	Aesthetics/Ambience	-2.757	.682	16.345	1	<.001	.064	.017	.242
	Inclusive environment	3.064	.724	17.898	1	<.001	21.419	5.179	88.581
	Safety	-.040	.495	.006	1	.936	.961	.364	2.536

a. The reference category is: Business.
b. Fixating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

5. Limitations

There are also some limitations to this research. First, the questionnaire did not include questions about the characteristics of the present coworking spaces where the majority of the respondent’s work. As a result, it was impossible to determine how their preferences related to their present situation. Future studies should take into account the respondents’ present circumstances as a control variable because they may have an impact on their decision to use the hypothetical coworking space. The preferences for common coworking space amenities or services (such as a coffee shop, event space, lounge area, exercise centre, or bar) were also not thoroughly examined. The attribute "aesthetics/ambience" merged these two, future studies might take these factors into account or employ different techniques to learn more about a co-worker’s unique requirements and tastes.

Future studies might employ different techniques (such as the revealed preference method). Being the first study on a relatively new idea, the research unavoidably has limitations in terms of the characteristics of coworking spaces and co-worker’s that were taken into account. Additionally, in the future or in a different context, other qualities might be more crucial. For instance, this research only considered physical accessibility, but digital accessibility could also be a crucial component of a coworking space as a whole. (Perree, 2018)

6. Conclusions and Recommendations

The study provided insights related to perception of Indian customers towards coworking space, while choosing where to work which was not covered in the previous studies. Furthermore, the availability of studies comprising of quantitative research on perception of Indian customers towards coworking space is limited. It had been witnessed with stated-choice method that the users were able to describe their preferences in all forms for coworking space, and had highlighted the ranking based upon likely and unlikely satisfaction towards various factors.

Amongst the various factors it had been analyzed that convenient location, ambience, and cost-effectiveness had gained highest ranking among other factors by the customers/working professionals. It is very crucial to understand that the working professionals are looking for an environment which provides them ambience, enables to do networking, social influence, and provides a calm place to concentrate on their work. Most working professionals feel that coworking is an innovative and good concept, however some of them feel that coworking space are sometimes overcrowded and working professionals are looking for calm environment to concentrate upon their work. Additionally, the Indian customers believe that inclusive environment and open discussions will lead to enhance knowledge sharing opportunities amongst each other.

The results highlighted in the study could support the owners and managers of the coworking to make strategic and informed

decisions about their coworking space and explore more options to enhance scalability of their business. The focus of the service providers could be on providing cost-effective working space, with concentration upon ambience, and providing other basic amenities to the users i.e., parking space, vending meeting, meeting rooms, and use of updated software for team meetings and discussions.

Traditional office concept had been blooming, before pandemic and post pandemic had provided increased accessibility to the concept of coworking space. An office space provides an opportunity to create an inclusive culture to retain talent, and interact with clients. However, with technological upgradation traditional office concept had somewhat become obsolete as the idea to hire employees remotely and telecommunicating (with various other communication platforms) has become a norm in the work industry today. The companies are also taking workspaces on lease for short durations thereby reducing their overall expenses and concentrate more upon operational effectiveness and work of their company. (M.K, 2019)

While the diversity of spaces was found to be the least important characteristic, it is still crucial for owners to provide a variety of workspaces (i.e., a standard coworking space), including meeting rooms, an open workspace, kitchen areas, event spaces, informal zones, and concentration rooms, in order to adapt to the needs and activities of the increasingly diverse group of tenants they are attracting. As coworking offices have flexible and short-term lease agreements, tenants frequently change, possibly also their user tastes and characteristics. Because of this, it's crucial to regularly assess the requirements and preferences of a given coworking space's tenants and be able to adjust the space to suit these needs by providing flexible workspaces and adaptable furnishings.

The companies can keep up with the demand of coworking space by providing required amenities to every customer by expanding their coworking area. Additionally, by opening multiple space the companies can benefit from economies of scale by allocating assets from one place to another, and can gain more targeted customers. The owners could invest towards expanding their services for the customers by providing them coworking space enabling them to book place from anywhere and at any time. These emphasizing factors could further enhance the brand visibility and strength, enhance customer base, and create positive perception in the minds of the Indian customers towards coworking space

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Study On Digital Banking Financial Services In India: Trends, Opportunities & Challenges

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Abstract

The rise of India's digital finance industry has been a major contributor to the country's recent economic success. The economy has been bolstered in part by the nation's financial system. The phrase "advanced banking" is used to describe and include all the various automated improvements to the banking system that are now under investigation. After the introduction of truly groundbreaking technology, the economy always improves. Changes in the financial industry have occurred as the result of a chain of unavoidable mechanical events. Mobile phones and the internet have enabled rapid expansion of digital financial systems in previously agricultural nations like India. These innovative methods will have an impact on all industries, including banking. Numerous banks and credit unions now provide online banking options. In an endeavour to advance "Computerized India," the Indian government has made a number of improvements to the existing electronic banking infrastructure. A "carefully enabled," "Unremarkable," "Paperless," and "Credit only" economy is the stated goal of this endeavour. Significant advances in computerization have occurred in the financial services sector during the past few years. They have to be able to meet all of their financial obligations on a regular basis and should be able to do so regardless of where they are. Modern innovations in the financial services industry include plastic money (MasterCards, Visas, and prepaid debit cards), online banking (including electronic payment services), online investing, internet trading accounts, electronic asset move and clearing services, branch organisation, phone banking, portable applications, and wallets. The banking and finance industry would benefit greatly from rapidly adopting state-of-the-art digital technologies. The goal of this shift is to make the country's monetary systems more transparent, competitive, and beneficial to all residents. More advanced know your customer (KYC) protocols, chatbots, fintech firms, blockchain technology, cloud banking, and biometric verification are just some of the developments in the banking industry today. A plethora of novel opportunities present themselves to the financial sector as a whole as a result of the advent of computerised financial services. With the advent of internet banking, there are now more ways than ever to improve customer satisfaction and output. This article's goal is to present a summary of the advantages and downsides of going totally digital in India's financial sector, as well as some recommendations for mitigating the latter.

Keywords: Digital Banking, Technology and Innovation Services, Opportunities, Challenges

1. Introduction

For India's economy to flourish, it must have secure monetary underpinnings. It is strategically placed near other major financial hubs. India's financial sector is rushing headlong into the future. The term "computerized financial framework" is often used to refer to the wide range of banking and banking-related monetary services available in today's financial system. More automated client contacts at lower costs and more options for service delivery are enticing bank clients to switch from the branch-based model to digital channels (Darlington, 1999). With a mechanized banking system, customers of an online bank can choose from a variety of automated methods to withdraw cash. Access to these features is made possible by use of the internet and other forms of state-of-the-art technologies that make use of automated banking. With the advent of e-

commerce, online banking has also become increasingly important. Mechanized Mode's services are essential to the success of any internet business, no matter what form that firm takes (e-commerce, advertising agency, etc.). Electronic banking, sometimes called modern banking, is the delivery of banking services to customers through electronic techniques. According to Daniel (1999), "electronic banking" is the provision of banking services to customers over the Internet. Customers can complete banking operations like wire transfers from the convenience of their own homes thanks to home banking and other electronic banking services (Dheenadhyayalan 2010). Whenever they find a solution to a problem, modern financial institutions consider both the near and distant futures. According to studies, banks are utilizing ATMs and other methods of electronic asset transfer as a means of setting

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themselves apart from the competition (Mubarak, 2007). In order to meet the needs of their customers more effectively, many contemporary banks now offer their services around the clock, using cutting-edge technology. Computerizing banking and financial services has many advantages, including lowering support costs and increasing accessibility to underprivileged communities (Ouzel 2018). When discussing money, "computerized finance" refers to the practice of using electronic means to complete financial transactions (Vardar Sardana and Shubham Singhania, 2020). Many different names are used to refer to the same concept of conducting financial transactions through the internet: electronic banking, online banking, and internet banking. Banking services are now available to customers all over the world thanks to computerized banking, which makes use of readily available technological advancements. The primary focus of modern finance is ensuring that clients' use of online financial services is safe and secure. Bill payment, credit line increases, and mobile money transfers are examples of non-banking services that are typically overlooked when people think about online banking. One of the many pervasive features of computerized banking is the elimination of paper checks and the advent of mobile banking apps. Forecasting the future of the banking and financial sector is complicated by a number of factors, one of the most important of which is the growing use of digital technology (Shrewdness 2012). Words like "electronic banking," "online banking," and "internet banking" have come to be used interchangeably to describe this category of financial technologies. Electronic banking has led to a more serious and organized approach to financial regulation by government agencies (Alex Fahrur Riza, 2019). The way we feel about interactions with financial administrations is changing, at least in part, as a result of technological advancements. One of the most efficient strategies to reduce poverty rates is to increase access to financial services, say Bruhn and love (2017). Hence, expert co-ops in the financial sector encounter many obstacles as they expand their offerings. Val Verde investigates the effects of digitisation on the flow of money and the threats it poses to financial stability (2017). Business banks have mostly moved away from the traditional branch network in favor of a more adaptable and efficient digital one since the introduction of the internet (Thuy Thu Nguyen, 2020). New banking services have emerged as a result of the widespread adoption and use of the internet and mobile devices in the financial sector. "e-banking comprises the provision of retail and low-value financial products and services via electronic channels, as well as large-value electronic installments and other discount banking services conveyed electronically," said the Basel Council on Financial Management (BCBS, 1998). Banking customers have flocked to electronic banking services due to its convenience, accessibility, and increased safety (Barjaktarovi et al., 2016; Schaechter, 2002). In the wake of technological advancements,

customers increasingly favored virtual banking over visits to physical branches. Globalization, competition, evolving societal trends, and most notably developments in information and communication technology have all resulted in a massive rearrangement of the banking industry (Loonam & O'Loughlin, 2008). At first, developed banks around the world considered the information infrastructure as little more than a possible way to increase product distribution through electronic channels. Remote banking services are referred to as "e-banking" or "electronic banking" (Nedelescu & Stănescu, 2012). As a result of their efforts to update banking technology, we now have ATMs, plastic money (credit cards, debit cards, and smart cards), online collection and payment services, online investments (deposits and mutual funds), online De-mat and Trading accounts, Electronic Funds Transfer (ETF) and clearing services, branch networking, telephone banking, mobile applications and wallet, internet banking, and so on (Chavan, J., 2013). Hence, the digitization of banking and financial services offers an opportunity to lower marginal costs while raising productivity. Online banking's rapid expansion can be attributed in large part to the convenience and accessibility of these electronic payment options.

2. Review of Literature

- As per (IMF Report, 2001; Schaechter, 2002). As a result of digitising financial services, banking has become more efficient, cost-effective, and accessible to competition.
- The nature of the delivery administration, which includes both speed of delivery (i.e., the short development time envisaged in requesting) and reliability of delivery, is reportedly the problem with online banking (Furst et al., 2000). (i.e., the timely delivery of goods and services).
- According to industry experts (Peterson K. Ozili, 2018), electronic banking is the delivery of banking services via electronic channels such as mobile phones, desktop computers, the World Wide Web, and/or credit/debit cards that are linked to a reliable electronic financial system.
- In the words of Yoonseock Child (2016), the traditional structure of monetary administrations, which relied heavily on in-person meetings with a representative, has given way to an online-only model as a result of the advent of cutting-edge financial technology.
- Due to 1980s financial principles, Kosovo's monetary system was in its infancy; at the end of the 1990s, uncertainty, the freezing of foreign cash, and the efforts of the former Yugoslavia to destroy the Kosovo monetary system all put it to the test.
- When new data breakthroughs meet conventional banking administrations, e-banking is born (Sannes, 2001; Reibstein, 2002). Major motivators for e-banking administrations include cutting costs and maximising revenues.

3. Components of Digital Banking Services:

The following are some features of digital banking financial services.

1. Electronic Fund Transfer:

- The Reserve Bank of India mandated the implementation of an electronic money transfer system for the banking sector in 1996.
- By simplifying the process of transferring funds between accounts at various banks, EFT helps both customers and banks.

2. On-line Banking:

- To put it simply, "online banking is the most cutting-edge kind of digital banking at present.
- Nowadays, most people associate "electronic banking" with "digital banking services," which offer the greatest ease of use and through which consumers may perform a wider range of banking transactions.

3. Automated Teller Machine:

- An ATM is a widely used example of a digital financial service. ATMs are available 24/7 for the convenience of bank customers.
- Checks, bank statements, and other financial documents are all available at ATMs.

4. Unified Payment Interface:

- Unified Payment Interface is a smartphone app that allows users to transfer money between accounts.
- This simplified method of paying with a mobile device was developed by the National Payments Corporation of India.

5. Digital Wallets:

- Electronic Money Transfers refer to digital wallets.
- A "digital wallet" is a storage medium for digital currency, which may be used to pay for goods and services on a computer or mobile device.

Research Objectives:

With our study, we aimed to do the following in particular:

- To study the importance & role of digitization in Indian banking financial services.
- To Look Into the Issues With Online Banking.
- As a means of better understanding the potential of India's growing digital banking industry.
- To study the recent digital banking innovation services in India.

4. Research Methodology

An evaluation of this sort is mostly evaluative in tone. The information used in the review is supplementary in nature, and it was gathered from a wide range of sources, such as RBI (Hold Bank of India) announcements and annual reports and a number of specialised reference books on subjects like E-Banking, Advanced Banking, Web-Based Business, M-Trade, Data Innovation, Advertising, Banking, Money, Trade, the Board, and so on. Secondary data used in this study comes from a wide range of resources, including but not limited to public and international exploration diaries covering issues including corporate management, marketing, and finance.

Importance of digitization in Indian banking financial services

Among the most important aspects of this new financial paradigm is the accessibility and ease of internet banking for users. To make a purchase or to honestly glance at your balance, two of life's most common monetary tasks, now demand less mental labour on your part. Online banking is increasingly significant since it eliminates the need to physically visit a bank branch to complete transactions like transferring money between accounts or getting cash from an ATM. Having the option to handle financial matters online, and especially via mobile banking, has been a boon to those residing in rural areas. Access to even the most essential financial services is a tremendous boost for people residing in more outlying places. Customers now have access to their money whenever they need it thanks to online banking. Integrating into virtual marketplaces like those used in e-commerce is a top priority for today's automated financial systems. Advances in digital innovation have made it possible for customers in one country to quickly interact with the financial systems of another. Errors caused by miscommunication can be minimised if talks are meticulously recorded. The most cutting-edge financial apps of today use robust AI and ML simulations to power their realisation processes.

Role of digitization in Indian banking financial services

A bank is more than just a place to deposit and withdraw money; it's an essential part of our daily routines. To fully digitalize, investment in new assets is necessary. The banking industry needs to devote more resources to integrating new technologies. The banking sector in India has a notorious reputation for being sluggish to adopt new technologies. The number of people utilising futuristic services like online banking has skyrocketed in recent years. In India, a sizable subset of the country's financial institutions are banding together to make the transition to digital.

"Internet Banking

The term "online banking" refers to a digital financial platform that enables clients to do a wide range of financial and non-financial transactions without leaving the comfort of their own homes. Using

an online bank provides a few benefits. Things like its reliable quality and safety fall under this category. "Subsidies may be moved across accounts effortlessly for customers with online banking." Internet banking, also known as Web banking, web based banking, and internet spending, is a direct result of this trend.

Magnetic Ink Character Recognition (MICR)

Make Some Tweaks to the Size of the Appealing Ink Font. On the back of the cheque is the mathematical chronic number. In some cases, MICR could speed up the time it takes to process a check. Financial stability, a high credit rating, and a head for numbers are all necessities if one hopes to win against the house. Each Indian bank branch is given its own MICR Code by the Reserve Bank of India (RBI). The MICR lines of a check are located at the bottom, and they contain information such the grouping number and MICR characters. The actual check number, the record number, and the bank's routing code all matter. In most cases, using a MICR reader will lessen the likelihood of misreading a document.

"Centralized Online Real-time Exchange (CORE)

"Central banking" refers to the major banking computer system that processes monetary transactions for all bank branches. There are a number of potential benefits for banks that use core financial software. Core banking applications are critical in the contemporary monetary systems. Customers appreciate the availability of "anytime, anywhere" banking services.

Real-Time Gross Settlement

In legal contexts, the phrase "Constant Gross Settlement" is occasionally used to denote an expedited conclusion. Transactions can be settled instantly thanks to continuous gross repayment, also known as real-time gross settlement or RTGS (without mesh). The widespread availability of instantaneous bank-to-bank transfers is made possible by the RTGS innovation. This method of sending money has zero inherent dangers. The Framework can be accessed at any time, day or night. Monday through Friday, 09:30-16:00, and Saturday and Sunday, 09:30-16:00, banks can settle with the RBI via the RTGS administration for customer exchanges.

Immediate Payment System (IMPS)

Instant Cash Move (Devils) allows for instant and secure electronic fund transfers between accounts around the clock. Facilitates fast financial management by allowing users to access accounts and perform transactions directly from mobile devices. There are four individuals or organisations involved in every pixie trade: the giver, the taker, the financial institutions, and the public monetary switch. Improvements to the Moment Installment Framework paved the way for more convenient mobile payment options. A continuous support action may involve multiple parties, including the sender, the collector, the two banks, and even the Public Monetary Switch NPCI. The

Moment Installment Framework is now being adopted by a growing number of organisations. There are a variety of methods available for transferring funds, including automated teller machines, internet banking services, and courier services.

National Electronic Fund Transfer

All around India, you can send money with just one tone thanks to public e-asset transfer. Transactions involving digital assets that are exchanged on an exchange are handled by RBI. No of the time of day or night, you can always reach someone at the NEFT office. At NEFT, we have gone paperless in every way possible. In terms of speed and security, NEFT is among the best money transfer methods out there. A bank branch's NEFT functionality is required for account-to-account transfers. It's possible to anticipate the following details while using NEFT: Account Holder's Name, Account Number, Account Title, Branch IFSC Code, and Total Details.

Electronic Clearing System (ECS)

Electronic clearing framework, as used above, is a protocol for the electronic settlement of financial transactions between banks. Most banks and other financial institutions use this method when sending out substantial payments including wages, dividends, premiums, and annuity payouts. The Electronic Clearing Framework handles all of our credit card and other electronic payment transactions. An ECS Credit user can make many withdrawals at once to cover expenses including rent, interest, and wages. Because of the ECS Charge system, multiple account holders can pool their funds to cover a single credit to a company. An integral part of India's electronic clearing infrastructure, the National Automated Clearing House (NACH) facilitates transactions between financial institutions and financial intermediaries. The Payee, the Payer, the Payee's Bank, the Payer's Bank, the Clearing House, and any other financial institutions involved in the transaction are all part of an electronic clearing instalment system.

5. Challenges of digital banking financial system

Computerized banking still has a ways to go before it can entirely replace traditional banking for the general public, as the industry has not yet stabilised. The banking industry is currently suffering a number of clearly visible problems.

(A) Traditional Challenges facing banking industry

Lack of Digital Literacy

While many Indians are literate, just a fraction of the population is tech savvy. Workers lower on organisational charts where infrastructure constraints prevent them from keeping up with the latest innovations in their fields.

Slow Digital Transformation

When it comes to new technologies, the traditional banking industry has always been a laggard. Its web presence is primarily devoted to rudimentary functions like wire transfers, bill pay, and music album financing.

Cash Dependent Economy

Significant numbers of people in India are afflicted with extreme poverty and instability. Due to a lack of familiarity with and access to contemporary monetary systems, the vast majority of Indians favour dealing in physical currency over paper notes. Many people in rural India don't know where to find accurate data on the use of virtual currencies.

Improper Customer Engagement

One of the most far-reaching repercussions of the 2008 crisis was a widespread loss of faith in the current monetary system. Client concerns should be answered quickly, and the customer should be helped to have a pleasant and trouble-free financial transaction experience.

Strict Regulatory Standards

The regulatory body of a bank determines what constitutes "regular" status for that bank. For instance, Indian banks are required by law to keep a certain liquidity ratio regardless of their capital-resource ratio or savings-ratio.

Customer's Preference for Traditional Branches

There is a plethora of excellent financial institutions in India, and they are always bustling with people. Important selling points for brick-and-mortar banks include the individualised attention and specialised assistance that can be found there.

(B) Upcoming Modern Challenges facing banking industry

Integrating Artificial Intelligence”

Artificial intelligence was first put to use in the banking industry, where it was put to use in automating risk assessment and predicting consumer preferences. Speech synthesisers and other key programming building components are required for integrating artificial intelligence frameworks. One of the most obvious benefits of AI is that it facilitates better and more open communication between individuals. Additionally, with the help of AI, new products may be developed more rapidly, and fewer misunderstandings can arise.

Payment Processing Costs

When making a trade, you may be subject to a variety of transaction fees. There will be costs assessed by the transferring financial institution or payment processor. Banks and other financial institutions may experiment with cutting expenses by employing blockchain technology. As a high-level data set

device, block chain technology makes it simple for businesses to exchange data. A block chain database organises data into blocks that are linked together to form a chain.

Competition between Banks and Fintech Companies

Traditional banks that wish to stay competitive must integrate more digital services into their brick-and-mortar branches. The rise of fintech companies in recent years has been meteoric, making them a formidable competitor to traditional banks. Web and smartphone apps now make it possible to receive and make payments for loans, exchange digital currency, and buy and sell devices.

Increasing Competitions

If brick-and-mortar banks want to stay competitive, they must integrate digital services into their existing offerings. Fintech firms have emerged as a formidable competitor to traditional banking institutions in recent years. Nowadays, web and smartphone apps make it possible to get financial aid in the form of lending, exchanging digital currency, and buying and selling devices.

Adoption of New Technology

Keeping up with the rapid pace of technological change is a major problem for today's banking organisations. Since we tend to rely on band-aid solutions and outmoded methods. The ability to be first to market with novel strategies and products may be more challenging for larger firms. The banking and finance sectors are being revolutionised by cutting-edge technologies such as artificial intelligence (AI) and chatbots.

6. To examine the advantages and prospects of digital banking financial services in India.

Additionally, digital banking has a number of prospects for improvement of service and expansion of revenue streams.

• Digital Banking Solutions

Computerized banking is the practise of making banking services, which were previously only accessible through paper documents, accessible to customers over the Internet and other digital means. Because to recent developments in banking technology, customers of any bank in the globe can now instantaneously gain access to their accounts and the full range of services they provide from any location using only a mobile device or computer.

• Initiatives of Government

Because of the government's efforts, a young biological system is thriving. This is Pradhan Mantri, India's Prime Minister. India's government has recently shown support for both the Jan Dhan Yojana programme and the country's digitization efforts. The government of India hopes that one day soon, every citizen will be able to take advantage of digital tools to participate fully in the country's economy and culture.

- **Usage Of Smart phones**

Everyday use of personal digital assistants (PDAs) is becoming increasingly common. Thanks to the bank's mobile applications, you can quickly and conveniently manage your accounts from your mobile device. In light of this, mobile phones have surpassed landlines as the preferred method of contact for a large percentage of consumers. Internet-based activities, such as social networking, instant messaging, video-sharing, and music-listening.

- **Internet Penetration**

A country's "Internet Penetration" score can provide insight into the extent to which its population really makes use of the internet. We can approximate what fraction of a country's population has access to the online by dividing the total population by the number of people who use the internet there. Given that nearly half of all Indians use the Internet at least once a month, India consistently features well on global rankings of Internet penetration. The percentage of the Indian population using the Internet in January 2022 was 658 million, according to a poll of the entire country.

To study the recent digital banking innovation services in India.

The following is a description of the most cutting-edge services now available in the realm of digital banking:

- **Digital KYC-**

Customers who do not comply with KYC regulations may use a digital KYC process, which is conducted entirely online. Effective and fraud-preventative, digital KYC is the way to go. Understand your customer, or KYC. For the bank to confidently identify its clientele, digital Know Your Customer (KYC) procedures are required. When it comes to verifying the identities of their clients, fintech firms will be going entirely digital.

- **Application Programming Interface**

The "Application Programming Interface" (API) is a term used by programmers to describe the means by which applications communicate with one another. Application Programming Interfaces (APIs) are protocols for communicating between programmes that are user-invisible and run automatically. API stands for "Application Programming Interface" and refers to a standard set of protocols for developing software. The utility of this programme cannot be overstated. With the application programming interface, companies may easily share data within their apps.

- **Chatbot**

A chatbot is a piece of misleading computer software that can mimic human interaction via voice or text. With a Chabot, you can provide support to consumers around the clock, every day of

the week. In the financial technology sector, catamarans are employed to better the experience of acquiring financial services for the consumer. You may find that using Chabot helps your company in numerous ways, including saving money and time, increasing efficiency (which can be measured statistically), and generating higher-quality leads.

- **Biometrics**

The field of study known as biometrics focuses on developing reliable methods for accurately identifying and classifying individuals based on observable traits. Identifiers such as fingerprints and facial scans are examples of biometric data. Biometrics can take various shapes and sizes, each as unique as a fingerprint, a face, or a voice. More and more, biometrics are being used to ensure the safety of online financial transactions.

- **Cloud Banking**

Cloud banking refers to the most popular method of constructing a monetary foundation for the management of core monetary services that are delivered via cloud computing. To keep track of their clients and their interactions with the bank, financial institutions use cloud-based customer relationship management software. The term "cloud banking" is used to describe the most common method of establishing a financial framework for managing critical monetary administrations on the cloud. Financial institutions rely on cloud-based CRM software to keep tabs on client data and interactions. Financial transactions, such as data processing, may be performed using the shared computer resources of a cloud banking system.

- **Block Chain**

For those unfamiliar, "block chain" is an abbreviation for "block chain ledger," which is a distributed ledger that may be used to record and verify transactions with no need for a trusted third party. Bitcoin, the most prominent instance of a decentralised, advanced currency, is dependent on the revolutionary technology of block chain. Blockchains work by grouping records into blocks that may then be accessed digitally. The Blockchain is an open, decentralised database that records all financial dealings between computers.

- **Fintech Companies**

When referring to how companies in the financial administrations sector have incorporated technological developments into their services, the term "fintech" is commonly used. As a result of technological advancements, fintech firms have been able to create innovative tactics, applications, cycles, and products that could have far-reaching consequences for the financial services industry as a whole.

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The Effect of Change management on Employee Performance in Private Banking Sector With special reference to Moradabad District

Prachi Rastogi *
Vibhor Jain **

Abstract

The banking sector is currently going through both new possibilities and problems in a highly competitive climate. Banks should develop the working capacity so that they can handle the pressures of competition which requires to adopt rapid changes as well as the difficulties brought on by the quick changes in the financial environment. As a result of staff being required to do a range of jobs, many of which are unique, banks may now obtain a competitive edge by meeting unmet requirements or specialised market demands. Some of these tasks, however, are unrelated to banking and may be outsourced. Banks must make certain institutional changes to respond to the marketplace. Top management regularly experiences an unexpected response from potential workers while making changes. Employee resistance to the adoption of new procedures may occur for a number of reasons, leading to failure. So, to resolve this problem, senior management should employ successful change management strategies. Change serves as a powerful catalyst for ecological progress. The goal of this research is to examine the amount of strategic change adoption and execution in banks, as well as how widely the approach is used by Indian financial organisations. The study focuses on how well employees are taught in strategically targeted technological strategies and operational alerts in order to help them maintain their leadership positions in a fast changing environment. In the dynamic corporate climate of today, change management is a crucial skill. It's never simple to manage change, and it may be especially difficult in a huge corporate setting. So, the purpose of this study is to understand how change management influences employee performance as well as to demonstrate how to manage change, particularly in the banking industry. According to the findings of this study, some of the change management aspects that will affect employee performance include hours of work, technology, discipline, participation, motivation, learning and development, and performance-based bonuses. The observations display the satisfaction level of employees and the percentage of resistance to change being out of different reasons.

Keywords: Employees performance, Competitive advantage, Change Management, Strategy, and Banking sector.

1. Introduction

Change management in refers to the process of planning, implementing, and managing changes to the human resources policies, procedures, and practices within an organization. The goal of change management is to ensure that the transition to a new system or process is smooth, efficient, and effective, and that employees are fully engaged and committed to the change. Change management involves a number of steps, including identifying the need for change, developing a plan for implementing the change, communicating the change to employees, providing training and support to employees, monitoring the implementation of the change, and evaluating the success of the change. Change management is becoming increasingly important in today's fast-paced business environment, as organizations need to be able to adapt quickly to changing market conditions and customer needs. By

implementing change management in, organizations can ensure that they are able to manage change effectively, while minimizing the risks and negative impacts associated with change.

The working of banking sector demonstrates how crucial it is to operate in the present scenario. The banking sector is currently going through both new possibilities and problems in a highly competitive climate. The demands of development and the challenges posed by the swift changes in the financial environment must be managed by banks. Banks must alter their organisational structure, realistic operational policies, sophisticated control systems, and qualified staff if they want the financial sector as a whole to fulfil the aims, by investigating the effects of change management in the banking sector with reference to the Moradabad District of the Uttar Pradesh State. Innovations for planned change can take many different forms, such as new product creation, technology advancements, or

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training and development. Organizational change and organisational development, however, are the two change kinds that have drawn analysis in the study of organisational behaviour. The latter is what this essay focuses on more. Yet, defining each will help others comprehend each better. The link between organisational change and human change is discussed in relation to organisational transformation. Products and services, technology, systems, connections, organisational culture, management tactics and style, strategies adopted, competencies and skills, performances, and other aspects of a corporation can all be affected by organisational changes. These further adjustments may be necessary for an organization's structure, legal system, ownership, sources of funding, networks, and impacts. Without a change in attitude and conduct, as shown in the image below, no genuine long-lasting improvements can take place.

A methodical strategy for the transformation of an organization's objectives, procedures, or technology is called change management. There can be different implementing ways for bringing about change, managing change, and assisting individuals in adapting the implemented change is the goal of change management. On the one hand, banks have changed their management, and on the other, the Indian economy has adopted policy changes that have changed the economic order in favour of the liberalisation, privatisation, and globalisation processes. The effective mobilisation and efficient use of bank money are fundamental to the banking industry. Due to recent financial sector changes that are too quick and difficult for bankers, there has been change in the banking industry. In this situation, the banks should have a strong change management procedure in place to guarantee that they thoroughly assess and address the compliance implications of any changes to regulations or products.

Organizations, especially those in the public sector, who operate in a highly competitive market and are confronted with acute risks that necessitate rapid change and development within constrained timeframes, favour this strategy. This clearly distinguishes organisational growth, which on the other hand promises better effectiveness over the long term, from organisational reform. In some situations, change is no longer an option; the organization's existing status must be changed. There are four common reasons why change management is required in the banking sector-

- If the previous method of doing things is no longer effective.
- If technology development and the promotion of new marketing technologies are required.
- To make use of the newly hired member's talents and competencies.
- As new objectives are introduced, the primary focus may vary and old objectives are no longer to be pursued in the current situation.

There is a strong likelihood that any of the following four categories of changes will occur in an organisation.

- Operational changes, are those which changes the automation of any particular work and this make impact like how you further proceed in any process
- The strategic changes refers when organization undergoes any strategic change, such as an entire change in management policies.
- Cultural change refers changes adopted for the flexibility or providing comfort to the employees for motivational purposes.
- Political changes refers systemic changes that occurs as a result comes from any political change in the state or law.

Further we can explain it like this also-

Technology change management: With the ever-evolving technology landscape, banks need to keep up with the latest technology trends to remain competitive. Technology change management involves implementing new technologies and processes to improve operational efficiency and enhance customer experience.

- Organizational change management: Organizational change management involves changes to the structure, culture, and processes of the bank. This may include changes in the reporting structure, job roles, or the introduction of new policies and procedures.
- Regulatory change management: The banking sector is heavily regulated, and banks must comply with various laws and regulations. Regulatory change management involves implementing changes to comply with new regulations and laws.
- Risk management change management: Banks are exposed to various risks, including credit risk, market risk, and operational risk. Risk management change management involves implementing changes to mitigate these risks.
- Strategic change management: Strategic change management involves changes to the overall strategy of the bank. This may include changes to the business model, expansion into new markets, or mergers and acquisitions.

Overall, effective change management is critical to the success of banks in today's dynamic business environment. It is essential to carefully plan and execute changes to minimize disruption and ensure a smooth transition.

2. Review of Literature

The theoretical framework for this literature review is based on Lewin's Change Management Model, which consists of three stages: unfreezing, changing, and refreezing. The unfreezing stage involves identifying the need for change, the changing stage involves implementing the change, and the refreezing

stage involves stabilizing the change and ensuring it becomes a permanent part of the organization.

Change management in the banking sector is a critical topic, especially with the emergence of new technologies and the need for banks to remain competitive. This review aims to explore the literature on change management in the banking sector, focusing on key themes and best practices.

One key theme that emerges in the literature is the need for a strong change management strategy. In their article "Managing Change in the Banking Industry," Martin and Prasad (2014) emphasize the importance of a comprehensive change management strategy that includes clear goals, effective communication, and active stakeholder engagement. The authors argue that a well-designed strategy can help to minimize resistance to change and ensure successful implementation.

Tenneti Sai Prasad , Prof. K. Srinivas Bose (2022) The purpose of change management is to implement strategies for effecting change, controlling change and helping people to adapt to change. With regard to its policies and management system, the banking system is facing fresh opportunities and difficulties in a market that is highly competitive. For adopting these changes successfully banks should be capable enough to handle the pressures of development as well as the difficulties brought on by the quick changes .

Ravindra Sangvai, Dr Rajan Dhamdhare (2021) Under the guidance of many Chief Executive Officers, the third-largest private sector bank in India, Axis Bank, has put change management principles into practise. The bank has reached the pinnacle of Indian banking because to its unique business practises. The bank is a pioneer in the application of modern technologies and has outperformed other major private sector banks. So, based on available literature, a researcher or student studying change management in banking must analyse its change management profile and developing approaches.

Abdullah (2021) Change management is handled differently in different organizations, and each one chooses a technique based on its unique circumstances, situation, and qualities of employees.

Ravindra Sangvai (2020) Banks must use change management as a tool and approach if they are to keep up with changes in their intricate ecosystem and satisfy consumers' rising expectations. The researcher has reviewed all of the information accessible on change management initiatives at State Bank of India with the aim of determining the acceptance and adoption of latest change management methods in the biggest bank in India.

Al-Saadi and Al-Majali (2020) Communication is also highlighted as a critical factor in change management in the banking sector. In their article "Effective Communication Strategies in Change Management for Banks," further argue that effective communication is key to managing employee resistance and

ensuring successful change. The authors recommend using multiple communication channels, including face-to-face meetings, email, and social media, to reach all employees and ensure that everyone is informed and engaged.

I. S. Baharudin (2019) With the right managerial leadership in place, implementing change management is a straightforward undertaking. The change management executives who have been effective in assisting businesses with their transformation are those that set the bar high and consistently convey their plans, knowledge, updates, and advice to others around them.

In their study of change management in a Turkish bank, Ozcan and Atik (2019) found that effective leadership was crucial to successful change implementation. The authors note that leaders must be able to articulate a clear vision for change, provide support and resources, and motivate employees to embrace the change.

Hussain (2018) Organizational members must act, act, and do their jobs differently, as a result of the reorganization and changing of initiatives. Organizational changes are expected to cause employees to quit their comfort zones , and old habits and processes are anticipated to be abandoned in favour of new ones that are consistent with the change effort's goal.

Mone and Carter (2017) technology is identified as a major driver of change in the banking sector. In their study of digital transformation in the banking industry, note that new technologies such as artificial intelligence and block chain are reshaping the industry and creating opportunities for banks to improve efficiency and customer experience. However, the authors caution that successful implementation of new technologies requires careful planning and effective change management.

Hesselink et al., (2016) change management can enhance performance by improving organizational agility. Organizational agility refers to an organization's ability to quickly and effectively respond to changes in the environment This requires a culture that values innovation, learning, and continuous improvement. Change management can help organizations to develop this culture by encouraging experimentation, risk-taking, and learning from failure (Eisenhardt & Sull, 2001).

Cummings & Worley, (2014) ,Another way to enhance performance through change management is by implementing organizational development interventions. Organizational development interventions involve planned activities that aim to improve organizational effectiveness and employee well-being (French & Bell, 1995). Examples of organizational development interventions include team building, leadership development, and employee engagement programs. These interventions aim to enhance communication, collaboration, and trust among employees, which can improve performance and reduce turnover .

Armstrong & Baron, (2005). One way to enhance performance through change management is by implementing performance management systems. Performance management systems aim to align individual and team performance with organizational goals and objectives, This is achieved by setting clear expectations, providing feedback, and recognizing and rewarding employees who meet or exceed expectations. In addition, performance management systems provide data that can be used to identify areas for improvement and to make decisions related to training and development.

According to Burnes (2004), change management is critical for organizational success and can lead to improved performance. In addition, various studies have shown that change management can positively impact organizational culture, employee morale, and productivity (Cameron & Quinn, 2011; Kotter, 1996; Oreg & Berson, 2011).

Arora (2003) The research places a strong that technology is playing a crucial role in facilitating the greatest number of transactions happening in the banking industry & encouraging banks that are undergoing different working transformations for launching new goods and services in the market.

Kohli (2001) According to him the weak condition of banks happened due to non performing assets due to which gradually the profitability of bank goes down. has provided some facts to show that no banks may suddenly become weak or potentially weak, this all tale place due to less loan recovery and not taking corrective actions.

Kotter (2001) According to him, the climate of any business is changing subsequently and will likely continue in the future as well. Throughout the upcoming years, Kotter predicted that the rapid changes of the environmental movement will speed up and pressure on organizations to adopt changes will intensify the situations. If this is the case, he contends, then learning more about what leads to effective transformation is the only sensible course of action.

- Success factors for an effective change management

Step 1- Make a detailed plan to put your strategy into action.

Step 2- Make sure everyone is on the same path about the changes

Step 3- Include everyone who is affected

Step 4- Maintain transparency

Step 5- Encourage the adjustments that have been made.

Step 6- Lessen the ambiguity

Managers must ascertain what drives each employee in the context of their position before putting a new procedure into place. Managers need to be aware that each person has a

distinct motivation for working. Some employees may be motivated by flexible work schedules, promotions, performance-based bonuses, or more paid time off. Employees therefore anticipate receiving some enjoyment from their work; otherwise, they risk becoming unhappy and unproductive.

According to (Bidabad, 2014), the characteristics of new processes in the banking sector should:

1. Be based on the employee's faith and beliefs
2. Be transparent at all managerial levels.
3. Be effortless and use information technology
4. Ensure that all people throughout the world have access to your services.
5. Be founded on high-level standards.
6. Operational procedures must be documented and easily accessible.
7. Achieving the bank's objectives and interests
8. Reducing financial-risks
9. Having sufficient monitoring measures in the workplace to prevent any deviations
10. Be built on the principles of accountability and responsiveness.
11. Increasing the creditworthiness of the bank and its employees on a long-term basis
12. It is necessary to identify official divisions, work domains, hierarchies, and reporting methods.
13. Ensure employment happiness and enrichment, as well as democratic leadership.
14. Organisational levels, Formalities, complexity, concentration, and communication channels must all be determined.

Objectives

- To know how change management affect employee's performance.
- To know how to manage the change in the banking sector.

3. Research Methodology

The study was situated on change management and focused specifically on exploring and understanding the perceptions of employees about change management in the banking industry in India. An early empirical investigation was conducted in Moradabad. The subject of this study is staff members of private banks. The survey questions was reduced to a minimum and the 95 participants were selected from a variety of banks. This research includes an exploratory questionnaire that will look at

several areas of change management. In this study, the effect of change management on employees in the banking industry is investigated in relation to their productivity and effectiveness at work. With the use of a questionnaire, data on several aspects of job performance and efficiency with regard to change management was gathered.

4. Research Discussion

A set of collected observations (data) are transformed into descriptive assertions using data analysis (information). This is

the most important section of the study since it is through here that the researcher will be able to discover findings and make recommendations.

In the current study, statistical methods like percentages, Chi-square, and graphs are utilised to convey the research findings more effectively and to help readers and users comprehend them.

Private bank employees in Moradabad were given a standard questionnaire, and the results were displayed in the tables below.

Table 1 General profile of the respondents

S.N.	Demographic Profile		Respondents	Percentage(%)
1	Gender	Male	58	61
		Female	37	39
		Total	95	100
2	Age	26-35	18	19
		36-45	43	45
		46-55	30	32
		Above 56	4	4
		Total	95	100
3	Marital Status	Single	22	23
		Married	73	77
		Total	95	100
4	Designation	Bank teller	10	11
		Marketing Representative	38	40
		Data processing processor	22	23
		Loan Officer	13	14
		Bank Manager	4	4
		Internal Auditor	2	2
		Others	6	6
		Total	95	100

From the above table, it is clearly shown that more than half of the respondents are male and more than seventy-five percent of the employees are married. Forty percent of the respondents are marketing representatives and the remaining sixty percent of the employees belong to different designations.

There are several factors that can affect change management within an organization. Some of the most significant ones include:

- Leadership: Effective leadership is critical for successful change management. Leaders must be committed to the change and have a clear vision of what they want to achieve.

They must also be able to communicate the change effectively and inspire their team to support it.

- Organizational culture: The culture of an organization can either facilitate or impede change management efforts. A culture that is resistant to change can make it difficult to implement new initiatives, while a culture that embraces change can make it easier to get buy-in from employees.
- Employee engagement: Employees are the backbone of any organization, and their engagement is essential for successful change management. It is important to involve employees in

the change process, listen to their feedback, and address their concerns to ensure their buy-in and commitment.

- **Resources:** Adequate resources are essential for successful change management. This includes financial resources, as well as human resources, such as skilled and experienced employees who can lead the change effort.
- **Communication:** Effective communication is crucial for change management. Clear and consistent messaging can help employees understand the change, why it is necessary, and how it will impact them. It is also important to be transparent about the process and progress of the change initiative.

- **Timing:** The timing of a change initiative can also impact its success. Implementing a change at the wrong time, such as during a busy season or when employees are already overwhelmed, can lead to resistance and failure. It is important to consider the timing of the change and plan accordingly.
- **Resistance:** Resistance to change is a common factor that can impact change management. It is important to anticipate resistance and have a plan in place to address it. This may involve providing additional training and support, or involving change agents who can help to persuade employees to support the change.

Further we have selected the following factors for analysis-

Table 2 Levels of satisfaction with the change management

Factors affecting change management	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied
Working Hours	47	15	13	12	9
Work culture	29	24	30	8	4
Technology	52	29	10	2	2
Discipline	35	24	19	14	3
Participation	54	29	11	2	1
Motivation	40	23	15	9	9
Learning & development opportunities	52	20	17	5	1
Performance based Incentives	49	26	16	2	1

From the above table, the majority of the employees are highly satisfied to participate in the change management process, they are also highly satisfied with the new technology and have positive scope for learning and development. Below ten percent of the employees are highly dissatisfied with the change management process.

Resistance to change is a common challenge in the banking sector, where new technologies and evolving customer demands often require significant organizational shifts. Some reasons for resistance to change in the banking sector include:

- **Fear of job loss:** Employees may be concerned that new technologies or processes will make their jobs obsolete, leading to job insecurity or layoffs.
- **Lack of understanding or training:** Employees may not fully understand the new processes or technologies being implemented, leading to confusion or fear of failure.
- **Comfort with the status quo:** Employees may have grown accustomed to the way things have always been done, and may be resistant to change simply because it feels unfamiliar.

- **Cultural barriers:** The banking industry can have a strong hierarchical and conservative culture, which can make it difficult to embrace new ideas or ways of working.
- **Resistance from stakeholders:** Change initiatives may face pushback from external stakeholders, such as customers or regulatory bodies, who may be resistant to changes that disrupt the status quo.
- **Implementation challenges:** Change initiatives can be complex and time-consuming to implement, and may require significant investment in resources and infrastructure.

To overcome these challenges, it is important for banking organizations to engage in effective change management strategies, such as effective communication and training programs, strong leadership and management, and a focus on building a culture of innovation and continuous improvement.

Here we are selecting some of the main factors for –

Table 3 Reasons Observed for Resistance to Change

S.N.	Reasons for resistance to change	No. Of Respondents			Total
		HDFC	AXIS	ICICI	
1	Fear of Failure	13	04	07	24(25.26%)
2	Creatures of habit	11	02	02	15(15.78%)
3	Concern about support system	16	09	03	28(29.47%)
4	Unwillingness to learn	10	03	03	16(16.84%)
5	Others	10	02	00	12(12.63%)
Total		60	20	15	95(100%)

Table-6.3. shows that there can be many reasons why employees resist for changes in banks , here 25.26% of employees resisted changes because of the fear of failure in the success of changes adopted , 15.78% employees avoid changes as human beings are the creature of habits and habits sometimes take times or unable to change , 29.47% of

employees don't want to go for changes because they have concerns about support system provided by the organization will be helpful enough or not , 16.84% of employees resisted for changes because of they are not willing to learn new changes and 12.63% of employees are due to any other reason.

Table 4 Effect of the Change Management

S.N.	Measurment	No. Of Respondents			Total
		HDFC	AXIS	ICICI	
1	Measurable in quantitative term	14	05	10	29(30.52%)
2	Measurable in subjective term	11	12	02	25(26.31%)
3	Largely subjective	16	01	02	19(20.00%)
4	Not Clear	19	02	01	22(23.15%)
Total		60	20	15	95(100%)

Table 4 shows that 30.52% of employees replied that the effects of changes occur is measurable in quantitative term, 26.31% of employees replied that the after effects of changes were largely subjective so it can't be quantify and 23.15% are not clear how to quantify it.

Change management can have both positive and negative effects on individual performance in banks. It largely depends on the nature of the change and how it is managed.

Positive effects:

- Improved skills: Change management programs often include training and development opportunities for employees. This can result in individuals acquiring new skills and knowledge that enhance their performance.

- Increased motivation: Change management initiatives that are communicated well and involve employees in the process can increase their motivation and engagement. This, in turn, can lead to improved performance.
- Better alignment: Change management initiatives can help employees better understand the goals and direction of the organization. When everyone is aligned, individuals are more likely to work together towards common goals, resulting in better performance.
- Streamlined processes: Change management can involve streamlining processes and eliminating redundant or unnecessary tasks. This can free up time for individuals to focus on more value-added activities, leading to improved performance.

Negative effects:

- Resistance to change: Change can be difficult for some individuals, leading to resistance and decreased performance. This can be mitigated by involving employees in the change process and addressing concerns and fears.
- Increased workload: Change management initiatives can result in increased workload for employees, leading to stress and decreased performance. It is important to ensure that individuals have the necessary resources and support to manage the workload.
- Uncertainty: Change can create uncertainty and anxiety, which can impact individual performance. It is important to communicate the rationale behind the change and provide clear guidance and support to minimize uncertainty.
- Disruption to routines: Change can disrupt established routines and ways of working, leading to decreased performance. It is important to provide adequate training and support to help individuals adapt to the new ways of working.
- Overall, effective change management can have a positive impact on individual performance in banks by improving skills, increasing motivation, better align.

Effects of Changes on Individual Job-

S.N.	Effect	No. Of Respondents			Total
		HDFC	AXIS	ICICI	
1	More rewarding Financially	20	10	10	40(42.10%)
2	More satisfying and easier	20	05	02	27(28.42%)
3	Replace old tasks with new ones	15	03	02	20(21.05%)
4	More Difficulty	15	02	01	18(18.94%)
Total		60	20	15	95(100%)

5. Conclusion –

Change management in the banking sector is crucial in adapting to the evolving landscape of the industry. The banking sector is constantly experiencing changes such as new regulations, technological advancements, and changing customer preferences. Effective change management in the banking sector requires a thorough understanding of the reasons for change, clear communication, and collaboration among stakeholders. Banks that successfully implement change management can improve efficiency, increase profitability, and enhance customer satisfaction. However, change management also presents challenges such as resistance to change, communication breakdowns, and a lack of buy-in from stakeholders. To overcome these challenges, it is essential to have a well-planned change management strategy that includes identifying the need for change, developing a plan for implementation, ensuring clear communication and collaboration, and providing appropriate training and support to all stakeholders.

According to the study, firms will be more productive and profitable if employees have a healthy work-life balance, but they have very little opportunity to adjust their work schedule in

order to take into account personal circumstances. Performance of an employee will be impacted by a number of change management aspects, including working hours, technology, discipline, participation, motivation, learning and development, and performance-based compensation. The results showed that there was broad agreement on all of the concerns of how change management affected the banking industry. These results highlight the need for bank executives to create change management and adaptation strategies in order to function in a dynamic business environment. The findings suggest that bank leaders should employ a variety of strategies to maintain bank sustainability, including technological adoption and application of new changes, training and learning regarding updated managerial and technical requirements, the adoption of participative leadership styles, effective communication at all levels, the use of change agents, and cost reduction. The study's results might be used by policy makers, bank management and owners, workers, and employers to improve the banking sector's overall management, which would be advantageous to everyone who has a direct or indirect connection to the sector. Revenue, deposits, and loans were all positively affected by the numerous banking modifications that changed industry practises. Employees reported they received enough support

from management at all levels while implementing new changes, however still employees shown resistance. Due to a variety of reasons, including Creature's Habits, Fear of Failure, Concern for the Support System, and Reluctance to Learn, workers demonstrate resistance to accepting change. In order to support them and lessen resistance, the bank's employer hosted seminars and gave training to staff employees so they could become proficient with the technology. As a result of this change, new duties have taken the place of old ones, making individual employment simpler and more enjoyable. Within a year, these changes helped workers become more productive at work. Top managers used hierarchical and matrix team structures when executing changes, involving employees. Also, it is implied that employees desire to improve their expertise so they can remain competitive in the market. Due of organisational changes, HR practises have changed in favour of workers, who are now providing rewards (fringe benefits) to employees. Even the implementation of this positive shift is taken into consideration when making promotion decisions. In conclusion, change management is an essential aspect of the banking sector that should not be overlooked. Banks that prioritize effective change management strategies can adapt to new market realities, remain competitive, and continue to provide excellent services to their customers.

In the future, there are several areas where change management will continue to play a vital role in the banking sector:

- **Digital Transformation:** With the growing adoption of digital technologies, banks need to transform their operations to stay competitive. Change management will play a key role in facilitating this transformation by helping employees adapt to new technologies and processes, and ensuring that the organization can achieve its digital transformation goals.
- **Regulatory Compliance:** Banks operate in a highly regulated environment, and regulatory requirements are constantly changing. Change management will be essential in helping banks adapt to these changes and ensuring that they remain compliant with relevant regulations.
- **Risk Management:** Managing risk is a critical function in the banking sector, and change management will be essential in ensuring that risk management processes are effective and efficient. This will involve ensuring that employees are trained to identify and manage risks, and that risk management processes are regularly reviewed and updated.
- **Customer Experience:** Banks are increasingly focused on providing a seamless and personalized customer experience. Change management will play a key role in ensuring that employees are equipped with the skills and tools necessary to provide excellent customer service, and

that the organization can adapt to changing customer needs and preferences.

Overall, change management will continue to be a critical process in the banking sector, helping organizations to adapt to new challenges, stay competitive, and improve operational efficiency.

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Sustainable and Green Roles of the Banking Industry: A Bibliometric Review from 1992 to 2022

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Abstract

Environmental sustainability is under a lot of pressure, and protecting the environment is the prime responsibility of every business organization and financial institution. In the current scenario, banking institutions at the national and international level are taking various initiatives that increase their contribution to the greening of the economy. Since the interest of researchers is rising in this topic, the number of publications on the green and sustainable role of the banking sector is increasing. Therefore, this paper seeks to conduct a thorough literature review of 628 research articles using bibliometric techniques, published between 1992 and 2022 in the Scopus database.

Keywords: Sustainability, sustainable banking, green banking, banking sector, sustainable development and bibliometric review.

1. Introduction

The environmental deterioration as a result of economic growth is a significant concern for the entire planet. Going green is essential for survival in all spheres, as the negative impacts of economic development have led to climate change and environmental destruction (Bouterra & Hisham, 2020). Environmental sustainability is under severe strain as a result of rising urbanization and changing consumer habits, and environmental protection has emerged as the world's most pressing issue. Environmental protection from ever-worsening conditions requires installing a sustainable environmental attitude in individuals as well as promoting environmental ethics (Taneja & Ali, 2021). The value of the environment has not only been understood by business organizations (Vanegas, 2003), but also by customers and the general public, who are much more conscious of it (Collins et al., 2007; Han, 2021). Due to rising environmental awareness, financial institutions have started to change their operations and tactics to safeguard the environment and natural resources. Generally, the banks are often seen as environment-friendly, as their "internal" banking activities have minimal impact on the environment (Meena, 2013). However, the "external" impact on the environment caused by banks' customers is significant (Deka, 2015; Sahoo & Nayak, 2007). Thus, the banks are now concentrating on the

protection of the environment by fulfilling corporate social responsibilities and adopting sustainable and green banking measures because of mounting environmental concerns, consumer demand, and regulatory pressure (Tara & Kumar, 2015).

Terms like ethical banking (Birindelli et al., 2015), corporate social responsibility of banks (Scholtens, 2009), green banking, and eco-banking (Rajput et al., 2013; Sahitya & Lalwani, 2014) are all related to sustainable banking (Aracil et al., 2021). As per Yip & Bocken (2018), sustainable banking is the provision of "financial products and services that are developed to meet the needs of people and safeguard the environment while generating profit." These sustainable and green financial products include green bonds, green loans, green vehicle finance, and other internal green practices of banks (Nath et al., 2014; Park & Kim, 2020). The role of the financial sector in sustainability was first recognized after the foundation of the United Nations Environment Programme Finance Initiative (UNEP FI) at the "Earth Summit" held in Rio de Janeiro in 1992 (Adegbite et al., 2012). However, the banking sector has reacted to sustainability-related challenges quite late (Prakash et al., 2018). According to estimates, developing countries' current financial gap per year to achieve the 2030 sustainability agenda is between \$ 2.5 and \$ 3 trillion, highlighting the urgency to align

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the financial sector with the SDGs (Taghizadeh-hesary & Yoshino, 2020). Thus, countries all around the world are aligning the financial sector with sustainability (Falcone et al., 2018; Mejia-escobar & David, 2020), due to which the banking industry showed a great contribution to sustainable development after the release of the SDGs in 2015.

In the current scenario, several banks, both regionally and globally, are taking various initiatives that increase the commitment of the banking industry to the greening of society (Duncombe, 2014; Herath & Herath, 2019). The significant impact of the banking industry on the economy has been extensively discussed in various past works (Aithal & Haralayya, 2021; Beck et al., 2010; Scholtens, 2009). Since banks play a crucial role as mediators by directing funds from depositors to investors, it has a significant impact on whether certain activities obtain funding or not (Aracil et al., 2021). In an equivalent way, it can play a mediating role in sustainable development as well (Taneja & Ali, 2021; Weber, 2014). Various initiatives at the global level, like the setting up of UNEP-FI (Adegbite et al., 2012), the Global Reporting Initiative (Aracil et al., 2021), the Equator Principles (Scholtens, 2009), and the Sustainable Development Goals (Sardianou et al., n.d.), have boosted the sustainable role of the banking industry.

The greening of the economy and the contribution of the banking industry to environmental sustainability are currently vogue topics (Aracil et al., 2021). On the other hand, limited research has been done on this topic. Even though the interest of researchers in this topic is growing, there is still a need for a bibliometric review of the literature published on the green and sustainable role of the banking sector. Therefore, this paper seeks to conduct a thorough literature review of 628 research articles using bibliometric techniques, published between 1992 and 2022 in the Scopus database. The research questions proposed for this current study are:

1. What is the annual trend in publications related to the green and sustainable role of the banking industry?
2. Who are the most prominent authors publishing documents on the green and sustainable role of the banking industry?
3. Which country, institution, and journal are the main contributors in this field?
4. Which keywords are most commonly and frequently used by the authors in their documents?
5. Which authors and journals are highly related to each other in terms of the number of publications?
6. Which research articles are the most useful in determining the direction of future

2. Literature Review

Rapid economic development and technological advancement have many detrimental effects on the environment as a result of rapid economic development and technological advancement, notably global warming, contamination of the air and water, degradation of the ozone layer, and haze (Wang et al., 2019). Flowers do not blossom on their own, and rivers also do not drink their own water. The purpose of natural resources is to benefit people. However, humans cut down flora, engaged in deforestation, water pollution, and nuclear testing in the name of industry and development in response to such natural blessings (Masukujjaman et al., 2016). As a result, numerous devastations are beginning to affect mankind as a form of poisonous retribution. Due to massive carbon emissions and nuclear explosions, the ozone layer has begun to deteriorate (Masukujjaman et al., 2016), the global temperature is rising, plate tectonics are shifting, and the Antarctic icebergs are melting all at the same time (Masukujjaman et al., 2016). The drastic transition in climate is the major concern for every nation (Rajput et al., 2013). Economists are also aware that limiting climate change and fostering a low-carbon economy can have a beneficial financial consequence, despite the fact that the consequences of global warming are becoming a greater threat to the nation's health, economy, and environment.

Origin of Sustainability

While talking about the origin of the concept of sustainability, the International Union for Conservation of Nature was the first to use the phrase "sustainable development" in an official statement signed in 1969 by 33 African nations (Seefried, 2015). And the Brundtland Report of 1987 has clearly defined the meaning of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Seefried, 2015). However, the financial sector was first aligned with sustainable development after the setting up of UNEP-FI in 1992 at the "Earth Summit" held in Rio de Janeiro (Adegbite et al., 2012). Moreover, the 2030 Agenda, approved by the United Nations in 2015, which contains 17 SDGs to be achieved by 2030, is one of the significant steps in the roadmap of sustainable development, and the banking sector has a crucial role to play (Fukuda-parr & Muchhala, 2020). A capital of \$ 5-7 trillion per year is required to fulfil the 2030 Agenda, and banks will play an important role in sustainable growth because the majority of this capital will come from the corporate sector and other financial organizations (Avrampou et al., 2019).

Role of banks in sustainability

Sustainability development is a method of growth that accords the environment an equal position as a pillar that supports decision-making in light of the social-environmental and

economic nexus (Masukujjaman et al., 2016). In the past few decades, the financial sector has played a unique intermediary role in obtaining sustainable development by directing financial resources towards sustainable goals (Alexander, 2014; Aracil et al., 2021; Beck & Demirgüç-Kunt, 2009; Yip & Bocken, 2018). Nowadays, the financial sector is playing an important role in reducing the negative impact on the environment through activities such as green loans, green banking activities, green banking initiatives, and so on. Banks have been playing a key leadership role in the necessary economic and social shift will create new opportunities for financing and portfolio management techniques, for the development of a robust and prosperous sustainable economy (Rajput et al., 2013). In order to advance towards sustainable practices, green banks integrate social and economic considerations into their strategy (Aracil et al., 2021; UNEP FI, 2011). New trends in the banking sector around the world place a big emphasis on sustainability. The inclusion of sustainable practices within financial sector through the absorption of social and environmental concerns into the bank's fundamental strategy is one of the most popular sustainable development strategies that banks are implementing globally (Prakash et al., 2018).

Sustainable and Green Banking

Green banking is a paradigm that is still in progress, but it is crucial for socioeconomic development, financial institution operations, and environmental legislation. The Dutch bank known as "Triodos Bank" was the first institution to put the concept into practice in 1980 (Chen et al., 2022). Green banking, as defined by the Indian Banks Association, is a conventional banking system which considers all facets of society and the

environment in pursuit of environmental sustainability and the efficient usage environmental resources (Lubin & Esty, 2010; Prakash et al., 2018; Scholtens, 2009; Sharma & Choubey, 2022). Moreover, it represents a form of lending practice wherein financial institutions take the initiative to conduct their everyday activities as conscientious citizens in society by taking internal and external environmental sustainability into consideration (Sharma & Choubey, 2022). The banks that engage in such initiatives are known as "socially aware," "sustainable," "green," or "ethical" banks (Hossain, 2020; Sharma & Choubey, 2022; Zhixia et al., 2018). Many organizations have been providing loans or remittances to developing and developed countries to maintain climate balance in order to achieve environmental sustainability. And the largest multilateral financier of climate investments in developing nations is the World Bank Group (The World Bank Group, 2021). In 2020, the World Bank Group has provided more than half of all international climate finance to developing nations, as well as more than two-thirds of financing for adaptation. Moreover, it has provided approximately \$109 billion in climate funding between 2016 and 2021, including a record \$26 billion in FY21 (The World Bank Group, 2021). Since 2017, UNEP FI has also collaborated with its members to better enable the financial sector to put the Task Force on Climate-related Financial Disclosures' recommendations into action (TCFD). UNEP FI has assumed a leadership position in the development of best practices around climate risk in the financial industry through the TCFD initiative. The TCFD initiative has produced a wide range of instruments, guidelines, and manuals to enable the financial sector to more effectively manage and disclose its climate risks (UNEP FI, 2022).

Table 1. Literature Review

Title	Author	Year	Findings
Linkage of Green Brand Positioning and Green Customer Value with Green Purchase Intention: The Mediating and Moderating Role of Attitude Toward Green Brand and Green Trust	Yong Ming Wang, Hafiz Muhammad Fakhar Zaman, and Abdul Khaliq Alvi	2022	There was a significant impact of green brand positioning and green customer value on the purchase intention. Attitude acted as a partial mediator between the green positioning and green customer value with green purchase intention.
Impact of Green Banking Initiatives on Customer Satisfaction	HMAK Herath, HMSP Herath	2022	The paper analyzed the impact of security and trust, ease of use, value creation and environmental and social concern on customer satisfaction with green banking initiatives. It is concluded that all the four factors have significant impact on the customer satisfaction.

Banking Support for Energy Security: The Customer Aspect	Nikola Milicevic, Nenad Djokic, Vera Mirovic, Ines Djokic, and Branimir Kalas	2022	This paper analyzed the impact of green banking services on users' intentions. It is observed that attitude, perceived behavioral control, and environmental consciousness have a significant impact on a user's intention to use green banking services. Moreover, attitude also has a significant impact on environmental consciousness.
Green banking initiatives: a qualitative study on Indian banking sector	Meenakshi Sharma, Akanksha Choubey	2021	Qualitative tool like interview was conducted to analysis the perception of senior level manager on green banking initiatives. It is concluded that green banking initiatives played an important role in resorting the user's trust through enhanced green brand image.
Assessing the Relevance of Green Banking Practice on Bank Loyalty: The Mediating Effect of Green image and Bank Trust	Grace Ibe-Enwo, Nicholas Igbudu, Zanete Garanti and Temitope Popoola	2019	It is concluded that there is a significant impact of green banking initiatives on green image, green trust, green loyalty. However, the green bank image has impacted green trust and green loyalty.

Source: Researcher's own contribution

Through the analysis of various past publications, it is concluded that “going green” and “sustainability” in the financial sector have been trending all over the world. After the establishment of SDG in 2015, the number of research projects has increased in the area of green banking and sustainability. Protecting the environment has become a major concern for every nation. Therefore, various initiatives have been taken at the global level, like the setting up of UNEP-FI (Adegbite et al., 2012), Global reporting initiatives (Aracil et al., 2021), equator principles (Scholtens, 2009), and sustainable goals (Sardianou et al., n.d.). In this paper, the data for bibliometric analysis has been taken from 1992 because the UNEP-FI was established in 1992, which introduced the banking sector's role in sustainable development. Moreover, in October 2022, the G-20 summit was held in Bali, Indonesia, and the focus was on climate change. So, the data has been taken from 1992 to 2022.

3. Methodology

Scientific research has increased over the last few decades, making it increasingly difficult to keep track of relevant papers in one sector (Abafe et al., 2022; Velasco-Muñoz et al., 2018). This calls for the creation of quantitative bibliometric methods capable of processing such massive amounts of data, selecting the most significant works by evaluating their impact, and elucidating the field's fundamental structure (Abafe et al., 2022; Velasco-Muñoz et al., 2018). The authors have applied the bibliometric method, which was first developed by Garfield and Sher (1963), to highlight the main themes and trends in the literature on sustainable development and green banking

(Abafe et al., 2022; GARFIELD & I.H.SHER, 1963). Bibliometric review, similar to systematic literature review, not only allows for the mapping of a large number of scientific researches (Gonzalez-Torres et al., n.d.), but also ensures the quality of data used and results produced (Nobanee et al., 2021). This technique is significant because it offers a structured overview of the literature in each research field based on unbiased criteria for evaluating and categorizing articles (Cavalcante et al., 2021). Moreover, VOSviewer software (van Eck & Waltman, 2010) has been used in this paper to graphically visualize the information using category maps related to the most influential authors, publications, documents, and countries.

The data on the researched topic was extracted on January 21, 2023, from the Scopus database, which is the most used and reliable database (Garrigos-simon et al., 2018). The Scopus database contains records of 916 documents that are related to keywords that were researched. For selecting the most relevant documents out of 916 documents related to the greening and sustainable role of the banking industry, the data was refined and exported in the CVS format. All the citation information, abstract, keywords, and bibliographical information related to relevant documents were extracted to a CVS file (Nobanee et al., 2021). The precise searched keywords are displayed below:

(TITLE-ABS-KEY ("sustainable" OR "sustainable development" OR "sustainability" OR "green") AND TITLE-ABS-KEY ("banking industry" OR "banking sector")) AND (LIMIT TO (DOCTYPE, "ar")) AND (EXCLUDE (PUBYEAR, 2023)) AND (LIMIT- TO (LANGUAGE, "English"))

Boolean operators (like AND, OR, AND NOT) were used to get the more relevant documents (Cavalcante et al., 2021). The

document type was limited to “articles” only; the language was also limited to “English” only; and publications after 2022 were excluded. Moreover, the title and abstract of the extracted articles were briefly studied to select the most relevant documents. After applying all these filters and performing a proper screening, 628 documents out of 916 were selected for further study (shown in Table 2). For the analysis of these 628 documents, VOSviewer software has been used, in which the co-authorship criterion has been used to examine the researched field’s social structure, co-occurrences to identify the most used keywords, bibliographic coupling to know the relatedness of two published articles, and citations to examine the relatedness of two or more authors and journals. Tables, graphs, and network visualizations are used to present the findings, which show publication year trends and identify the most influential authors, articles, journals, and organizations. Tabulation and graphical representation are crucial because they make it easy for viewers to understand the information.

Table 2. Methodology

Main Information about Data	
Database	Scopus
Geographical scope	Global scientific production
Document type	Articles only
Language type	English
Data range	1992-2022
Searched date	January 21, 2023
Searched terms	TITLE-ABS-KEY ("sustainable" OR "sustainable development" OR "sustainability" OR "green" AND TITLE-ABS-KEY ("banking industry" OR "banking sector"))
Final number of documents	628

Source: Researcher’s own contribution

4. Justification of this study

After reviewing various past studies, it is analyzed that the green and sustainable role of banks has been rising, and consumers are also becoming more conscious of it. The concept of sustainability has grown over time in the banking industry and refers to performing banking operations while addressing environmental, social, and governance (ESG) issues. The establishment of UNEP-FI in 1992 introduced the role of the financial sector in sustainable development. After that, various initiatives have been taken at the international level (like the introduction of equator principles, global reporting standards, and SDGs) and various agreements have been signed (like the Paris Agreement in 2015), which have boosted the sustainable role of banks. Even though the interest of researchers in this topic is growing, there is still a need for a bibliometric review

that will list the most prominent authors, journals, and documents on the researched topic. Moreover, based on this, the authors can provide future research directions for further studies. Therefore, this study is focusing on the systematic review through bibliometric analysis of publications related to the green and sustainable role of the banking sector from 1992 to 2022.

5. Data analysis

5.1. Annual trend in Publication

The first document that was identified in the Scopus database related to greening or the sustainable role of the banking sector, titled “Water for sustainable development in the twenty-first century” was published as a book article in 1993. This article discusses how banks can help finance the development of water resources. The setting up of UNEP-FI in 1992 (Adegbite et al., 2012), which has for the first time highlighted the role of the financial sector in sustainable development, has attracted the attention of researchers towards the role of the banking sector in sustainability. The number of publications from 1993 to 2010, related to the research topic remained regular, but fewer than ten articles were published every year (shown in Figure 1).

The research on the involvement of the banking sector in mitigating and managing environmental deterioration has also been stimulated by the formation of the “Green Climate Fund” in 2010. Thus, in 2011, there was growth, with 14 articles. After that, within five years, from 2011 to 2015, 100 articles were published in distinct journals. Moreover, the announcement of 17 SDGs by the United Nations in 2015 has also accelerated the growth in the number of publications from 2016 to 2022, as it can be seen from the fact that 487 articles were published in the time span of six years (2016–2022), which represents 77.55% of the total number of articles published from 1992 to 2022. Figure 1 depicts the annual trend in the number of publications on the research topic based on 628 articles retrieved. The number of published articles is the highest in 2022, with 121 published articles. The rising trend in the number of publications shows that this topic is becoming more and more popular among researchers, and there will likely be more publications on it in the upcoming years.

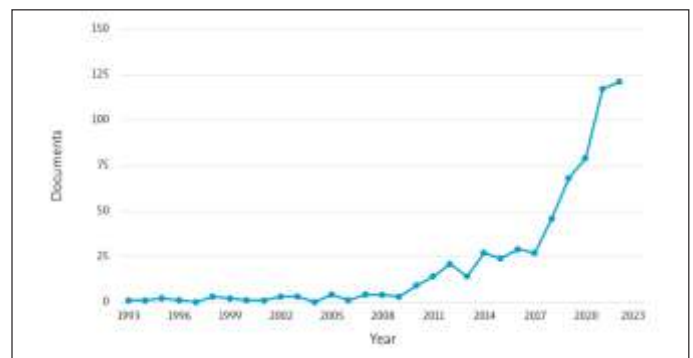


Figure 1. Number of Publications by year

Source: Researcher’s own contribution

5.2. Most prominent authors

Using the VOSviewer software, we conducted a co-authorship analysis, which is a tool used to identify the most prominent organizations and authors as well as examine their association (Velmurugan & Ramasamy, 2021). It helped us identify the leading authors and rank them by documents and citations. Identifying the most prominent author in a particular research field is crucial, as they have huge knowledge that can be used for policy formation. On the VOSviewer software, there are 1658 authors who have contributed to 628 articles. Figure 2 depicts a network visualization of the most influential authors in the field under consideration.

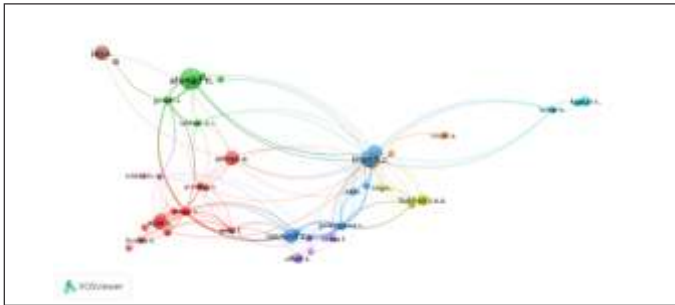


Figure 2. Network visualization of most prominent authors

Table 3 shows the list of the top ten most influential authors who have published the most articles, and it was found that Admad N. and Khan H.Z. are the most potent authors, as they have published six and five articles, respectively. Likewise, Table 4 shows the list of the top ten authors who have received the maximum number of citations, and it is seen that Weber O., who has published four articles, has received the maximum number of citations. Weber O.'s article, titled "Empirical analysis of the integration of environmental risks into the credit risk management process of European banks", alone has received 98 citations.

Table 3. Most prominent authors by documents

Rank	Author by Documents	Documents
1	Ahmad N.	6
2	Khan H.Z.	5
3	Amran A.	4
4	Aras G.	4
5	Bose S.	4
6	Iannuzzi A.P.	4
7	Jan A.	4
8	Marimuthu M.	4
9	Weber O.	4
10	Bukhari S.A.A.	3

Table 4. Most prominent authors by citations

Rank	Author by Citations	Citations
1	Weber O.	275
2	Iannuzzi A.P.	220
3	Buallay A.	186
4	Gangi F.	160
5	Ahmad N.	157
6	Birindelli G.	151
7	Savioli M.	151
8	Dell'atti S.	144
9	Khan H.Z.	137
10	Amran A.	137

Source: Researcher's own contribution

5.3. Geographical analysis of countries

The 628 publications that comprise the sample are distributed across 99 different countries for the purpose of examining the country of affiliation of authors, indicating that this study topic is international. These 99 countries have contributed at least one article in the field of study. However, for the purpose of creating a network visualization of countries, only those countries are selected that have published at least 2 documents, and 67 countries out of 99 have met the threshold limit.

The nation's co-authorship map from the sample of 628 articles is shown in Figure 3. The clusters of countries—India, China, Malaysia, Pakistan, and the United Kingdom are easily visible on the map because they account for 44.75% of all publications. The spacing between the clusters on the map and the lines connecting them illustrate the strength of the relationships between the nations and how frequently they publish as coauthors. The map offers a decent image of the degree of international collaboration in research on the banking sector and sustainability/green issues.

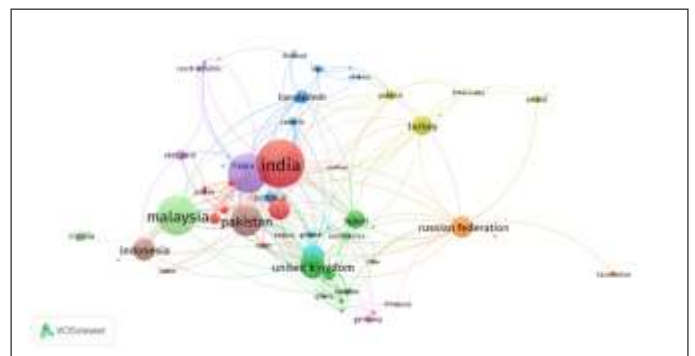


Figure 3. Network visualization of country affiliation of diverse authors

Source: Researcher's own contribution (using VOSviewer)

Table 5 lists the top 10 countries that have contributed the most articles; collectively, they represent 69% of all published articles. Analysis shows that India, with 76 total articles published between 1992 and 2022, is the nation with the largest number of papers, followed by China and Malaysia, each with 61 documents. The United States ranks seventh in terms of the total number of published documents.

Table 5. Number of documents published by countries (1992-2022)

Country name	Number of documents	Percentage of total documents
India	76	12.10%
China	61	9.71%
Malaysia	61	9.71%
Pakistan	46	7.32%
United Kingdom	37	5.89%
Indonesia	32	5.10%
United States	32	5.10%
Italy	31	4.94%
Russian Federation	31	4.94%
Turkey	28	4.46%

Source: Researcher's own contribution

5.4. Publication by Organizations

A total of 1309 organizations have contributed to the publication of 628 articles. Table 7 shows the list of the top five universities or organizations that have published two or more documents on the greening and sustainable role of the banking industry. The

Organization	Department	Documents	Citations	Citations per document
University of Central Punjab, Pakistan	Faculty of Management Studies	4	87	21.75
Comsats University Islamabad, Pakistan	Department of Management Sciences	3	113	37.67
University of Salford, United Kingdom	Civil Engineering Research Group, School of Science, Engineering and Environment	2	50	25.00
South Ural State University, Russian Federation	Department of Town Planning, Engineering Networks and Systems	2	41	20.50
Wuhan University, China	Economics and Management School	2	75	37.50

Source: Researcher's own contribution

Figure 4, created with VOSviewer, displays the network visualization of the most prominent organizations. Out of 1309 organizations from distinct nations, only 36 are interrelated, and their collaboration is shown in figure 4. When it pertains to the

number of papers published by an organization, it is evident that the occurrences are fairly dispersed, unlike what occurs in the publication of journals or countries. This is because the majority of organizations or universities have produced only one article.

Table 6. Number of citations received by countries (1992-2022)

Country Name	Citations
China	860
Malaysia	766
United Kingdom	701
Italy	644
India	616
Pakistan	550
United States	482
Bangladesh	408
Canada	397
Netherlands	368

Source: Researcher's own contribution

University of Central Punjab in Pakistan has written the most articles in the span of 30 years (1992–2022). The second organization, Comsats University Islamabad, is also from Pakistan; it has published three articles and received the most citations per document.



Figure 4. Network visualization of most influential organization
Source: Researcher's own contribution (using VOSviewer)

5.5. Publications by journals

According to the analysis, the 628 articles were published in 346 distinct journals (shown in Table 8). From the 345 journals, 70.81% (245 journals) published just one article on the topic researched, which suggests that these journals do not focus on the greening or sustainability of the banking sector; 15.03% (52 journals) issued just two articles; 6.65% (23 journals) issued three articles; 3.76% (13 journals) issued four articles; and only 3.76% (13 journals) issued five or more articles, which indicates that these journals consider sustainability concerns in the banking industry (shown in Table 8).

Table 8. Summary of articles published in each journal (1992-2022)

Articles published	Journals	% of 346
Published 1 article	245	70.81
Published 2 articles	52	15.03
Published 3 articles	23	6.65
Published 4 articles	13	3.76
Published 5 and more articles	13	3.76

Source: Researcher's own contribution

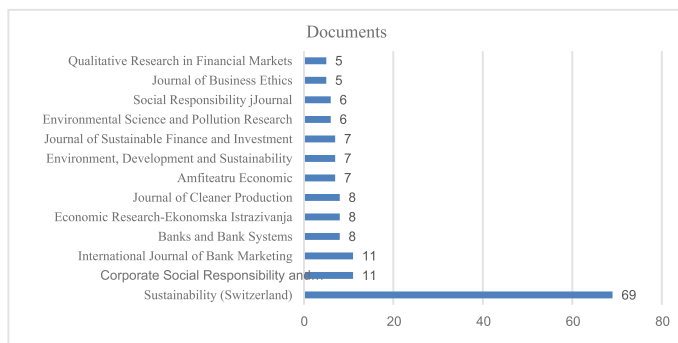


Figure 5. Journals with five and more publications

Source: Researcher's own contribution

Figure 5 shows the thirteen journals that have published five or more articles related to the greening and sustainability roles of the banking industry. These 13 journals together published 158 articles, which is 25.16% of the total number of articles researched. Moreover, the "Sustainability" journal alone has published 69 articles, making it the leader in terms of

publications related to the role of the banking sector in sustainable development. Thus, future researchers can consider these 13 journals for publication of their research work related to this sample research.

5.6. Keywords analysis

To categorize the 628 articles that make up the sample, the most popular keywords were found and examined. The subjects that come up more frequently in the investigated area stand out as a result of this analysis. Table 9 lists the top 15 keywords that have occurred the most in the analyzed documents.

Table 9. Number of keywords in co-occurrence from 1992-2022

Keywords	Co-occurrence	Cluster
Banking	157	3
Sustainability	117	3
Sustainable Development	89	1
Banking Sector	72	2
Corporate Social Responsibility	50	2
Banking Industry	32	3
Economic Growth	25	4
Finance	23	1
Financial System	23	8
Green Banking	22	2
Corporate Governance	20	2
Sustainable Banking	19	6
Profitability	19	7
Financial Crisis	18	4
Green Finance	15	1

Source: Researcher's own contribution

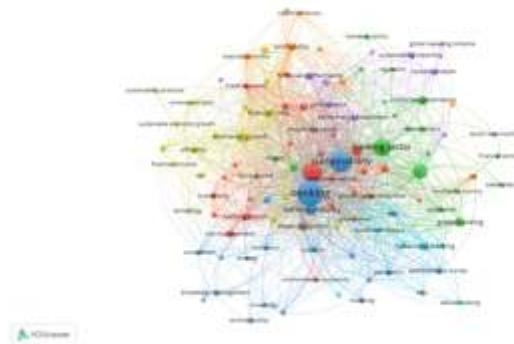


Figure 6: Keywords trends (1992-2022)

Source: Researcher's own contribution (using VOSviewer)

The map in Figure 6 creates eight clusters of keywords. The most used keywords from each cluster include: sustainable development (Cluster 1); banking sector and corporate sustainable responsibility (Cluster 2); banking and sustainability (Cluster 3); economic growth (Cluster 4); financial performance (Cluster 5); sustainable banking (Cluster 6); CSR (Cluster 7); and financial system (Cluster 8).

From the 628 articles, 2573 keywords were identified. However, for the purpose of network visualization (shown in Figure 6), the authors considered only those key terms that had co-occurred five or more times. Thus, only 134 keywords out of 2573 have met this threshold limit. In the network map of keywords, terms like sustainability, banking, banking, sector, corporate social responsibility, and financial system are more visible because they have co-occurred for the most times. The significance of this analysis is that it helped the researcher reveal the research field's development and structure. It helped in mapping the scientific literature's intellectual structure.

5.7. Bibliographic coupling

Bibliographic coupling is when two research articles cite the same article, which highlights a particular publication's strength in comparison to a group of other publications (Farrukh et al., 2020). This method can be used for authors, articles, journals, organizations, and countries (Cavalcante et al., 2021). Bibliographic coupling analysis makes it feasible to identify the articles and authors who are often cited by looking at the bibliographic coupling map.

The bibliographic coupling of authors is represented in Figure 7, which enables us to see and assess the strength of the relationship between them. Only 108 of the 1658 prolific authors who published research articles satisfied the minimal requirement of two articles when the full counting approach was used. There were eight clusters with 108 items and a total link strength of 49,868. Admad N., Iannuzzi A.P., and Khan H.Z. were the three authors who showed the highest total link strengths of 2010, 1567, and 1445, respectively. As a result, these authors worked closely together with other authors to produce research articles.

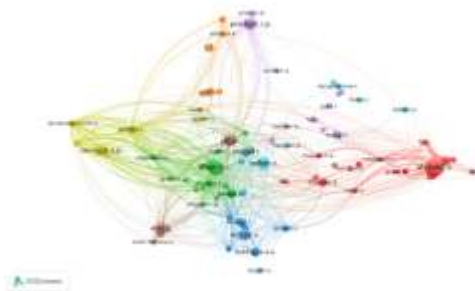


Figure 7. Bibliographic coupling by authors

Source: Researcher's own contribution (using VOSviewer)

Figure 8 shows the network visualization of bibliographic coupling by sources. A total of 346 journals produce 628 articles. However, only 101 sources have produced two or more articles, of which only 90 are connected with each other. The total link strength, created by nine distinct clusters of 90 items, is 7713. Two source journals, namely "Sustainability (Switzerland)", and "Corporate Social Responsibility and Environmental Management", from cluster 6, are showing the maximum number of total link strengths with 3049 and 1463, respectively. As a result, these two journals have strong links with other sources as well as with one another in terms of producing valuable articles.

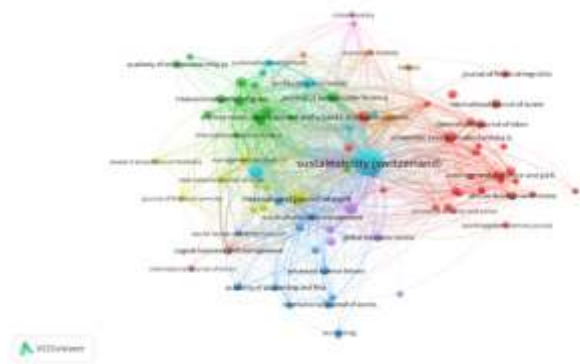


Figure 8. Bibliographic coupling by sources

Source: Researcher's own contribution (using VOSviewer)

5.8. Analysis of most cited articles

The primary goal of this research is to identify future research opportunities in the banking industry's green and sustainable role, as well as to provide a detailed overview of previous research on this topic. Since the role of the banking sector in greening the economy is still emerging in various developing nations, there is a need to identify research opportunities that can help both the financial sector and the government. As a result, the detailed analysis of the eight most cited articles is performed in this section and presented in Table 10. In the five columns, the purpose and findings of these eight articles are identified, and on the basis of those findings, some future recommendations are made that are framed in the form of research questions. However, future research should not be limited only to these recommendations; more opportunities can be identified with the development of the trend of research publications.

Table 10. Findings, purpose, and future recommendations

Title	Citation	Purpose	Findings	Recommendation for future researchers
Tracking the implementation of green credit policy in China: top-down perspective & bottom-up reform	163	To examine the execution of green credit policy at the regional and national levels.	The execution of green credit policies is not up to scratch. Vague standards of implementation, imprecise policy details, and a lack of environmental knowledge are major issues with the execution of green credit policy.	How can the coordination between the government and other financial sectors be strengthened so that effective green credit policies are made and implemented both at the national and regional level?
Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector	155	To examine the connection between ESG and the financial, operational, and market performance of the banks.	Environmental disclosure has a favorable impact on financial and market performance. CSR disclosure has a negative effect on all three performances. Corporate governance disclosure has a favorable impact on market performance but an unfavorable impact on financial and operational performance.	Can this ESG model and bank's performance model be applied to other banks globally?
Sustainable business model archetypes for the banking industry	143	To investigate sustainable business models for the banking industry.	Eight archetypes of business models are developed. Three business models, namely, "substitute with digital processes", "adopt a stewardship role", and "encourage sufficiency," are most preferred by consumers.	These eight archetype business models are developed from the point of view of the retail banking industry. Can these models be extended while considering commercial banking, corporate banking, or co-operative banking?
Sustainability disclosure in annual reports and websites: A study of the banking industry in Bangladesh	103	To know the current state of corporate sustainability disclosure in the annual reports and corporate websites of Bangladesh's banking sector. To compare the sustainability disclosure in three generations of banks.	Each of the listed Bangladeshi banks revealed at least one piece of sustainability-related information in their annual report and company website. Due to the technological advancement, the second generation of banks reveals more sustainability information.	What is the present state of sustainability disclosure in Bangladeshi banks? How can the quality of information disclosure be improved?
Empirical analysis of the integration of environmental risks into the credit risk management process of European banks	98	To conduct an examination of the integration of environmental risks into all stages of credit risk management.	The findings demonstrate that banks incorporate environmental concerns only in the rating phase of the credit management process and not in other phases like pricing, costing, and monitoring.	What is the relevance of considering the environment for the banks while giving credit? How can banks conserve the environment while engaging in responsible credit?

Corporate sustainability reporting of major commercial banks in line with GRI: Bangladesh evidence	90	To assess the trends in sustainability reporting made by the Bangladeshi commercial banks in relation to the GRI framework's global sustainability reporting metrics.	The study examined the reporting of banks in five major areas of sustainability. The results show that disclosures related to environment, labor, and work practices are more efficient as compared to disclosures related to human rights and product responsibility.	How can disclosure related to sustainability be made more transparent in the banking industry?
Corporate sustainability and financial performance of Chinese banks	90	To study the relationship between sustainability standards and the financial performance of the Chinese banks.	Fulfilling corporate sustainability has a favorable influence on a bank's financial performance. Green credit can further increase the financial performance of banks by reducing environmental risk.	Can fulfilling CSR and initiating a green credit policy reduce the environmental risk and credit risk of banks?
The changing environment of banks	86	To investigate how banks' environmental concerns have grown, their effects on the environment, their contribution to the economy, and the drivers that motivate them to develop policies for sustainable development.	The study identified that there is a huge gap in how banks respond to the sustainability needs of their stakeholders. The government's policies play a significant role in shaping the bank's actions.	What is the level of policy implementation made by UNEP and the World Bank in each nation? How can the government make a significant contribution to the greening of the banking industry?

Source: Researcher's own contribution

6. Results and Discussion

Green banking, also known as sustainable banking, has emerged as a key facilitator in combating environmental risks and global warming while laying the strong foundation for never-ending sustainable development and growth (Kissinger et al., 2019; Muchiri et al., 2022). Kissinger et al. (2019) have mentioned that the financial sector has the capacity to bridge the current green finance gap, which is the major barrier to attaining the "UN sustainable climate change" target of bringing the overall temperature down to the desired level of 1.5 degrees Celsius. Thus, the present study on bibliometric research on publications related to the green and sustainable role of the banking industry

helps in understanding the current status of research on this topic. The study has highlighted those organizations and countries that have published the maximum number of articles, as well as journals whose focus is on sustainability (particularly journals that deal with sustainability in the banking industry). Moreover, it has also analyzed the current trend in the number of publications, the trend in the most frequently occurring keywords, and the citation network of authors and journals. In a broader sense, it has been discovered that following the implementation of the SDGs, there was an increase in academic interest in the sustainability of banks, which will continue to grow over time. However, Gomez-echeverri & Gomez-echeverri (2018) mentioned that, in addition to the SDGs, the Paris

Agreement of 2015 has also significantly enhanced scholarly attention on this topic.

The analyses of the 628 articles on the researched topic, published by distinct authors, journals, and nations, show that: (a) the number of documents on sustainability in the banking sector has significantly increased from 1992 to 2022; (b) of the 1658 authors identified in this analysis, only five authors alone have received more than 1000 citations; (c) the major 13 journals, out of the 345 identified in this review, have published 158 (25.16%) articles; (d) India is the top-ranking country in terms of the maximum number of documents, while China in citations; and (e) keyword trend analysis shows that banks have been becoming conscious of the greening and sustainability of the whole banking industry. All these analyses make it crucial to identify the current research gaps and future trends in the publications related to the sustainability domain of the banking sector.

The issue of environmental change and global temperature rise has existed for a long period of time and requires proper maintenance because the world's economies are engaging in activities that strive for rapid economic growth (Muchiri et al., 2022). According to previous studies, there has been a clash between economic and environmental goals, due to which economies need sustainable mechanisms (Radulescu et al., 2022; Yip & Bocken, 2018). The analysis of various scientific publications shows that the sustainability concern has been examined from the perspectives of society, technology (Yip & Bocken, 2018), and organizations (Jeong & Park, 2017). Not only this, but because of the mounting environmental concerns, consumer demand, and regulatory pressure, it has been analyzed that banks are now concentrating on the protection of the environment by fulfilling corporate social responsibilities and adopting sustainable and green banking measures (Weber, 2014; Yip & Bocken, 2018). As a result of implementing a sustainable banking strategy and participating in sustainability disclosures, customer loyalty has increased, which provides banks with a competitive advantage (Aracil et al., 2021; Igbudu et al., 2018). Moreover, the authors have clearly asserted that there is a scope for further study on sustainability, particularly for the banking industry, due to the rising level of investments in green projects (Taghizadeh-hesary & Yoshino, 2020), innovations in the financial sector, and the emergence of new green and sustainable banking practices (Nath et al., 2014; Park & Kim, 2020).

Finally, the study reveals that there are a limited number of research publications on the green and sustainable role of the banking industry and that there is a huge scope for future researchers. Only a few studies have been conducted to learn about the customer aspect of sustainable and green banking (Bouterra & Hisham, 2020; Milicevic et al., 2023; Taneja & Ali,

2021); thus, this area can be further explored. Along with the customer aspect, sustainable and green banking can be studied from the perspective of bankers and government employees. Moreover, a comparative analysis can be done to know the improvement in the bank's performance before and after the adoption of sustainability standards. In addition to this, Table 10 lists the various recommendations for future research based on the top articles in this field. However, the study was only based on articles collected from the Scopus database, so further studies can use the combination of various databases, like Web of Science, Google Scholars, Science Direct, and many others. In addition to the keywords searched in this paper, other similar keyword combinations may also be utilized to broaden the coverage and highlight scholarly transitions.

7. Conclusion

From a global viewpoint, sustainability is a problem that is difficult to solve from a corporate, commercial, or personal standpoint. The most important worldwide environmental concern right now is probably how to mitigate and adapt to climate change. If humans wish to stop global warming and its effects like floods, rising sea levels, heat waves, and severe storms, they must dramatically reduce CO2 emissions. Thus, it is the societal duty of all to have more sensible, unbiased concerns for welfare. The concept of sustainability has evolved over time in the banking industry, and it entails conducting banking operations while addressing environmental, social, and governance (ESG) concerns. In the banking industry, there are two aspects to implementing green and sustainable banking. The first aspect involves integrating environmental and societal concerns into the bank's daily operations, like implementing sustainable policies, using energy-efficient methods, and participating in green building. While the second aspect emphasizes incorporating environmental, social, and ethical challenges into banks' basic strategies, such as through green mortgages, sustainable funds, financial inclusion, and policies related to business ethics. However, most of the nations are still in the initial stages of implementing sustainability practices in the daily operations of their banks.

The current study enhances the pool of existing scientific research by presenting the current trend in publications and identifying the gaps and future research directions with the help of a detailed literature review of the most relevant and recent published documents in this field of research. The empirical results present a detailed image of the development of sustainable and green banking in the literature across time and between various areas and publications. It can be inferred from the study that the relevance of the concept of sustainability has increased in the banking industry. Moreover, the perceptions of all the stakeholders, mainly customers, have changed, and they develop loyalty and trust only for those banks and financial

institutions that fulfill sustainability requirements and take environmental conservation initiatives. The rising number of research articles on the sustainable and green role of banks creates a positive impact on the perception of the authorities as well as customers. Between 1992 and 2022, various initiatives at the national and international level have inspired the authorities, bankers, and customers to adopt green and sustainable banking practices in their daily operations. Some of these international initiatives include the establishment of UNEP-FI, the Global Reporting Initiative, the Equator Principles, the Paris Agreement, and the Sustainable Development Goals. Therefore, in the present study, a systematic literature review through bibliometric analysis of publications (from 1992 to 2022) on the researched topic has been done, which will help future researchers to know the most prominent authors, journals, and documents in this field.

While investigating the current framework, the authors obtained a few findings that will help in directing the future course of action. First, global initiatives have significantly contributed to the concept of sustainable development, which has piqued the interest of academics over time. Second, there are a limited number of journals that consider sustainable growth in the banking industry, as most of the journals have published only one article related to this field. Thus, it is expected that journals will concentrate more on documents related to sustainability issues in the banking sector in the near future. Third, there is a scope for further research in this field as sustainability reporting standards are evolving, customers are becoming more conscious of the environment, and authorities are taking strict steps to inculcate sustainable development in daily banking operations. As a result of the findings of this study, the concept of sustainability is attracting every industry, and the banking sector plays a critical role in this because it provides the funds required to achieve sustainable development.

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UAVs - Pioneering the Future of Remote Sensing and Precision Agriculture

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Abstract

Unmanned Aerial Vehicles (UAVs) have emerged as a promising technology for remote sensing and precision agriculture applications. The rapid development of UAVs and related sensors has enabled high-resolution data acquisition, leading to new opportunities for data analysis and decision-making in various fields, including agriculture, forestry, environmental monitoring, and disaster response. In this paper, we review the state-of-the-art UAV-based remote sensing and precision agriculture research and applications, including the latest UAV technologies, sensors, and data analysis methods. We highlight the advantages and challenges of UAV-based remote sensing and precision agriculture, including data quality, processing, and interpretation. We also discuss the potential of UAVs in addressing critical global challenges, such as food security and climate change. Finally, we provide a comprehensive research paper outline for future UAV-based remote sensing and precision agriculture research, covering topics such as sensor design, data processing and analysis, and decision support systems. Our paper aims to provide insights and guidance for researchers and practitioners interested in leveraging UAVs for remote sensing and precision agriculture applications.

Keywords: UAVs, Remote sensing, Precision agriculture, Data fusion, Data storage.

1. Introduction

A. Background and Motivation

The rapid technological advancements in unmanned aerial vehicles (UAVs) have revolutionized the field of remote sensing and precision agriculture. The ability to capture high-resolution aerial imagery, obtain multispectral data, and analyze it in real-time has transformed the way we monitor crops, map land use, and gather environmental data. These technological advancements have significantly improved our ability to make informed decisions in agriculture, forestry, urban planning, disaster response, and many other fields. However, despite the enormous potential of UAVs, there are still many challenges that need to be addressed to fully realize their potential.

B. Overview of Unmanned Aerial Vehicles (UAVs)

UAVs, also known as drones, are aerial vehicles that are remotely or autonomously piloted. They come in various sizes and shapes, from small handheld drones to large fixed-wing aircraft. They are equipped with sensors such as cameras, multispectral sensors, and LIDAR that capture high-resolution imagery and data from the air. UAVs are used in a wide range of applications such as surveying, monitoring, mapping, and surveillance.

C. Objectives and Scope of the Paper

The objective of this paper is to provide an overview of UAV technology, its applications in remote sensing and precision agriculture, and the challenges that need to be addressed. This paper will review the recent literature on UAV-based remote sensing and precision agriculture, highlighting the advancements in UAV technology, the applications of UAVs in agriculture, and the challenges and opportunities that arise with this technology. The scope of this paper includes a comprehensive review of the literature on UAVs in remote sensing and precision agriculture, as well as a critical analysis of the challenges and opportunities presented by this technology.

2. Applications of UAVS In Remote Sensing

Unmanned Aerial Vehicles (UAVs), also known as drones, have revolutionized remote sensing. These devices are equipped with sensors that can collect a variety of data, including images, video, and spectral information. The data collected can then be used for a wide range of applications, including environmental monitoring, mapping, and precision agriculture.

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Fig. 1. Aerial image of a crop field captured by a UAV, showing the vegetation index values and highlighting areas of concern for precision agriculture.

One of the key advantages of using UAVs for remote sensing is their ability to access hard-to-reach areas. For instance, they can be used to monitor forest fires, track the migration of animals, and assess the impact of natural disasters. In addition, UAVs can capture images with higher resolution than traditional satellite imagery. This makes it possible to see details such as individual trees, crops, and even soil moisture levels.

UAVs are also being used extensively in precision agriculture. By collecting data on crop health, yield, and growth patterns, farmers can optimize their operations and reduce waste. UAVs equipped with Near-Infrared (NIR) cameras can capture images that reveal plant health by measuring the amount of chlorophyll present in leaves. This data can be used to detect diseases and nutrient deficiencies, allowing farmers to take targeted action to improve crop health. Other remote sensing applications of UAVs include coastal mapping, wildlife tracking, and disaster response. In coastal mapping, UAVs can capture detailed images of shorelines and coastal habitats, which are critical for conservation efforts. In wildlife tracking, UAVs are used to monitor the movement patterns of animals, helping to understand their behavior and ecology. In disaster response, UAVs are used to assess damage and provide real-time information to emergency responders.

Overall, the applications of UAVs in remote sensing are vast and varied. These devices are playing an increasingly important role in monitoring and managing our natural resources, and are poised to transform a wide range of industries, including agriculture, conservation, and emergency response.

A. Overview of remote sensing and UAVs

Remote sensing refers to the collection of data from a distance, typically through the use of sensors. These sensors can be located on the ground, in aircraft, or even in space. The data collected is analyzed to provide information about the environment being observed. Remote sensing has become

increasingly important in many fields, including agriculture, forestry, and environmental management.

Unmanned aerial vehicles (UAVs), also known as drones, have emerged as a valuable tool for remote sensing. They offer a flexible and cost-effective way to collect data from a variety of environments, and can be equipped with a range of sensors, including cameras, LiDAR, and multispectral scanners.

B. UAV-based remote sensing of natural environments

One notable application of UAV-based remote sensing is in the monitoring of natural environments. The Super-Sauze case study is an excellent example of how UAVs can be used to monitor a mountainous area for erosion and other environmental changes. In this case, the UAV was equipped with a high-resolution camera and flown over the area to capture detailed images. The images were then analyzed to identify areas of erosion and other changes.

Other examples of UAV-based remote sensing in natural environments include the monitoring of forests for insect infestations and the tracking of wildlife populations. UAVs can provide detailed information about these environments that would be difficult or impossible to obtain through traditional ground-based methods.

C. UAV-based remote sensing in precision agriculture

UAV-based remote sensing is also being increasingly used in precision agriculture. The use of UAVs for crop monitoring and surveillance can help farmers make informed decisions about their crops, leading to improved yields and reduced costs.

One common method of crop monitoring is through the use of NIR-Green-Blue digital photographs. These photographs can be used to identify areas of stress in crops, such as those caused by disease or water stress. Spectrometric and stereoscopic imagery can also be used to provide detailed information about crop health and growth.

Other applications of UAV-based remote sensing in precision agriculture include the monitoring of soil moisture levels and the detection of crop damage from pests or weather events.

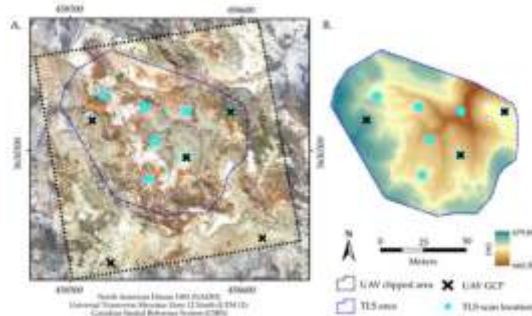


Fig. 2. 3D reconstruction of a landscape using data fusion from multiple UAV sensors, showing the accuracy of the resulting model.

Overall, UAV-based remote sensing is a rapidly developing field with many potential applications. As the technology continues to improve and become more accessible, it is likely that we will see even more innovative uses of UAVs in remote sensing.

3. Advances In Uav-based Remote Sensing And Precision Agriculture

A. Multi-source measurement data fusion for 3D real reconstruction

Advancements in remote sensing technology and UAVs have enabled the generation of 3D models of real-world environments for various applications. However, the accuracy and completeness of the models depend on the quality and resolution of the acquired data. Multi-source measurement data fusion is a technique that integrates data from multiple sensors and sources to enhance the quality and accuracy of the 3D models. This technique is particularly useful for mapping and monitoring of large areas, such as forests and urban environments.



Fig. 3. Object-based classification map of a rangeland area, created using UAV imagery and demonstrating the effectiveness of the method for monitoring vegetation.

B. Low-cost multi-sensorial mobile mapping system for tree measurements

Precision forestry is an important application of UAV-based remote sensing, as it allows for accurate and efficient forest inventory and management. A low-cost multi-sensorial mobile mapping system can be used to measure tree characteristics such as diameter, height, and volume, using data obtained from UAV-based remote sensing. This system combines laser scanning, photogrammetry, and GPS to accurately map and measure trees, enabling efficient forest inventory and management.

C. Object-based classification of UAV imagery for rangeland monitoring

Rangelands cover a significant portion of the earth's surface, and are critical for the livelihoods of many communities. UAV-based remote sensing can be used to monitor and manage rangelands. Object-based classification is a technique that uses

machine learning algorithms to classify and map land cover types based on UAV imagery. This technique is useful for rangeland monitoring, as it enables the identification of vegetation cover, vegetation density, and grazing patterns.

D. High-resolution reconstruction of topography using UAVs

High-resolution topographic maps are essential for a variety of applications, such as urban planning, flood management, and natural resource management. UAVs can be used to generate high-resolution topographic maps using photogrammetry and LiDAR sensors. The accuracy of the maps depends on the resolution and quality of the data obtained by the UAVs. High-resolution topographic maps generated by UAVs can provide valuable information for various applications.

E. Visualizing and quantifying vineyard canopy using UAVs

UAV-based remote sensing can be used to monitor and manage vineyards. The vineyard canopy is a critical component of grape production, and its management is essential for the quality and yield of grapes. UAVs can be used to visualize and quantify the vineyard canopy, providing information on its structure, health, and density. This information can be used for the management and optimization of grape production.

F. Capturing micro-topography of Antarctic moss beds using UAVs

Antarctic moss beds are important indicators of climate change, and their monitoring is critical for understanding the effects of climate change on the environment. UAV-based remote sensing can be used to capture the micro-topography of Antarctic moss beds, providing valuable information on their structure and composition. This information can be used to monitor and understand the effects of climate change on the moss beds, and inform conservation and management efforts.

G. Small unmanned aircraft systems and structure-from-motion for topographic surveys

Structure-from-motion is a technique that uses photogrammetry to generate 3D models of real-world objects and environments. This technique can be used with small unmanned aircraft systems (sUAS) for topographic surveys. sUAS equipped with cameras and LiDAR sensors can be used to capture high-resolution images and data, which can be processed using structure-from-motion to generate accurate 3D models of topography.

H. High-resolution mapping of global surface water and its long-term changes

Surface water is critical for the sustenance of life on earth, and its monitoring and management are essential for human well-being. UAV-based remote sensing can be used to map and monitor surface water at high resolution and accuracy.

TABLE I. ADVANCES IN UAV-BASED REMOTE SENSING AND PRECISION AGRICULTURE

Technology	Application	Accuracy/Resolution	Data Format	Spatial Coverage
Multi-spectral UAVs	Crop health monitoring and yield prediction	< 1m GSD, 95% accuracy	GeoTIFF, NDVI RGB	100-500 acres per flight
LiDAR	Terrain modeling and crop height analysis	<10cm GSD, 1-3cm accuracy	LAS ASCII GeoTIFF	200-300 acres per flight
Thermal sensors	Crop water stress detection and mapping	<0.1Å°C accuracy	GeoTIFF, temperature values	50-100 acres per flight
Hyperspectral UAVs	Crop species classification and mapping	< 1m GSD. 80-90% accuracy	ENVI. HDF. ASCII, GeoTIFF	25-50 acres per flight
GPS-enabled UAVs	Field boundary mapping and navigation	<10cm GSD. sub- meter GPS	KML SHP, GeoTIFF, point cloud	500-1000 acres per flight

4. Data Management And Storage For Uav-based Remote Sensing And Precision Agriculture

A. Spatial and temporal spectrum integrated storage structure design:

In recent years, with the increasing amount of data generated by UAV-based remote sensing and precision agriculture, effective data management and storage have become crucial for data processing and analysis. A spatial and temporal spectrum integrated storage structure has been proposed to address this issue. This structure combines spatial and temporal information to optimize data organization and access.

Spatial information refers to the location of data, while temporal information refers to the time when data is acquired. The integration of these two types of information can improve data retrieval efficiency and reduce redundancy. For example, data acquired at the same location and time can be stored together to minimize storage space and facilitate data access. Similarly, data acquired at different times but in the same location can be grouped together for easy comparison and analysis.

The spatial and temporal spectrum integrated storage structure design includes several steps. Firstly, spatial and temporal information should be extracted from UAV-based remote sensing and precision agriculture data. Then, a hierarchical data storage model is built based on the extracted information. In this model, data is organized into different levels according to its spatial and temporal characteristics, such as location, time, and resolution. Finally, data access and retrieval methods are developed to ensure efficient and accurate data processing.

B. RS data distributed storage model based on object-oriented:

A distributed storage model based on object-oriented technology has been proposed to manage UAV-based remote sensing data. This model aims to improve data access efficiency and reduce storage redundancy.

Object-oriented technology is a programming paradigm that emphasizes the use of objects to represent and manipulate data. In this model, each data object is stored in a separate storage unit, and metadata is used to describe the object's properties and relationships with other objects. The metadata can be used to retrieve the object and to manage its storage and processing.

The distributed storage model based on object-oriented technology has several advantages. Firstly, it can handle large amounts of data by distributing the data across multiple storage units. Secondly, it can improve data access efficiency by enabling parallel processing and distributed data retrieval. Thirdly, it can reduce storage redundancy by eliminating duplicate data.

C. RAM-Drive cloud-based strategy for high-resolution RS data storage and computation integration:

A RAM-Drive cloud-based strategy has been proposed to store and process high-resolution UAV-based remote sensing data. This strategy combines the advantages of cloud computing and RAM-Drive technology to achieve high-speed data processing and storage.

RAM-Drive technology is a type of storage technology that uses RAM as a temporary storage space. This technology can achieve high-speed data access and processing, making it suitable for handling large amounts of data.



Fig. 4. Visualization of vineyard canopy using a UAV-generated digital surface model, allowing for identification of potential disease hotspots and yield prediction.

The RAM-Drive cloud-based strategy includes several steps. Firstly, UAV-based remote sensing data is uploaded to a cloud server. Secondly, the data is stored in the RAM-Drive of the cloud server. Thirdly, data processing and analysis are performed using the RAM-Drive technology. Finally, the processed data is stored back in the cloud server.

The RAM-Drive cloud-based strategy has several advantages. Firstly, it can achieve high-speed data processing and storage, which is essential for handling large amounts of data. Secondly, it can reduce the need for local storage and computing resources, making it more cost-effective. Thirdly, it can enable real-time data processing and analysis, making it suitable for time-sensitive applications such as precision agriculture.

5. Future Directions And Challenges

A. Emerging trends and future directions:

UAV technology has rapidly evolved in recent years, and it is expected that this trend will continue in the future. One emerging trend is the use of swarm technology, where multiple UAVs can work together to cover a larger area and collect data more efficiently. Another emerging trend is the integration of artificial intelligence (AI) and machine learning (ML) algorithms, which can help automate the data collection and analysis process. Additionally, there is a growing interest in the use of hyperspectral sensors, which can provide more detailed information about the environment being studied.

Looking towards the future, it is likely that UAVs will become even more sophisticated and integrated with other technologies. For example, they may be combined with ground-based sensors or autonomous ground vehicles to create a more comprehensive monitoring system. Furthermore, as UAVs become more affordable, it is expected that their use will expand to new industries and applications, such as infrastructure inspection and disaster response.

B. Key challenges and limitations:

Despite the many benefits of UAV-based remote sensing and precision agriculture, there are still several key challenges and limitations that need to be addressed. One major challenge is the issue of regulatory compliance, as many countries have strict regulations regarding the use of UAVs for commercial purposes. Additionally, there are still technical limitations, such as limited flight time and range, and the need for more sophisticated sensors and data processing tools.

Another key challenge is the need for more efficient and effective data management and analysis strategies. As the amount of data collected by UAVs continues to grow, it is becoming increasingly difficult to manage and analyze this data in a timely and cost-effective manner. Furthermore, there is a need for more robust and reliable data storage and sharing systems that can ensure data security and privacy.

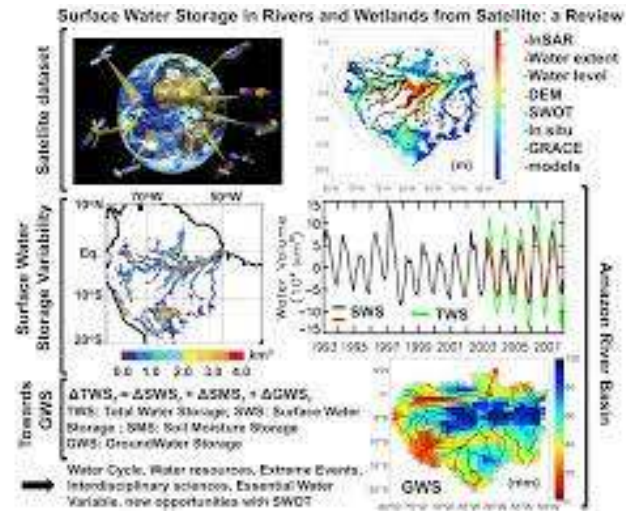


Fig. 5. High-resolution map of surface water distribution created using UAV imagery, highlighting changes in water bodies over time.

C. Strategies for overcoming limitations and addressing challenges:

To overcome the limitations and challenges facing UAV-based remote sensing and precision agriculture, several strategies can be employed. One strategy is to work closely with regulatory agencies to ensure compliance with regulations and to advocate for changes that would allow for more widespread use of UAVs. Another strategy is to continue to invest in research and development to improve UAV technology, such as developing longer-lasting batteries or more advanced sensors.

Additionally, there is a need to develop more effective data management and analysis strategies, such as using AI and ML algorithms to automate data processing and analysis. To address issues of data storage and sharing, there is a need to develop more secure and efficient cloud-based storage solutions that can handle the large amounts of data generated by UAVs.

Finally, it is important to collaborate with stakeholders from different industries and sectors to develop comprehensive monitoring systems that can integrate data from UAVs with other sources of information. By working together, it may be possible to develop more effective solutions to the challenges facing UAV-based remote sensing and precision agriculture, and to unlock the full potential of this technology for the benefit of society.

6. Conclusion

A. Summary of the main points

This paper has presented an overview of the applications of unmanned aerial vehicles (UAVs) in remote sensing and precision agriculture, and discussed recent advances in UAV-

based remote sensing and precision agriculture. The paper has also highlighted some key challenges and limitations associated with UAV-based remote sensing and precision agriculture, and proposed strategies for addressing these challenges.

In terms of applications, UAV-based remote sensing has been found to be highly effective in natural environment monitoring and precision agriculture. Case studies such as Super-Sauze have demonstrated the potential of UAV-based remote sensing for applications such as monitoring soil moisture, vegetation health, and land use changes. UAV-based precision agriculture has shown promise for crop monitoring and decision support, with imaging technologies such as NIR-Green-Blue digital photographs and spectrometric, stereoscopic imagery being used for precision agriculture.

Recent advances in UAV-based remote sensing and precision agriculture have shown great potential for 3D real reconstruction, tree measurements, rangeland monitoring, topography mapping, vineyard canopy quantification, and micro-topography capturing. In addition, high-resolution mapping of global surface water using UAVs has the potential to provide valuable insights for climate change and water resource management.

B. Concluding remarks and recommendations for future research

The use of UAVs in remote sensing and precision agriculture is still in its early stages, and there is great potential for future research in this field. However, there are also some key challenges and limitations that need to be addressed in order to realize the full potential of UAV-based remote sensing and precision agriculture.

One of the key challenges is the management and storage of large volumes of remote sensing data generated by UAVs. Spatial and temporal spectrum integrated storage structure design, RS data distributed storage model based on object-oriented, and RAM-Drive cloud-based strategy for high-resolution RS data storage and computation integration are some of the strategies that can be used to overcome this challenge.

Another challenge is the need for better data processing and analysis methods that can handle the large volumes of remote sensing data generated by UAVs. Machine learning algorithms and object-based classification of UAV imagery have shown promise in this regard.

In addition, there is a need for better integration of UAV-based remote sensing with other data sources such as ground-based sensors and satellite remote sensing. This would enable more comprehensive monitoring and analysis of natural environments and precision agriculture.

Future research in UAV-based remote sensing and precision agriculture should also focus on developing more sophisticated UAV platforms that can operate in different weather conditions and environments, and can carry a wider range of sensors. Finally, there is a need for more research on the economic and social implications of UAV-based remote sensing and precision agriculture, and the potential impact on farming practices and rural communities.

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Role of sustainable development goals in business and economics transformation

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Abstract

Paper emphasize the role of workable expansion in Uttar Pradesh Moradabad region. 'Transforming the political era and business era from last two years – after covid effect development goals include ethical, economic and political environment and that why it has shown change in corporate social responsibility. Thus we can state that sustainable development goals are the important drivers for critical analysing the vision and strategic tools for governance management.

After discussing the goals paper critically analyse the CSR goals, paper also elaborates on corporations for Sustainable Change Areas & sustainable performance management systems. The integrate political objectives with economic ambitions. The goal of the article is to investigate how the SDGs might support corporate ethics and an ethical economy by mobilising private sector, governmental, and non-governmental organisations.

The SDGs primarily depend on the institutions that use resources in an unsustainable manner, and some of the actions they suggest even serve to support present trends toward less sustainability, according to our analysis of the potential SDC emphasis for institution construction. We end by highlighting the strategic relevance of the SDGs for visions, research, and practises of forward-looking transformative change towards sustainability, despite finding that the SDGs have limited transformative potential from an analytical standpoint.

Keywords: *Economic growth rate, regression analysis of MBD region, Sustainable development, CSR, strong ethical and political policy.*

1. Introduction

SDGs are essential to business and economics transformation as they promote fiscal growth, conservation sustainability, social responsibility, innovation, and risk management. By aligning themselves with the SDGs, businesses can contribute to a more supportable future while also creating new growth opportunities and building sturdier associations with their stakeholders.

The sustainable development goals (SDGs) are critical to business and economics transformation for several reasons:

Economic growth: The SDGs aim to promote sustainable economic growth by focusing on key areas such as infrastructure development, energy efficiency, and job creation. Businesses that align themselves with SDGs can benefit from new growth opportunities and contribute to economic development.

Environmental sustainability: The SDGs promote environmental sustainability by protecting natural resources, and promoting

clean energy. Businesses that adopt sustainable practices can reduce their conservational impression and contribute to a more sustainable future.

Social responsibility: The SDGs promote social responsibility by setting targets for reducing poverty, promoting gender equality, and improving access to healthcare and education. Businesses that prioritize social responsibility can build trust with customers, employees, and stakeholders and create positive social impacts.

Innovation: The SDGs can inspire innovation by encouraging businesses to develop new products and services that address social and environmental challenges. **Risk management:** The SDGs can help businesses manage risks by identifying and addressing social and environmental hazards that can influence their operations and reputation. By incorporating viable follows into their operations, businesses can reduce their exposure to risks and protect their long-term viability.

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Sustainable development is essential for achieving a better economic condition for several reasons:

Long-term economic growth: Sustainable development takes into account the long-term impact of economic activities on the environment and society. By promoting sustainable practices, we can ensure that economic growth is sustainable and can continue in the long term, without depleting natural resources or damaging the environment.

Improved resource efficiency: Sustainable development encourages the efficient use of resources, reducing waste and improving productivity. By optimizing resource use, we can achieve better economic outcomes while reducing our impact on the environment.

Resilience to economic shocks: Sustainable development promotes economic resilience by diversifying economic activities and reducing dependence on finite resources. This enables economies to withstand economic shocks and disruptions, reducing the risk of economic instability.

Enhanced social inclusion: Sustainable development recognition and equity, ensuring that economic growth benefits all members of society. By promoting social inclusion, we can reduce poverty and inequality, leading to more stable and prosperous communities.

Meeting global challenges: Sustainable development addresses global challenges such as climate change, biodiversity loss, and resource depletion, which have significant economic implications. By addressing these challenges, we can create more sustainable economic schemes that are well armed to tackle future challenges.

In summary, sustainable development is essential for achieving a better economic condition. By promoting sustainable practices, we can ensure that economic growth is sustainable, resource-efficient, and resilient, benefiting both current and future generations.

Sustainable development is essential for achieving a better business condition for several reasons:

Cost savings: Supportable observes such as energy efficiency and waste reduction can help businesses save costs by reducing their resource consumption and waste generation.

Brand reputation: Consumers are increasingly conscious of the environmental and social impact of businesses. Adopting sustainable practices can help businesses build a positive reputation among consumers, leading to increased loyalty and sales.

Improved employee engagement: Sustainable practices can improve employee engagement by creating a sense of purpose and responsibility among employees. This can lead to improved

productivity, reduced turnover, and increased job satisfaction. **Access to new markets:** Sustainability is becoming a key factor in market access and business opportunities. By assuming justifiable performs, businesses can access new markets and opportunities that prioritize sustainability.

Risk management: Sustainability risks, such as environmental and social risks, can impact business procedures and reputation. By addressing these risks, dealings recovering risks and protect their bottom line.

Innovation: Sustainable development encourages businesses to adopt innovative business models, technologies, and products. This can lead to new business opportunities, increased competitiveness, and improved profitability.

Sustainable development is essential for achieving a better business condition. By adopting sustainable practices, businesses can benefit from cost savings, improved brand reputation, better employee engagement, access to new markets, risk management, and innovation.

2. LITERATURE REVIEW

Numerous studies have highlighted the crucial role of SDGs in driving business and economics transformation towards sustainability. Here is a literature review of some key findings:

Raising Awareness and Understanding: Several studies have emphasised the rank of SDGs in raising awareness and understanding of sustainability issues among businesses and policymakers. According to Cai et al. (2018), SDGs have increased the demand for sustainable investments and sustainable business models, leading to an increased focus on sustainability in business strategies and policies.

Setting Targets and Benchmarks: The SDGs provide a clear set of targets and benchmarks for businesses to work towards. As highlighted by Bull (2018), SDGs serve as a guide for businesses to align their activities with sustainable development priorities towards sustainability goals.

Stimulating Innovation: According to Hahn et al. (2018), SDGs promote innovation and creativity in business. Companies are encouraged to develop new products, services, and business models that contribute to achieving the SDGs. This has resulted in the emergence of new sustainable business models, such as circular economy and social entrepreneurship.

Driving Collaboration: The SDGs promote collaboration among businesses, governments, civil society, and other stakeholders. According to Kolk et al. (2018), SDGs provide a platform for businesses to collaborate and share knowledge and resources towards achieving sustainable development goals. This collaboration is essential for creating a sustainable future.

Improving Risk Management: The SDGs provide a framework for

businesses to assess and manage sustainability risks, including environmental, social, and governance risks. As highlighted by Eccles et al. (2018), addressing sustainability risks can help productions to diminish their acquaintance to potential financial losses and reputational damage.

In conclusion, the literature review suggests that SDGs are critical in driving business and economics transformation towards sustainability. By aligning their activities with the SDGs, businesses can create price for them and society while causal to a more justifiable future.

3. Methodology

In Moradabad City, Uttar Pradesh, that are categorised as HEIs in the PPP sectors

Made up the population of the study, which used a cross-sectional research design because the size of target population is controllable and the study of census is significant method to collect data

The questionnaire was distributed to employees in public and private sector offices or the representatives of economic indicators. Through an appropriate data screening process:

Research Methodology: Survey

This section outlines the methodology for conducting a survey to explore the role of SDC in driving business and economics transformation towards sustainability.

Research Design

This research will use a cross-sectional survey design to collect data from a sample of businesses in different sectors. The survey will include specific question basically in form of close ended to collect prescribe data .

Sampling

The target population for this research is businesses operating in different sectors in a particular region or country. A convenience sampling technique will be used to select the sample for this research. The sample will comprise businesses that have adopted sustainable practices and policies aligned with the SDGs. The sample size will be determined based on the availability of businesses in the target population.

Data Collection

Data will be collected using an online survey questionnaire. The questionnaire will be designed to collect data on the following aspects:

- Awareness and understanding of the SDGs among businesses.
- Alignment of business operations with the SDGs.
- Adoption of sustainable practices and policies by businesses.

- Innovation in business towards achieving the SDGs.
- Collaboration among businesses, governments, civil society, and other stakeholders towards achieving the SDGs.
- Management of sustainability risks by businesses.

Data Analysis

The data collected from the survey will be analysed using expressive figures such as frequency distribution, mean, and standard deviation. Inferential statistics such as correlation analysis and regression analysis may be used to examine the connection between dissimilar variables.

Ethical Considerations

The research will adhere to ethical principles such as confidentiality, informed consent, and voluntary participation. The participants will be informed about the purpose of the research, and their participation will be voluntary. The data collected will be kept confidential and will be used only for the research purposes. The data will be stored securely and will be destroyed after the completion of the research.

The survey methodology outlined in this research will provide insights into the role of SDGs in driving business and economics transformation towards sustainability. The survey data will help to identify the level of awareness and understanding of the SDGs among businesses, the extent of alignment of business operations with the SDGs, the adoption of sustainable practices and policies by businesses, and the management of sustainability risks by businesses. The findings of this research will have implications for policymakers and businesses seeking to promote sustainable development

4. What Is Organizational Decline?

Failure to maintain sustainable development goals can lead to negative outcomes for businesses, including reduced sales, legal penalties, increased costs, employee turnover, and reputational damage. It is significant for organizations to prioritize sustainable development in order to ensure their long-term success.

- Consumer demand: Today's consumers are more aware and concerned about the environment and social issues. They prefer contracting companies with high impact on the environment and society. Failure to meet sustainable development goals may lead to loss of customers and declining sales.
- Legal requirements: Governments around the world are increasingly enacting laws and regulations aimed at promoting sustainable development. Failure to observe with these guidelines result in fines, lawsuits, and reputational damage.

- **Cost savings:** Adopting sustainable practices such as energy-efficient operations and waste reduction can lead to significant cost savings for businesses. Failure to adopt such practices can lead to higher operating costs and reduced profitability.
- **Employee retention:** Companies that prioritize sustainable attractive places to work by employees. Failure to prioritize sustainable development can lead to reduced employee morale, increased turnover, and difficulty attracting new talent.
- **Reputational damage:** Companies that prioritize sustainable development are seen as responsible and ethical, while those that don't are viewed as contributing to environmental and social problems. Negative publicity resulting from failure to meet sustainable development goals can lead to damage to a company's reputation and brand.

5. Morale Domain

Economical Satisfaction: The degree to which students receive from the society. **Administrator and Employment Satisfaction:** The degree to which administrators and personnel are happy with their positions within the institution. **Organizational Health:** The degree to which the institution's procedures and activities run smoothly.

SDG were adopted by the United Nations in 2015, with the aim of achieving sustainable development across the world by 2030. The 17 SDGs provide a framework for addressing social, economic, and environmental challenges faced by societies globally. The role of the private sector in achieving the SDGs is crucial, as businesses can contribute significantly to sustainable development through their products, services, and operations. This research paper aims to examine the role of SDGs in driving business and economics transformation towards sustainability.

Raising Awareness and Understanding

One of the critical roles of SDGs in driving business and economics transformation towards sustainability is raising awareness and understanding of sustainability issues among businesses and policymakers. Companies are increasingly recognizing the need to align their operations with the SDGs to address sustainability challenges. The SDGs have led to an increased demand for sustainable investments, sustainable business models, and sustainable supply chain practices.

Setting Targets and Benchmarks

The SDGs provide a clear set of targets and benchmarks for businesses to work towards. Companies are adopting sustainable practices and policies to achieve the SDGs. Companies are aligning their sustainability reporting with the SDGs to measure their growth towards accomplishing sustainability goals. The SDGs have encouraged companies to adopt sustainable business practices, such as the circular

economy and social entrepreneurship, which contribute to sustainable development.

Stimulating Innovation

The SDGs promote innovation and creativity in business. Companies are developing new products, services, and business models that contribute to achieving the SDGs. For instance, companies are developing products and services that contribute to achieving the SDGs, such as renewable energy technologies, sustainable food production, and water conservation. Companies are also adopting innovative business models that promote sustainable development, such as circular economy and social entrepreneurship.

Driving Collaboration

The SDGs promote collaboration among businesses, governments, civil society, and other stakeholders. Collaboration is essential for achieving the SDGs and creating a sustainable future. The SDGs provide a platform for businesses to collaborate and share knowledge and resources towards achieving sustainable development goals. For instance, companies are collaborating with governments and NGOs to develop sustainable supply chain practices, promote sustainable agriculture, and address human rights issues.

Improving Risk Management

The SDGs provide a framework for businesses to assess and manage sustainability risks, including environmental, social, and governance risks. Addressing sustainability risks can help trades during the reduction of operating cost reputational damage. Companies are adopting sustainable practices and policies to address sustainability risks, such as environmental impact assessments, human rights due diligence, and stakeholder engagement

6. Athletical Domain

Academic progress, growth, and progress made by students while attending the institution, as well as the opportunities made available by the institution.

- **Professional Ability and Faculty Quality:** The level of professional ability and development of the society, as well as the level of institutional support for professional development.
- **Organization Development:** The degree of social, cultural, and emotional development and enhances the educational system offer.

7. External Adaptation

Business carrier growth is the main objective of degree economic system for vocational development and the change that offered by credit bank system New policy emphasize on

interaction and adaption of institutional external learning system known as openness of economic policy. The ability to acquire resources is the main degree that institution are obtain resources from business and organization approaches

The SDGs play a critical role in driving transformation in business and economics. Here are some ways in which the SDGs are influencing business and economics transformation: Increasing awareness and understanding: The SDGs have helped raise awareness and understanding of sustainability issues among businesses and policymakers. This has led to increased focus on sustainability in business strategies, policies, and practices. Setting targets and benchmarks: The SDGs provide a clear set of targets and benchmarks for businesses to work towards. By aligning their activities with the SDGs, businesses can measure their progress towards achieving sustainability goals and improve their performance. Stimulating innovation: The SDGs provide a framework for innovation and creativity in business. Companies are encouraged to develop new products, services, and business models that contribute to achieving the SDGs.

- Driving collaboration: The SDGs promote collaboration among businesses, governments, civil society, and other stakeholders. This collaboration is essential for achieving the SDGs and creating a sustainable future.
- Improving risk management: The SDGs provide a framework for businesses to assess and manage sustainability risks, including environmental, social, and governance risks. By addressing these risks, businesses can reduce their exposure to potential financial losses and reputational damage.

SDGs are playing an increasingly important role in driving transformation in business and economics. By aligning their activities with SDC increase operational value of firm and society while contributing to a more sustainable future

Objective

1. To examine The Internal Steadiness of business Organizational
2. To understand business enactment that affected In Organisational Decline
3. To assess The Development for Betterment Of Economic System
4. To Study the problems in Economic System of Organisational Decline.

7. Encounters Of Present Developed Learning System In India

India has made significant strides in developing its learning system in recent years, with a attention on increasing access, improving quality, and leveraging technology. However, there are still several challenges that need to be talked to confirm that

the culture in India is truly inclusive and equitable for all students.

One of the main challenges facing the learning system in India is the issue of access. While there has been a significant increase in enrolment in primary education, there is still a significant disparity in enrollment rates between different regions and socio-economic groups. Children from disadvantaged backgrounds, particularly in rural areas, are more likely to drop out of school early due to factors such as poverty, lack of infrastructure, and cultural norms.

Another challenge facing the learning system in India is the subject of excellence. While the government has made efforts to improve the quality of education through measures such as curriculum reform and teacher training, there are still significant gaps in learning outcomes between students in different regions and socio-economic groups. This is partly due to a lack of qualified and trained teachers, particularly in rural areas, as well as a lack of resources and infrastructure.

Technology has the potential to play a significant role in improving the learning system in India. The government has launched several initiatives aimed at leveraging technology to improve access and quality, such as the Digital India campaign and the National e-Learning Portal. However, there are still challenges in terms of ensuring that students from disadvantaged backgrounds have access to these technologies, and ensuring that the content is relevant and effective.

In conclusion, India has made significant progress in developing its learning system in recent years, but there are still challenges. Addressing issues of access, quality, and technology can help to ensure that the learning system in India is truly inclusive and equitable for all students.

Hypotheses Development

- H1: There is a suggestively constructive effect of the organisation decline with effectiveness of organization institution
- H2: economic development strategy moderates the relationship of the organisational decline with effectiveness of organization institution.
- H3: Diversity plan regulates the association of organisation with performance of institution development
- H4: Policy controls with organization decline and performance HEIs.

Data analysis for the survey conducted in the Moradabad region on the role of Sustainable Development Goals (SDGs) in driving business and economics transformation towards sustainability can be conducted using descriptive statistics and inferential statistics. The following sections outline the types of data analysis that can be performed on the data collected from the survey.

India could face several problems if we do not maintain sustainable development:

- **Environmental degradation:** India's environment is already under stress due to pollution, deforestation, soil degradation, and water scarcity. If we do not maintain sustainable development, these problems could worsen, leading to irreversible damage to our natural resources.
- **Public health crisis:** Environmental degradation and pollution have significant public health implications, including respiratory diseases, waterborne illnesses, and exposure to toxic chemicals. If we do not maintain sustainable development, public health could deteriorate, leading to a public health crisis.
- **Economic losses:** Unsustainable development practices can lead to economic losses in the long run. For example, environmental degradation can impact tourism, agriculture, and other sectors, leading to economic losses.
- **Social unrest:** Environmental and social issues are often interconnected. If we do not maintain sustainable development, social issues such as inequality, poverty, and social exclusion could worsen, leading to social unrest.
- **Climate change impacts:** India is highly vulnerable to climate change impacts, including increased frequency and intensity of extreme weather events, sea-level rise, and reduced water availability. If we do not maintain sustainable development could worsen, leading to significant social, economic, and environmental consequences.

In summary, if we do not maintain sustainable development, India could face environmental degradation, public health crisis, economic losses, social unrest, and worsened climate change impacts. Therefore, it is crucial to prioritize sustainable development practices to ensure a better future for India.

Descriptive Statistics

Descriptive statistics will be used to summarize and describe the data collected from the survey. The following descriptive statistics can be computed for each variable:

Frequency distribution: This describes the number of responses in each category of a variable. For example, the frequency distribution of the variable "awareness of SDGs" could describe the number of businesses that are highly aware, moderately aware, and not aware of SDGs.

Measures of central tendency: This describes the central or typical value of a variable. The mean, median, and mode can be computed for quantitative variables. For example, the mean of the variable "extent of alignment with SDGs" could describe the average level of alignment of businesses with the SDGs.

Measures of dispersion: This describes the spread or variability of a variable. The standard deviation and range can be computed for quantitative variables. For example, the standard deviation of the variable "adoption of sustainable practices" could describe the degree of variation in the adoption of sustainable practices among businesses.

9. Data Collection

TABLE 1.1 SHOWING INTERNAL CONSISTENCY & RELIABILITY

	Dimensions	Respondent	Agrees	Disagrees	Average	No Response	Rank
Organisational performance	Social Responsibility	82	36.20	26.90	17.27	19.60	2.16
	Business Quality	79	41.85	30.16	24.37	4.59	1.86
	Business Resources	76	55.33	21.00	16.33	6.33	1.83
	economic Activities	85	40.66	29.76	10.90	15.67	2.03
	Development Target & Characteristics	88	32.81	41.90	11.36	14.90	2.11

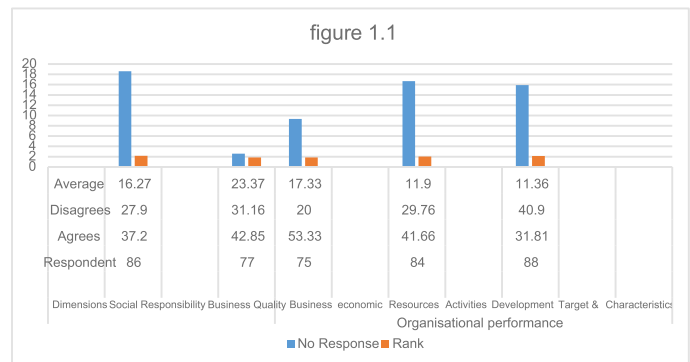
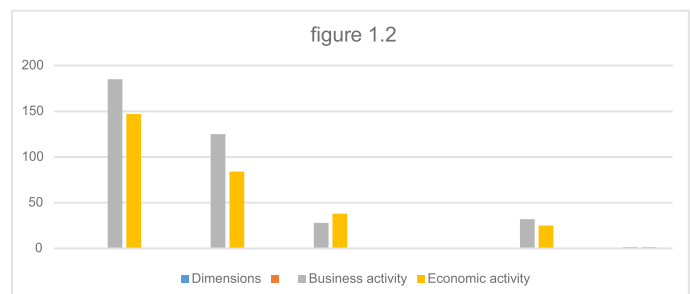


Table 1.2 Showing Academic Resources

Dimensions	Respondent	Employees related	Other Participation	Yearly Participation	Average
Business activity	185	125	28	32	1.49
Economic activity	147	84	38	25	1.59



Here is a resilient association between economic activity and business development. Economic activity refers to the production, consumption, and distribution of goods and services within an economy, while business development refers to the growth and expansion of businesses. Businesses are a crucial component of monetary movement as they are the primary producers of goods and services. As businesses grow and expand, they contribute to the overall growth and expansion of the economy. This, in turn, creates more economic activity and leads to further business development.

The relationship between economic activity and business development can be seen in several ways:

- Job creation: As businesses grow and expand, they create more job opportunities. This, in turn, leads to increased economic activity as more people are employed and have more disposable income to spend on goods and services.
- Increased investment: Economic activity attracts investment, and businesses that are growing and

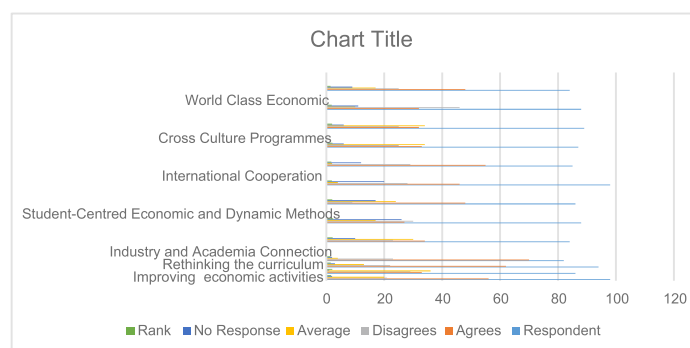
expanding are more likely to attract investment. This, in turn, leads to further business development, as businesses can use the investment to expand their operations and improve their products and services.

- Innovation: As businesses grow and expand, they are more likely to invest in research and development, leading to innovation. This can lead to new products and services, which can create new markets and further economic activity.
- Increased tax revenue: As businesses grow and expand, they generate more tax revenue for the government. This revenue can be used to fund public infrastructure and services, further stimulating economic activity.

In summary economic activity and business development has satisfactory relation. As businesses grow and expand, they contribute to the overall growth and expansion of the economy, leading to more economic activity and further business development.

Table 1.3 Showing Students Development Consistency & Reliability

Dimensions	Respondent	Agrees	Disagrees	Average	No Response	Rank
Improving economic activities	98	56	21	20	2	1.68
Creating a CSR activity	85	33	29	36	1	2.04
Rethinking the curriculum	96	61	23	11	3	1.57
Industry and Academia Connection	81	72	24	6	2	1.37
Innovative Practices	83	33	21	31	10	2.17
Student-Centred Economic and Dynamic Methods	86	28	29	18	25	2.42
To Provide Need Based Job - Oriented Courses	88	49	8.7	23	19	1.10
International Cooperation	97	45	28	5	21	2.97
Towards a New vision	89	54	30	2	11	1.72
Cross Culture Programmes	87	30	26	34	6	2.14
Quality development	89	30	28	37	6	2.00
World Class Economic	88	32	47	11	11	1.86
Personality Development	84	48	25	17	9	1.50



It is clear from Table 1.3 the respondents' understanding of student development, consistency & dependability strategy with student-centered economic & dynamic methods, and student development are more directly responsible for the loss of organisational institutions, was met with the highest degree of agreement. The degree of agreement is significant to the respondent.

Indicates that the sample population is aware of the student development consistency and reliability, but not to the same degree as the average agreement for all of the organisation strategies.

10. Proposals For Refining Quality Of Organization

1. Towards a Learning Society-

As we progress toward a learning society, every human resource activity will necessitate good contributions from experts, focusing the entire sector of organization.

2. Industry and Academia Connection-

It is required for offerer and offeree to interconnect and interlink in order to ensure curriculum and skills are in line with requirements. Skills development is a critical role in ensuring employees' academic understanding and ensuring good performance.

3. To enable the provision of specialised programmes to students, vocational and diploma courses are more alluring than general economic courses. To make these occupations more appealing to the younger population, faculties and researchers should be given enticing incentives.
4. The information age is here as the world needs more effective and affordable organization for young students and professionals, rapid changing jobs and lifelong learning is a new agenda of economic
5. A New Vision: India recognises, along with other nations, that the world is currently experiencing a period of greatly increased knowledge must cooperate to carry out concerted action for the advancement of humanity, the maintenance of peace, and rapprochement with Indian culture. Based on the data analysis conducted on the role of Sustainable Development Goals (SDGs) in business and economics transformation in the Moradabad region, the following suggestions can be made:

Increase Awareness and Understanding of the SDGs: The data analysis showed that there is a need to increase the awareness and understanding of the SDGs among businesses in the region. Therefore, initiatives such as training, workshops, and awareness campaigns can be organized to educate businesses about the SDGs and their relevance to business operations.

Promote SDG Alignment: The data analysis also revealed that the level of SDG alignment among businesses in the region needs improvement. To promote SDG alignment, businesses can be encouraged to adopt sustainable practices and policies that are aligned with the SDGs. Incentives and recognition can also be provided to businesses that demonstrate a high level of SDG alignment.

Foster Innovation: The level of innovation in business towards achieving the SDGs can be enhanced by promoting research and development initiatives that focus on sustainable technologies and products. Businesses can also be encouraged to adopt innovative business models that promote sustainability.

Encourage Collaboration: The data analysis showed that collaboration among businesses, governments, civil society, and other stakeholders towards achieving the SDGs needs improvement. Therefore, initiatives such as public-private partnerships and multi-stakeholder dialogues can be organized to foster collaboration and promote a collective approach towards achieving the SDGs.

Manage Sustainability Risks: The data analysis revealed that businesses in the region need to improve their management of sustainability risks. To manage sustainability risks, businesses can be encouraged to conduct sustainability risk assessments and develop risk management plans that incorporate sustainability considerations.

CONCLUSION

Has it been possible to address the fundamental problem of quality as a result of the quantitative growth, though? India is currently one of the nations that is developing the fastest in the globe, with an annual rate that exceeds 9%. Increases in both the number of institutions and the calibre of organization in India are necessary to maintain that rate of growth. There is a compelling need to reconsider the financial resources, access and equity, quality standards, connection, and ultimately responsiveness in order to successfully meet the long-term requirements. Certain components are especially important in order to achieve and maintain national, regional, or international quality, most notably careful employee selection and ongoing employee development, particularly through the promotion of acceptable programmes for tutorial development, along with teaching/learning methodology and quality between countries, between economic establishments and the labour market, as well as student quality within and between countries. If possible, international consultants should be brought in to help with the internal self-evaluation and external review. If implemented, the National Information Commission's report will help the economic industry grow. Moving toward an era that might be defined by the parameters of information and knowledge, we tend to have this propensity. India aims to

become a developed country and a global information power by the year 2020. We want professionals with advanced economic who will advance our economy.

We can easily and swiftly transition developing country to a developed country once it introduces experienced people to the outside world. Require a modern, liberal economical system that can change to meet the demands of a changing globe, economy, and society.

The SDGs play a critical role in driving business and economics transformation towards sustainability. By aligning their activities with the SDGs, businesses can create value for themselves and society while contributing to a more sustainable future. The SDGs have led to an increased demand for sustainable investments, sustainable business models, and sustainable supply chain practices. Companies are adopting sustainable practices and policies to achieve the SDGs. The SDGs promote innovation and creativity in business, and collaboration among businesses, governments, civil society, and other stakeholders. The SDGs provide a framework for businesses to assess and manage sustainability risks, including environmental, social, and governance risks.

Sustainable Development Goals (SDGs) have the potential to play a crucial role in transforming business and economics in the Moradabad region towards a more sustainable future. The data analysis conducted in this study revealed that there is a need to increase awareness and understanding of the SDGs among businesses in the region. Additionally, businesses need to adopt sustainable practices and policies that are aligned with the SDGs and demonstrate a higher level of innovation and collaboration towards achieving the SDGs. Finally, businesses in the region need to improve their management of sustainability risks to ensure long-term sustainability.

To achieve these objectives, it is essential to develop a multi-stakeholder approach that involves businesses, governments, civil society, and other stakeholders working together towards a common goal. Public-private partnerships can be established to promote sustainable development initiatives, and stakeholders

can engage in dialogue to foster collaboration and identify areas for improvement. By taking a collective approach, businesses in the Moradabad region can contribute to the achievement of the SDGs while also realizing the economic benefits of sustainability.

Overall, the findings of this study underscore the importance of integrating sustainability considerations into business operations and strategies. As the world faces unprecedented challenges such as climate change, biodiversity loss, and social inequality, businesses must take the lead in addressing these challenges and promoting sustainable development. By doing so, businesses can contribute to a more equitable, resilient, and sustainable future for all.

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Emerging Technologies in Marketing

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Komal Gururani **

Abstract

The vast Indian market changes quickly and frequently. Professionals are increasingly using the internet and mobile devices. With digital channels constantly increasing in number and power, change is still happening quickly. Every year, more people in India spend more time online, and the apps and websites they use have a bigger and bigger impact on their daily lives. Good marketers maintain their focus regardless of the scale of the change and make sure that their advertising strategies and talking points correspond to the places where the customer spends their time. These remarks provide us an idea of the extent of modification we have observed thus far and suggest the size of what is returning. However, according to market terms, technology is a way that helps in the distribution of a marketer's deliverables to the end user. Technology has always been evolving, from television commercials to online market and it involve digital marketing in it. Digital marketing is another word for new age marketing This paper initially provides a knowledge of emerging technology in marketing. Promoting or selling a product, service, or brand involves communicating to customers the value of that product, service, or brand. Customer loyalty, market analysis, target market selection, consumer value advertising, and market analysis are all examples of marketing techniques. This research paper will highlight new technologies influencing marketing. The research presented in this special issue on "Emerging Technologies in Marketing" explores how new technologies influence marketing practice and can inspire additional study. The traffic of people on networking websites is far more than offline marketing platforms. This research paper will discuss the pros and cons of growing technologies in the market. In order to increase our knowledge about the method of technological innovation, academics might use the conceptual framework offered here to support the growth of a field of study in strategic orientation and planning procedures. The result from this research paper consists many technologies that help the marketers for growing their market.

Keywords: *New marketing strategies, informative technologies, customer loyalty, digital marketing, expensive products.*

1. Introduction

As a social point of view, marketing serves as a bridge between society's material needs and its economic response patterns. Marketing meets these demands and objectives through establishing lasting relationships and taking part in trade activities. The percentage of marketing is equal to percentage of sales. Marketing combines the use of information technology, art, and applied science. Then technology arrived, adding a new view to traditional marketing and creating a revolution. According to the definition, technology is defined as "the creation, use, and study of tools, machinery, methods, crafts, procedures, or ways of company in order to address a challenge or carry out a particular task. However, according to marketing terms, technology is a way that helps in the distribution of a marketer's deliverables to the end user. Innovation has

always been evolving, from television commercials to online marketing and it involve digital marketing in it. Digital marketing is another word for new age marketing. Promoting or selling a product, service, or brand involves communicating to customers the value of that product, service, or brand. Customer loyalty, market analysis, target market selection, consumer value advertising, and market analysis are all examples of marketing techniques. (Adam Barone, Updated June 23, 2022, Margaret James, Yariilet Perez). Marketing functions as a link between a society's material needs and its economic reaction, patterns from a social point of view. By building long-lasting relationships and engaging in exchange activities, marketing serves these needs and goals. Utilizing information technology, art, and applied science are combined in marketing {Igor Dunayev, Serhii

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Hromov, Yuliia Tymchenko, Mariia Proskurina, (Kiev National University of Culture and Art, Oct 2022)}. From TV ads to online marketing, technology has constantly been developing. New age marketing is sometimes referred to as digital marketing. The value of a product, service, or brand must be communicated to customers in order to promote or sell it. Marketing strategies include things like consumer value advertising, market research, target market selection, and customer loyalty. Emerging technology is a key to success of helping the marketers and to promote their product through communicating to customers and making promotion easy. With today's fast innovation, success is essential. The public has been completely attracted by the products on the market. To meet the demands and wants of the market, there are several products available in the markets. The marketers have been on their toes as a result of the wants, whether they be basic, latent, or dreamed. Although there are many benefits to technology, there are also many drawbacks, therefore the idea that technology is helpful for marketing is a lie. The benefits of technology include the ability to attract new clients, automate simply follow, allow participation in online decision-making, etc. (Donald Gerwin, HBR March–April 1982, p. 107; Bela Gold, “CAM Sets New Rules for Production,” HBR November–December 1982, p. 88; Joel D. Goldhar and Mariann Jelinek, “Plan for Economies of Scope,” HBR November–December 1983, p. 141; and Robert S. Kaplan,). On the flip side, the drawbacks include being expensive and finding it challenging to manage with the short amount of time. For make the right decision, the advantages and cons of this situation must be adequately examined. When marketing is a product, the use and introduction of technology at the appropriate time is crucial. Personal selling is most important at the introduction period of any new competitor, whether it be a product or a service. However, when a product develops and needs to be maintained, technology becomes more important. It gives a dull, dead product new life and renews the audience's perception of it. An enormous amount of money is spent on research as technology advances. This study does result in new innovations and this is referred to as a technological advance.

2. Objectives

1. To know the effective ways of digital marketing.
2. To analyze Internet of thing's infancy (IoT) in marketing.
3. To study future marketing to enhance marketing strategies.
4. To analyze VR integration with facial recognition software for marketing.
5. To study and improve customer service and conversions by utilising the power of AI.

2. EFFECTIVE WAYS OF DIGITAL MARKETING

Digital marketing has become a crucial component of companies' marketing strategy since the middle of the 2000s. Companies can directly reach consumers who really are likely to be curious in your products by tailoring their messaging to certain audiences.

Digital marketing is a powerful tool for expanding your consumer base and enhancing your brand. To reach target audiences, it entails utilising digital sites and channels like websites, social networks, google search, and email. A successful digital marketing plan can be developed using a range of techniques, such as digital marketing, SEO, PPC, and other online advertising methods.

- **Internet search engine optimization.**

SEO is the practise of improving your website's content so that it will appear more prominently in search engine listings. The ranking of your website in search engine results can be improved by utilising a variety of techniques, including targeted keywords, backlinks, content strategy, and other tactics. You'll be able to connect with more potential clients and improve your website's visibility online by optimising it for search engines.

- **Email promotion**

A great way to connect with customers and spread brand awareness is through email marketing. You can use it to foster relationships, boost engagement, and promote conversions. Making an email list, creating quality programming, and monitoring the effectiveness of your emails are all necessary first steps. Email marketing has the potential to be a potent instrument for business growth if used effectively.

- **Pay Per Click (PPC)**

Digital marketers who use paid per click (PPC) advertising charge a fee every time one of their ads is clicked. You may target particular audiences with this kind of advertising, and you can track your ROI with specific metrics and reports. PPC can be a fantastic strategy to enhance conversions by bringing focused visitors to your website. Before spending any money on internet advertising, it is crucial to have a specific plan and success plan.

- **Content Promotion**

Building relationships with potential clients through content marketing is a terrific method to interact with your target audience. In order to promote customer engagement, qualified leads, and brand awareness, it requires producing and disseminating valuable and pertinent content through your website, social media accounts, and other online platforms. A few examples of content marketing are blog, videos, e-books, and others. It is a fantastic method to present

your knowledge and educate your audience, all while increasing traffic to your website & generating leads. You can successfully reach your intended audience and boost your sales with the appropriate plan and strategies.

- **Social media promotion.**

Utilizing social media advertising can be a terrific method to grow your brand's recognition, connect with potential customers, and keep in touch with current ones. It offers a chance to communicate with current clients and forge relationships with prospective ones. Using images,

being consistent with your posting schedule, using analytics to monitor progress and modify your plan to achieve your goals, and interacting with your followers are some essential strategies for effective social media marketing.

- **Affiliate promotion**

A form of performance-based marketing called affiliate marketing pays affiliates for attracting new clients and producing sales. It's a fantastic approach to market your company, its goods and services, as well as forging profitable business partnerships. To monitor the success of an affiliate's marketing initiatives, custom URLs, logos, and text ads are used. By providing affiliates with a perk, you may expand your network and raise your profile while also boosting sales and visibility.

3. (IOT) INFANCY

Probably you've heard Nathan Mayer Rothschild's famous quote, "Who has the information, has the world." Because it enables you to establish closer seller-customer ties by utilising digital connectivity, this remark captures the essence of IoT Marketing. The first function, data tracking carried out by various linked devices, is made feasible by sensors found in IoT hardware. Data tracking has become much more streamlined, real-time, and of higher quality, enabling marketers to pinpoint precise "here-and-now" consumer behaviour and wants. Such experts are able to adjust their marketing strategies quickly and offer more individualised product promotion thanks to this insight.

For instance, smart home items such as door locks, lightbulbs, kitchen appliances, etc. can collect data on a customer's daily routines. Wellness devices are well-known IoT data sources since they may collect information about your health-related behaviour and track your movements to determine your level of activity. To stay current, product retailers use IoT to evaluate data about a product's journey from the shelf to the customer.

- **Rising opportunities by digital influencing.**

A valuable source of information for marketing is undoubtedly the "connected customer," who is rapidly becoming hyper-

connected as more devices are added, as is the case with the Internet of Things.

In the opposite direction, the use of the Internet of Things in advertising allows businesses to communicate with customers in a more relevant and personalised fashion, for example, through digital signage in real-world settings like stores or through the use of mobile or other digital devices. Marketers are paying more attention to IoT in the retail setting. According to research, a retail IoT value proposition frequently revolves around the client.

These days, marketing is heavily data-driven, and marketers are drawn to the mine site of Internet of Things data.

However, because the data used for Internet of Things marketing is frequently private, it also ranks among the places where we need to exercise particular caution. Here, new laws like the GDPR (General Data Protection Regulation) of the EU are essential.

- **Uses of IoT by marketers.**

One of the first to look at it was Marketo, a digital marketing firm that is quite involved in the data-driven field. For instance, Marketo takes into account real-time point-of-sale notifications. But we need to exercise caution. Marketing experts frequently consider the concept of ideas and campaigns. While that is significant, data professionals are aware that the major strength of data lies in its ability to recognise patterns and produce information and insights that can be put to use. Additionally, in marketing, actions are definitely not about messaging and campaigns. That's only the simple part.

- **End-to-end enhancement focused by IOT in marketing.**

We have been hearing the phrase "correct data at the right moment and location and so on for a very long time in relation to information management, the supply chain, and other areas.

Additionally, it is essential. The prospects of the Internet of Things in marketing, however, are at least as much about a number of other things than simply communications if we are to be true customer-centric and data-driven champions.

- **This is how everything is related to Internet, through the client point of view.**

- a) No matter how persuasive your communications are, if supply chains aren't operating effectively, consumer experience will suffer.
- b) In order to improve client experiences or to better arrange and exhibit the things they sell, for example in a store, marketers can use use data on customer behaviour.
- c) Real-time engagement may be the objective, but real-time optimization that goes beyond the context of the message is

even more crucial and occurs outside of the constrained marketing environment.

- d) Last but not least, obtaining pleased consumers involves more than simply the purchasing process and problem-solving.

Knowing and comprehending the consumer completely is the goal of marketing. He suits the product or service, which sells itself. Modern management is said to have been founded. (PETER DRUCKER)

- **IOT in marketing requires taking creative risks.**

IoT in marketing requires creative thinking. The real power of IoT in marketing lies inside the potential of marketers to think outside the box and optimise for their consumers in a much larger sense, irrespective of points of contact or phases in the overall customer life cycle. While this is all essential, once performed well and when trust building regarding data usage.

Better engagement and listening are a place to start. Better customer service should be obvious to clients these days; they consider it to be merely fundamental business. Better customer experiences from beginning to end are a different story. And in this situation, the Internet of Things (IoT) may have a role to play, not just in the setting of consumer-focused IoT applications, but also in corporate IoT applications that might generate straightforward value. Just one example: How frequently have you looked for a parking spot near your preferred mall or store? How simple would it be for a certain mall or store to establish a modestly priced method of allowing its clients to view available parking places within their preferred apps, perhaps even with branded content?

Or how about intelligent packaging options? Creating software that allows users to connect particular goods in novel ways that they haven't before? New approaches to product delivery? And 3D printing in the not-too-distant future? By the way, it goes without saying that there are prospects for product marketing, and that advertising is not the same as advertising messages.

5. Future marketing to enhance marketing strategies.

Partnership, which is new to both the top priorities and difficulties lists for marketers, will be the topic of our first discussion. Marketers who have switched to remote-first employment may feel isolated from their coworkers. Marketers will probably continue to leverage an evolving range of technology, like video conferencing and messaging platforms, given the interest of both employees and enterprises in continued flexible and remote work. This year, marketers' top five goals included two additional brand-new objectives: streamlining the customer journey across channels and devices and enhancing marketing ROI and attribution. The key to

achieving both of these is cooperation. The only way that marketers can provide a consistent experience at each client touchpoint is through collaboration inside the marketing organisation as well as with the sales and service divisions. It is hardly surprising that the epidemic has led to the adoption of new work-collaboration technologies by 78% of marketing businesses. Finding fresh, cutting-edge approaches to measuring marketing ROI will be made possible by coordination across marketing campaigns and activities as well as strong digital awareness. Managers should make a serious effort to enhance their measurement abilities because only 31% of marketers are entirely pleased with their ability to measure marketing ROI and performance. This year, inadequate organisational structures and processes joined collaboration as a brand-new difficulty in marketers' top five concerns. It's common for marketers to feel unprepared for the quick rate of business transformation they've seen over the past year. But it's time to take a step back and consider ways to enhance systems to better service clients, run the company internally, and spur expansion. This year, inadequate organisational structures and processes joined collaboration as a brand-new difficulty in marketers' top five concerns. It's common for marketers to feel unprepared for the quick rate of business transformation they've seen over the past year. But it's time to take a step back and consider ways to enhance systems to better service clients, run the company internally, and spur expansion.

- **Utilizing technologies that have changed consumer and quality of life.**

This is of the greatest priority. Modern technology has made life easier while also becoming more efficient. Mobile gadgets (such as mobiles, smart phones, tablets, etc.) are without a doubt one of these, whose utility is stunningly varied by a burst of applications. A excellent example are the apps from Flipkart, Amazon, and other retailers. Everything in the world is moving quickly, so whatever needs to be done must be done immediately. What people are doing is that. They have an extremely short attention span, so anything that doesn't grab their attention right away will almost certainly fail to win them over. This is where mobile devices truly shine.

Just think about how many smart phone alerts you get every hour! How many of them are also advertisements? You have an infinite number of options for consumer goods and services thanks to these deals. As a result, everything is now mobile! Be aware of the capabilities of your mobile device. That is the key idea.

- **Building relationship with customers.**

The marketing slogan "customer is king" has been in popularity for a while. But since every single person is a potential consumer and they are all unique, they each have their own standards for deciding what they will consume. They do have a wide range of

options in marketing. Customers, however, have a well-known tendency to explore various possibilities before deciding which one best suits them. And once they are aware of this, they stick to it. In other words, they stick with the brand that succeeds in winning customers.

VR integration with facial recognition.

The urge to catch attention and provide customers with something novel is a common theme among most marketing methods, which come in many shapes and sizes. Clearly, technology is important in this situation because it not only aids in the creation of the material used in advertising campaigns but also facilitates its delivery to users. The ideal tool for this job is virtual reality. Virtual reality has hundreds of applications in various areas, despite for many years being connected with entertainment and games. In fact, two-thirds of VR users are predicted to be corporate users by 2023, and marketing will likely be a major area of interest. Then comes the advantages of VR advertising it has the power to mesmerize consumers and customers. Virtual reality is a very glittery technology that undoubtedly makes an impact. People often enter an immersed encounter with high expectations since they are always keen to try out new technology. This makes it simple to impress them with your offering and leave a lasting impression. It improves the interaction in between user and a product, a virtual app is almost as effective at educating your customers about what you are giving as the actual physical object because handling anything in VR is a terrific method to understand how it works. Additionally, you may even create an emotional connection between a consumer and a product if you make the experience enjoyable and engaging. A software and a headset are the only real requirements for providing a Virtual reality experience to a user. This is whenever we are discussing physical access to events, business locations, etc. Additionally, you may publish the app online so that current VR users can download and test it remotely. VR can be used as a sales tool in addition to presenting a product or service, allowing customers to quickly move from looking at and learning about something to ordering it. As you may anticipate, this rewarding and useful experience can significantly lower the volume of requests made to sales agents.

For a few reasons, VR appears to have a promising future in this industry. First of all, the use of VR headsets is increasing steadily, with sales expected to reach 29 million units annually (8 million is the current rate). Additionally, businesses everywhere are developing their own "metaverses" based on immersive technology, which will likely drive up demand for VR experiences.

Last but not least, we should take into account trendsetters—massive brands and corporations that are implementing VR marketing and opening the door for smaller businesses to follow suit. Everyone strives to develop with new technologies since no one wants to fall behind or lose

momentum to rivals. Later in the article, we examine several examples of forward-thinking companies utilising virtual reality. Applications that enable immersive experiences can be created with a variety of uses and for a variety of VR target audiences. VR can be used, for instance, in B2B marketing. Techniques for VR marketing, the most frequent use is one that enables users to interact with, view something up close (and from many angles), and occasionally even change it (product configurators).The game branding, personalized games may be a very effective approach to increase brand awareness and introduce customers to your product in a lighter and discreet manner. Users are subjected to content that represents a corporation and its products as they concentrate on gaming. An excellent option in the current socially distant period. Virtual events are now constantly held, enabling participants from any location to wear a headset, explore a virtual event space, view presenters, and engage in social interaction (via their avatars). The usage of VR in content marketing works since the technology is one of the best visualisation tools now accessible. When presented in a headset, 3D models, graphics, movement, and sometimes even text become considerably more engaging and easy to understand. Here comes the market analysis, since most VR apps don't primarily focus on data collection from users, this is a somewhat indirect function. However, the actions and decisions users do while using these applications may be easily detected and offer useful information into a company's customer base. Despite the fact they aren't yet widely used, virtual reality advertisements are already being tested on platforms like Oculus. You can still include VR branded content and personalised adverts in your immersive app up unless a framework ad system is put into place. The examples of VR marketing, recently, Aston Martin decided to promote their brand-new high-end car (the DBX type) via a VR software for Varjo headsets. Users of the app can view the vehicle's outside and inside in amazing detail and with the finest lighting possible. VR in finance and marketing, in order to promote the use of immersive technology in the banking industry, Bank of America developed a special application for Vr Headset and Google Glass headsets. The software, which presented important information and content on the subject, was made accessible to investment managers and small enterprises. The TAITRA is a medical group with headquarters in Taiwan that is well-known for putting on events and exhibitions involving well-known corporate figures and up-and-coming healthcare entrepreneurs. Users might visit the 2020 show in person or check out over 700 distinct medical devices from various manufacturers by donning a VR headset.

7. Improvements by utilizing AI Power.

The days when a product's price and quality were the only factors that mattered are long gone. The situation has changed completely today. Customer experience is extremely important,

as product and price are no longer the only factors in success. And for that reason, an increasing number of companies are using artificial intelligence (AI) to deliver the best possible consumer experience (CX).

Businesses are now aware of how artificial intelligence (AI) may enhance customer service and meet modern consumer demands. Organizations are utilising artificial intelligence. (AI) to remove obstacles and develop more adaptable procedures.

- **Eight Ways Artificial Intelligence May Boost Overall Customer Service:**

- 1. Offer individualised customer care**

Customer service agents are entrusted with answering a lot of phone calls from clients. Whenever it comes to solving these difficulties, chatbots are crucial. In addition to giving quick responses in an instant, chatbots may free up human agents by answering a lot of consumer questions with the highest level of accuracy and human-like behaviour.

Chatbots are made to stay in the user's mind at all times, ensuring a positive experience and averting any potential issues. They can help with anything, including addressing commonly asked questions, giving advice, offering assistance with order placing, and offering tips. Your customers' perceptions of and interactions with your brand will be significantly impacted.

- 2. Boost the generation of leads**

Customers want a simple transaction that doesn't involve any difficulties when they make a purchase. Additionally, chatbots with AI capabilities can ease the procedure as much as possible. Based on their browser history, chatbots start discussions with clients to speed up the sale and sometimes even upsell after it has been made.

- 3. Constant client service(24X7)**

Customers of today expect to receive service whenever and wherever they choose. They want their preferred brands to be reachable and accommodating all year round. Businesses that fail to comprehend this basic concept risk losing potential clients. And AI-powered systems can accomplish that with ease. It enables companies to continuously provide customer care and handle problems as they come up. This suggests that clients can have their questions answered without having to wait for a response, 24 hours a day. It fosters increased client loyalty, improves brand perception, and raises customer satisfaction.

- 4. Analytical modelling**

Predictive analytics is the practice of predicting things based on statistics, data gathering, and modelling. AI is able to quickly evaluate massive amounts of data, and it use predictive analytics to produce timely, actionable insights that direct a customer's next interactions with a company.

Attempting to make the customer satisfied more meaningful and likely to result in a sale, increasing the consumer's emotional bond with a brand, and understanding how and when to communicate with each individual customer are all required.

- 5. Customized user encounters**

Giving users a personalised experience can completely transform your business. And using AI- powered algorithms is the only way to make that happen. Automated systems have a big part to play in helping clients find the information they need more quickly. Massive data sets can be analysed by AI, which can then use the results to suggest to clients appropriate content.

Customers are given product or service suggestions based on their exploring and purchase patterns by AI-powered programmes that analyse consumer data and key indicators. Businesses can utilise this information to better understand each consumer and provide them with the relevant valuable material.

- 6. Better relationships with customers**

The customer relationship of companies that have included artificial intelligence in their systems have improved. They are capable of promptly giving their clients relevant data, which enhances communication and transparency. AI-powered computers swiftly scan past goods or services and make suggestions for goods that are important to the user. As a result, customer relationships are improved and consumer interactions and experiences are streamlined across all channels.

- 7. Enable clients to make more informed choices**

Because customers now connect with brands throughout devices, individualised engagements are necessary to support the customer's decision-making process. Instant responses to consumer inquiries, thorough product or service information, and assistance in making the right choices are all features of AI-powered assistants.

- 8. Coordinated motion**

AI chatbots are excellent at responding to frequently asked inquiries from customers. They never lose motivation, which is the best part. They are available 24/7 to respond to inquiries from your consumers. All of this shortens the time customer care representatives spend on jobs and liberates people to concentrate on much more difficult activities that call for human involvement. It also expedites the settlement process by finding and presenting options quickly.

Bots are capable of offering accurate answers to particular issues. Let's say that the chatbot and the consumer have too many intricate interactions. When that occurs, the conversations are passed to a human, which gives consumers prompt solutions, creating a delighted and happy customer.

11. Conclusion

The research presented in this special issue on "New Technologies in Marketing" explores how new technologies influence marketing practise and can inspire additional study. This research demonstrates that technological innovation is spawning new sorts of data and analytic tools, develops marketing innovation, and gives rise to new marketing strategy frameworks by clarifying how technological innovation allows opportunities for social interaction among customers and enterprises. Communally, the articles included in this issue highlight the positive feedback loop that occurs when businesses implement new marketing technologies, increasing the volume and richness of market data, which then gives rise to new analytical techniques, enabling novel insights, supporting more efficient marketing decisions, and so on. The various components of our viewpoint are brought together in this section, with a focus on the most important lessons for consumers and marketing researchers. Additionally, we pinpoint a number of highly promising future research directions. These suggestions are based on our own research in the field and were inspired by the editor's work on events like the 2019, Theory + Practice in Management [TPM] conference's special session on new technologies in marketing and the 2019 European Management Academy Conference's conference. As the country of India transitions dramatically toward digitalization, so do we all. To find the greatest bargain from the sellers in India, the consumer is conducting more and more online searches.

Search engine optimization (SEO), pay per click, lead generation, digital broadcasting, content automation, e-commerce advertising, market job, social platform broadcasting, social media optimization, email explicit marketing, display advertising, e-books, optical discs, and games are some of the digital marketing strategies that are becoming more and more popular as technology advances. We are all linked today credit to social media handles, and the rising popularity of social media is opening up new chances for online marketers to connect with consumers online. Knowing the new innovations in marketing helps us realise how much new age marketers have fought to integrate marketing into daily life, and how quickly the gap is closing. Technology serves as an essential component and tool for advertisers to connect with the general public and their intended market. Businesses have received stunning benefits thanks to the marriage of innovation and promotion that would have never been possible. In the recent past, nobody has ever considered that there might be anyone else form of advertising outside newspapers.

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Unpacking the Relationship of Opportunities and Challenges with Social Entrepreneurship Performance: Analysing Mediating Role of Social Networks

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Abstract

This study aims to identify the role of opportunities and challenges in social entrepreneurship performance through the mediation role of social networks. With the help of online survey data, a sample of 250 social entrepreneurs in India was collected. Structural equation modeling was applied to the sample. The results suggest that opportunities and challenges affect social entrepreneurship performance. Beyond that, the findings suggest that social networks partially mediate the relationship between opportunities and challenges and social entrepreneurship performance. Our findings may help social entrepreneurs to have a more positive social impact on society and the development of businesses.

Keywords: social entrepreneurship performance, opportunities, challenges, social networks, social impact

1. Introduction

Social entrepreneurship has been recognized as a rapidly growing sector that can address societal challenges and create sustainable solutions. It involves the use of business models to address social, environmental, and economic problems in society. Social entrepreneurs are individuals who use their innovative ideas and business acumen to create ventures that generate social value alongside financial profits (Mair & Marti, 2006). However, social entrepreneurship faces several challenges and opportunities that impact its performance. This paper will explore these opportunities and challenges and analyze how they affect social entrepreneurship's performance.

Social entrepreneurship provides opportunities to address societal challenges that are not being addressed by the government or private sector. It has the potential to create social value by providing innovative solutions to social problems such as poverty, unemployment, and environmental degradation (Peredo & McLean, 2006). Social entrepreneurs are motivated by a desire to make a positive impact on society, and this passion fuels their innovation and creativity.

Another opportunity for social entrepreneurship is the availability of resources and funding. The growth of the social entrepreneurship sector has attracted interest from investors, philanthropic organizations, and governments. These entities provide funding, expertise, and support to social entrepreneurs to scale their ventures and increase their impact (Dees, 1998). For instance, the Skoll Foundation has invested millions of

dollars in social entrepreneurs who are tackling social problems globally. Such funding and support enable social entrepreneurs to develop sustainable models and reach more people in need.

Moreover, social entrepreneurship provides opportunities for collaboration and partnerships. Social entrepreneurs often work with other organizations, governments, and communities to achieve their goals. These collaborations enable them to leverage resources, expertise, and networks to create a more significant impact (Mair & Marti, 2006). For example, the partnership between the Grameen Bank and Danone has enabled them to provide affordable and nutritious food to low-income families in Bangladesh.

Despite the opportunities, social entrepreneurship faces several challenges that affect its performance. One of the significant challenges is the lack of a clear legal and regulatory framework. The legal and regulatory environment for social entrepreneurship is often ambiguous and fragmented, which creates uncertainty and impedes growth (Nicholls, 2006). Social entrepreneurs often struggle to access funding, register their ventures, and navigate regulatory requirements, which limits their ability to scale and impact more people.

Another challenge is the difficulty in measuring social impact. Social entrepreneurs often face challenges in demonstrating the social impact of their ventures to investors and other stakeholders. Unlike traditional businesses that measure success primarily based on financial metrics, social entrepreneurs need to measure the social value they create,

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which is often challenging to quantify (Mair & Marti, 2006). This makes it difficult for social entrepreneurs to access funding and support, as investors and donors require evidence of impact before committing resources.

Social entrepreneurship has gained immense popularity in recent years, as it involves using innovative ideas and business practices to create social impact and solve societal problems. One of the key factors that has enabled social entrepreneurs to reach and engage with a wider audience is the use of social networks. Social networks have transformed the way social entrepreneurs operate, as it enables them to connect with potential customers, collaborators, and investors, and to share their message with a large audience. As a result, the role of social networks in social entrepreneurship performance has become an important area of research.

According to a study by Zahra, Gedajlovic, Neubaum, and Shulman (2009), social networks play a critical role in the success of social entrepreneurship ventures. Social networks can help social entrepreneurs access critical resources, such as funding, knowledge, and social support, which are necessary for the success of their ventures. Social networks also provide social entrepreneurs with access to potential customers, collaborators, and mentors, who can provide valuable feedback and guidance, and help them refine their business models and strategies.

Furthermore, social networks can help social entrepreneurs build legitimacy and credibility, which are important factors for attracting customers and investors. According to the social identity theory, people tend to form their social identities based on the groups they belong to and the social categories they identify with (Tajfel & Turner, 1979). By leveraging social networks, social entrepreneurs can build their social identity and establish themselves as reputable and trustworthy players in their respective fields (Zhang & Arvey, 2009).

Social networks can also help social entrepreneurs create and disseminate social impact. By using social networks to communicate their message and engage with stakeholders, social entrepreneurs can create awareness and educate people about social problems and their solutions (Bacq & Janssen, 2011). Social networks can also help social entrepreneurs mobilize support and resources for their initiatives, and create positive social change.

Despite the potential benefits of social networks, there are also challenges associated with their use. One of the key challenges is the need to balance the desire for social impact with the need to generate revenue and sustain the business. Social entrepreneurs must carefully navigate the tension between social and economic goals, and ensure that their ventures remain financially viable while delivering social value (Mair & Marti, 2006).

Another challenge is the need to maintain authenticity and

credibility in a crowded and competitive online environment. Social entrepreneurs must be careful not to engage in "social washing" or greenwashing, which refers to the practice of making false or exaggerated claims about the social or environmental impact of a business (Lee & Park, 2018). Maintaining authenticity and credibility is essential for building trust and attracting customers and investors.

2. Literature Review

Social entrepreneurship has gained significant attention in recent years due to its potential to drive social change through innovative solutions to social problems (Mair & Marti, 2006). Social entrepreneurship has become an increasingly important approach to addressing social and environmental challenges, and it has the potential to create significant social impact (Mair & Marti, 2006). However, social entrepreneurship performance is influenced by a range of factors, including the opportunities and challenges faced by social entrepreneurs. This literature review explores the relationship between opportunities and challenges and social entrepreneurship performance.

Opportunities are key factors that can enable social entrepreneurship performance. Social entrepreneurs can identify opportunities to address social and environmental challenges and create innovative solutions to these problems (Austin et al., 2006). Opportunities can also arise from changes in government policies and regulations, social trends, technological advancements, and market developments (Mair & Marti, 2006). Access to opportunities can help social entrepreneurs to leverage their resources, develop effective strategies, and scale up their impact.

Furthermore, access to opportunities can be crucial for securing financial resources and generating revenue for social ventures (Dees & Anderson, 2006). For example, social ventures can benefit from funding opportunities, such as grants, investments, and loans, to support their growth and sustainability (Gazley & Brudney, 2007). Additionally, social entrepreneurs can leverage market opportunities to generate revenue by providing products and services that address social and environmental challenges (Klein, 2011).

On the other hand, social entrepreneurship performance can also be influenced by challenges those social entrepreneurs face. Social entrepreneurs may encounter obstacles related to funding, regulations, legal structures, and stakeholder expectations (Mair & Marti, 2006). Limited access to financial resources can pose a significant challenge for social ventures, which often struggle to attract investment and secure funding (Gazley & Brudney, 2007). Additionally, social ventures may face regulatory barriers that can limit their operations and growth (Klein, 2011).

Social entrepreneurs may also face challenges related to stakeholder expectations, particularly when it comes to

measuring social impact. Measuring social impact can be challenging, as it requires the development of appropriate metrics and indicators that capture the social value created by social ventures (Dacin, Dacin, & Matear, 2010). Moreover, social entrepreneurs may face pressure from stakeholders to prioritize financial returns over social impact, which can create tension and conflict (Mair & Marti, 2006). Finally, social entrepreneurship faces challenges related to sustainability. Many social ventures struggle to achieve financial sustainability, as they operate in markets with limited purchasing power, and the social value they create is not always easily monetized (Peredo & McLean, 2006). Additionally, social entrepreneurs often face competition from traditional businesses that may be more efficient and have more significant resources. This competition can limit the social impact of social ventures and their ability to achieve financial sustainability.

Social entrepreneurship performance is also influenced by various factors, including the use of social networks. Social networks refer to the relationships between individuals, organizations, or groups that facilitate the exchange of information, resources, and support (Lin, 1999). This literature review examines the role of social networks on social entrepreneurship performance.

Social networks play a crucial role in social entrepreneurship performance by providing access to resources, information, and support (Klein, 2011). Research has shown that social networks can facilitate access to financial resources, such as funding, loans, and grants, which are crucial for the growth and sustainability of social ventures (Gazley & Brudney, 2007; Mair & Marti, 2006). Social networks can also provide social entrepreneurs with access to specialized knowledge, expertise, and skills that can help them develop and implement effective strategies to address social problems (Dees & Anderson, 2006).

Moreover, social networks can play a critical role in creating social legitimacy and recognition for social entrepreneurship. Research has shown that social networks can enhance the credibility and reputation of social ventures by providing social entrepreneurs with access to influential individuals and organizations (Dacin, Dacin, & Matear, 2010). Social networks can also facilitate partnerships and collaborations that can help social entrepreneurs leverage their resources and reach a broader audience (Mair & Marti, 2006).

However, social networks can also present challenges and barriers for social entrepreneurship performance. For example, social networks can reinforce existing power structures and exclude marginalized communities, limiting their access to resources and opportunities (Lounsbury & Glynn, 2001). Social networks can also create homophily, where individuals tend to associate and form relationships with others who share similar characteristics and backgrounds (McPherson, Smith-Lovin, &

Cook, 2001). This can lead to a lack of diversity and inclusivity in social entrepreneurship, limiting its potential impact and effectiveness.

In conclusion, social networks play a crucial role in social entrepreneurship performance by providing access to resources, information, and support, as well as creating social legitimacy and recognition for social ventures. However, social networks can also present challenges and barriers, such as reinforcing existing power structures and creating homophily. To maximize the potential of social networks for social entrepreneurship, it is essential to develop strategies and interventions that promote diversity, inclusivity, and equitable access to resources and opportunities.

3. Research Methodology

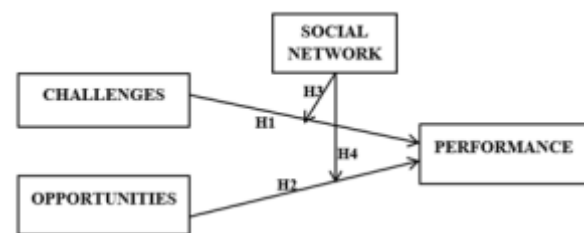


Figure 1 Conceptual Framework

The sample population was 250 social entrepreneurs and NGOs. The survey questionnaire was distributed to participants personally using simple random sampling. In all, 400 questionnaires were distributed online to social entrepreneurs and founders of NGOs, 250 (see Table I) of which were answered and returned; representing a 63% response rate.

Table I Demographic Information

Demographics	Profile	N	Percentage (%)
Gender	Male	74	29.6
	Female	176	70.4
Age	Below 25	56	23
	25-35	94	38
	35-45	45	17
	45 and above	55	22
Academic qualification	Graduate	140	56
	Post Graduate	64	26
	Other	46	18
Experience	Below 2 years	65	26
	02-05 years	97	39
	05-10 years	56	22
	Above 10 years	32	13

In this study, the affect component was utilized to evaluate entrepreneurial performance due to its appropriateness for research purposes. The measurement instrument for this component comprised of 27 items. In addition, the entrepreneurial challenges Questionnaire (CH) was employed to gauge founders' perceptions of their challenges. The CH consisted of 7 items and had a Cronbach alpha value of .87. The Opportunity Questionnaire (OP), which consisted of 7 items and

had a Cronbach alpha value of .89. was utilized to assess entrepreneurial opportunity. Social Network was measured using the social network Questionnaire (SN), which had 5 items and a Cronbach alpha value of .94. The measurement instrument used a five-point Likert scale (ranging from "strongly disagree" to "strongly agree"), with a Cronbach alpha value of .96.

Table I Demographic Information

Constructs	Factor loading		rho_A	CR	AVE	VIF
Challenges		0.876	0.891	0.898	0.756	1.534
CH1	0.911					
CH2	0.932					
CH3	0.861					
CH4	0.647					
CH5	0.879					
CH6	0.843					
CH7	0.854					
Opportunity		0.894	0.902	0.913	0.782	1.673
OP1	0.881					
OP2	0.865					
OP3	0.892					
OP4	0.834					
OP5	0.902					
OP6	0.924					
Social Network		0.945	0.949	0.953	0.876	1.584
SN1	0.846					
SN2	0.873					
SN3	0.889					
SN4	0.789					
SN5	0.898					
Performance		0.951	0.956	0.963	0.643	-
PE1	0.828					
PE2	0.941					
PE3	0.906					
PE4	0.956					
PE5	0.943					
PE6	0.856					
PE7	0.878					
PE8	0.845					
PE9	0.903					

4. Measurement Model

“The measurement of the model includes factor loading, Cronbach’s alpha, and composite reliability. The results of the factor loading, Cronbach’s alpha, composite reliability, and average variance extracted are shown in Table II. As suggested by previous researchers, the values of Cronbach’s alpha should be greater than .70, and the values of composite reliability must be greater than .80 (Li, Murad, Shahzad, Khan, & Ashraf, 2020; Neneh, 2019; Verkijika & De Wet, 2018). Therefore, Cronbach’s alpha and composite reliability for the challenges were .876 and .889, respectively; for opportunity .894 and .858, respectively; for social network .945 and .934, respectively; for performance .951 and .986, respectively. Thus, all the values met the suggested criteria for assessing the reliability of the measurement model. Moreover, convergent validity was evaluated through the average variance extracted (AVE) using standards set by Bagozzi and Yi (1989), and the values of AVE should be greater than 0.50. Hence, the AVE for the challenges was 0.756, for opportunity was 0.782, for social network was 0.876, for performance was 0.643. Consequently, all the values of AVE were greater than 0.50 and thus met the suggested criteria as well.”

5. Common Method Bias

“Harman’s single-factor test was applied to check the common method bias variance in the study (Podsakoff et al., 2003). Per Harman (1976), common method bias exists only when one factor emerges from factor analysis and explains greater than 50% of the eigenvalue of the variance. Therefore, we have used the un-rotated matrix and produced five factors and first-factor eigenvalue, explaining 40.95% of the variance. Thus, common method bias was not considered a problem in this study.”

“The structural model assessed 5,000 subsamples using bootstrap method through Smart-PLS software (Chin, 1998; Hair et al., 2012). The fitness of the structural model was evaluated by the standardized root mean square residual (SRMR) value and determination coefficient (R²). According to Henseler et al. (2016), a good model must have an SRMR value of less than 0.08. Therefore, the value of SRMR was 0.050, which shows an acceptable and adequate level of structural model fitness. Besides, Table III shows the results of the structural model, which explained 26.1% variance in social network and 42.2% variance explained in sustainable enterprise development. As suggested by Chin (1998), desired R² values must be greater than .1 or 0. Furthermore, for the predictive relevance of the model, we have applied cross-validated redundancy measure Q² for assessing the model (Stone, 1974). According to Falk and Miller (1992), Q² should be greater than zero. Table IV shows that the values of Q² exceeded 0.1 and the positive predictive significance level of the model.”

Table III Strength of Model

Constructs	R ²	Adjusted R ²
SN	0.261	0.258
PE	0.422	0.362

Table IV Cross-Validated Redundancy

Constructs	SSO	SSE	Q ² = (1 - [SSE / SSO])
SN	2563	2095.789	0.182
PE	5267	4714.532	0.104

Testing of Hypotheses

“The results of the structural model are shown in Table V and Figure 2. H1 demonstrates that challenges positively related to performance. The findings reveal that challenges have a positive and significant effect on performance ($\beta = 0.265$, $t = 4.327$, $p = .002$). Thus, H1 was accepted. Moreover, H2 explains that opportunity positively associated with performance. The outputs illustrate that opportunity has a positive and significant impact on performance ($\beta = 0.186$, $t = 3.076$, $p = .000$). Hence, H2 was supported. Meanwhile, H3 indicates that social network positively linked to performance, and results show that social network has a positive and significant impact on performance ($\beta = 0.195$, $t = 3.893$, $p = .001$). Therefore, H3 was accepted.”

Mediation Analysis

“To test hypotheses, H3b and H3c positively mediate the relationship between challenges, opportunity, and performance. The results show that social network positively and significantly has an indirect effect on the relationship between challenges, opportunity, and performance ($\beta = 0.064$, $t = 2.576$, $p = .004$; $\beta = 0.062$, $t = 2.987$, $p = .003$). In addition, mediation analysis also assessed through variance accounted for (VAF), which indicates the ratio of indirect effect to the total effect. According to Hair et al. (2010), if the value of VAF is more excellent below 0.8, it represents the partial mediation. If the value of VAF is more significant than 0.8, it indicates the full mediation. Therefore, Table VI highlights the results of VAF, which is within the threshold value below 0.8. Thus, we can confirm that the social network partially mediates the relationship between challenges, opportunity, and performance. Hence, H3b and H3c were accepted.”

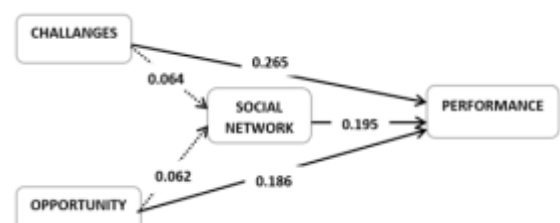


Figure 2 Structural Model

Table V Path Coefficients and Hypotheses Testing

Hypotheses	Relationships		M	SD	T		Decision
Direct effects							
H1	CH ---> PE	0.265	0.263	0.043	4.327	0.002	Supported
H2	OP ----> PE	0.186	0.189	0.052	3.076	0.000	Supported
H3	SN ----> PE	0.195	0.196	0.058	3.893	0.001	Supported
Mediating effects							
H3b	CH--->SN---->PE	0.064	0.059	0.022	2.576	0.004	Supported
H3c	OP--->SN---->PE	0.062	0.052	0.025	2.987	0.003	Supported

Table VI Mediation Analysis (Social Network as Mediator)

Exogenous Variable	Direct Effect	Indirect effect	Total effect	VAF range	Mediation	Endogenous variables	Confidence interval	97.50%
CH	0.265	0.064	0.329	17.56	Partial	PE	0.024	0.087
OP	0.185	0.061	0.256	23.45	Partial	PE	0.022	0.108

6. Discussion

“Our findings suggest that opportunity is the most influential factor in enhancing the performance of social enterprises. Individuals with a high commitment to opportunity are more likely to perform well in the social organizations and help achieve a competitive advantage. These kinds of social entrepreneurs are motivated to perform their tasks, and it is hard for the market forces to avert them from their social mission extracted from the opportunities. Similarly, we found that opportunities from social issues is a positive predictor for sustainable enterprise development, and our results are consistent with the prior study (Muscat & Whitty, 2009). Moreover, a recent cross-sectional quantitative study examined the role of the social mission on sustainable enterprise development and found that social mission positively influenced sustainable enterprise development. Therefore, our findings suggest that opportunities from social issues have a strong influence on sustainable enterprise development and results are commented (Javed et al., 2019), which indicated that social enterprises assist social entrepreneurs in solving economic and social issues. Meanwhile, we found that challenges positively influenced sustainable enterprise development. Challenges is the dynamic factor of social entrepreneurship. Innovation is the strongest element for measuring economic sustainability and helpful in tackling the economic, social, and environmental challenges faced by enterprises (Melville, 2010). This result aligns with the previous findings (Aksoy et al., 2019; Dawson & Daniel, 2010). Furthermore, our findings show that social network positively

affects sustainable enterprise development and the results are in line with Dempsey et al. (2011) and Littlewood and Holt (2018), who outlined that social network is the necessary factor of social entrepreneurship for achieving competitive advantage. Consequently, social network enterprises help entrepreneurs connect with identifying opportunities and resources in the available market. Social network supports the entrepreneur’s opportunities and challenges in forming connections with the individual to tackle social and environmental issues. The study has practical implications for policymakers, researchers, and social entrepreneurs. Our study tested the social entrepreneurship factors that help sustainable enterprises achieve maximum profitability and protect organizations from different environmental hazards. The study found that social mission has an exceptional trait of social entrepreneurship, which is associated with the aim of capable and robust mission. Therefore, individuals with a high commitment to opportunities from social issue are more likely to perform well in the social organizations and are helpful in achieving the competitive advantages. It is also indicated that social entrepreneurs resolve social issues that are directed by governments or business sectors during epidemic situations with the help of human resource innovative ideas, new product development, and competencies to accomplish sustainable enterprise solutions. Social entrepreneurs can influence on challenges through social networking among enterprises, which enhances their market value. Finally, our findings will assist the social entrepreneurs in creating competitive pressure in the market through social missions, opportunities, challenges, and practices that will boost the economy and social enterprise development.”

7. Conclusion

Social entrepreneurship faces several challenges and opportunities that affect its performance. The availability of resources and funding, opportunities for collaboration and partnerships, and the ability to address societal challenges provide opportunities for social entrepreneurship. However, the lack of a clear legal and regulatory framework, difficulty in measuring social impact, and challenges related to sustainability present significant obstacles. It is crucial to address these challenges to enable social entrepreneurs to create sustainable solutions and scale their impact, ultimately contributing to a more just and equitable society.

Social networks play a critical role in the success of social entrepreneurship ventures. They provide social entrepreneurs with access to critical resources, help them build legitimacy and credibility, and enable them to create and disseminate social impact. However, social entrepreneurs must be mindful of the challenges associated with social networks, including the need to balance social and economic goals and maintain authenticity and credibility in a crowded online environment. By leveraging social networks effectively, social entrepreneurs can create meaningful social impact and drive positive social change.

Limitation and Scope for Future Study

This study has some limitations. The main limitation is that the study did not use measures taken in the context of entrepreneurship for several variables such as social and psychological capital. We propose the development of specific tools to measure opportunities and challenges in an entrepreneurial performance context. The study also collected self-reported data, which may be biased. Therefore, further research should include other interviewees, such as owners to obtain more objective results. In the future, it is necessary to conduct systematic research on models that examine the effects of various explanatory variables such as social capital and entrepreneurial attitudes.

Declaration of Conflicting Interests

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An Analysis of Volatility with Beta Practise and R²: A Study of Nifty 50 Shares.

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Abstract

The volatility of the stock market is deterring investors from making investments in assets that will generate large returns. The objective of this paper is to estimate the beta values and R² for the securities of Nifty 50(NSE), So that traders, investors and other concerned people can understand the role of beta and R² in choosing the correct security. Here, the movement of the stock in each market is estimated using the beta value. In this study, 249 days of data covering the period from January 12, 2021, to January 12, 2022, were used. Unit root test, Volatility table. Descriptive analysis, F test and T test were applied in this research. The study's conclusions showed that data is not level or steady and that roughly 50% of the shares are highly volatile while the other shares are lowly volatile. R square has same variability but the mean of both the samples have significant difference. For making decisions on stock market investments, investors, traders, FII, and DII will find the empirical evidence from this study to be helpful.

Key Words: NSE, R square (R²), Covariance, Beta, JEL Classification; G1, G11, N2

1. Introduction

Investors constantly worry about market fluctuations or shifts in the value of capital market indices while making investments in the stock market. Price movement depends on two types of risks: systematic risk and unsystematic risk. Economically significant uncertainties give birth to systematic risk, which describes the trend of movement in stock prices and fluctuations in the stock market index. Diversification of the stock portfolio cannot be used to lower systematic risk, also known as market risk. Investors are subject to market risk even if their portfolio of assets is well-diversified. The stock's beta indicates how sensitive it is to the market index, which is the percentage by which the stock's return tends to rise or fall for every 1% change in the index's return. Beta indicates the high and low volatility of the shares. High-volatile shares are those with a beta greater than one, which are more aggressive than the market. Low-volatile stocks, in contrast, are those that have a beta below one because they are more defensive than the market index. High-beta stocks frequently carry more risks but also higher potential profits. Despite carrying less risk, low-beta equities sometimes have lesser returns. Investors should understand that beta quantifies the performance of any individual security or portfolio concerning market variabilities. Generally, investors confuse beta with standard deviation. Stocks, bonds, and other financial instruments that are reliant

on returns spread over a while are volatile, and standard deviation demonstrates this.

The unpredictability of market returns and the variability of individual stock returns both affect beta. To calculate a security's beta, one must comprehend the covariance between its return and the market return as well as the variance of market returns. Beta is related to systematic risk, which affects the entire market and cannot be controlled or dispensed with simply by differentiating one's portfolio. The simple linear regression model is used in this paper with the help of the below-mentioned equation.

$$R_i = \alpha_i + \beta_i R_m + e_i$$

When the market return is zero, the intercept of this equation, alpha (α), shows the stock return. Any positive alpha is regarded as "excellent," as it indicates that an investment outperforms the market. Beta (β) = Covariance (R_i, R_m) / Variance R market Error Term = e_i = In statistics, an error term is a measure of the discrepancy between observed data and population data.

In the Simple Linear Regression Model (SLRM), the coefficient of determination is typically used to measure the relationship's strength (R²). The correlation coefficient is frequently transformed into the coefficient of determination, also known as R², which is the correlation coefficient squared In SLRM, R² indicates the percentage of variation in the dependent variable

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(stock return) that can be measured by the independent variable (market return). Because certain factors other than the market return are generating the variation in stock return, a beta with a low coefficient of determination suggests that the beta is not very useful in explaining the movements in stock return. In the present study, we have also focused on R^2 which is a measurement of how much of a security's return is attributable to beta and alpha, as opposed to random variation.

2. Literature Review

Sanghi and Bansal (2011) compared the R-squared statistic's accuracy to beta coefficients for both defensive and offensive stocks. This study used information from the Nifty 100. It was determined that aggressive stocks not only had high beta coefficients compared to their peers but also much higher R-squared values also. Deb and Mishra (2011) This study looked at the strength of beta coefficients in the Indian security market throughout the year as well as over specific 'control periods' or sub-periods that corresponded to market bull and bear phases. They found indications of beta instability, especially over shorter time periods. As the beta estimation period lengthens, this instability is somewhat lessened. Another intriguing finding is that excessively low and high beta show slightly stronger stability than the intermediate range of beta. Dash and Sundarka (2015) examined the stationarity of beta for businesses in the car industry and related sectors under various market regimes on Indian stock exchanges. The findings showed that for all of the sample equities, the beta remained largely stationary during the various market regimes. This means that for equities in the automotive and auto-ancillary sectors on the Indian stock exchanges, beta can be regarded as stationary. Gautam and Manjunatha (2021) examined the Indian equity market's beta coefficient stability for the whole year. The beta stability issue is crucial because it establishes how well beta can anticipate future outcomes in terms of immediate practical use. It was found that there were indications of beta instability in the Indian capital market. With a few exceptions, portfolio beta remains stable on the Indian capital market. James and Edmister (1983) The purpose of this study was to ascertain if the impact of firm size can be explained by differences in trading activity between large and small organizations. The results demonstrate that there is undoubtedly a large link between business size and trading activity, but that this correlation does not explain systematic differences in the risk-adjusted returns of stocks of firms of different sizes. Shinde and Mane (2019) through an analysis of the link between risk and return and a determination of whether the predicted rate of return and its systematic risk are directly proportionate, this study sought to ascertain whether the Nobel Prize winner's model can be applied to the Indian stock market. It has been discovered that risk is the only factor influencing security returns and the relationship between risk and return is linear. According to empirical research, the

CAPM is not applicable in India, especially for the NSE at that time.

However, social networks can also present challenges and barriers for social entrepreneurship performance. For example, social networks can reinforce existing power structures and exclude marginalized communities, limiting their access to resources and opportunities (Lounsbury & Glynn, 2001). Social networks can also create homophily, where individuals tend to associate and form relationships with others who share similar characteristics and backgrounds (McPherson, Smith-Lovin, & Cook, 2001). This can lead to a lack of diversity and inclusivity in social entrepreneurship, limiting its potential impact and effectiveness.

In conclusion, social networks play a crucial role in social entrepreneurship performance by providing access to resources, information, and support, as well as creating social legitimacy and recognition for social ventures. However, social networks can also present challenges and barriers, such as reinforcing existing power structures and creating homophily. To maximize the potential of social networks for social entrepreneurship, it is essential to develop strategies and interventions that promote diversity, inclusivity, and equitable access to resources and opportunities.

Research Objectives

- To check the stationarity of data.
- To suggest to the investors about high-volatility and low-volatility shares.
- To determine whether the degree of beta coefficient reliability for highly volatile equities is noticeably higher than that for shares with moderate volatility.
- To determine each security's coefficient of determination (R^2)

Hypothesis

H01: There is a unit root among the variables.

H02: High-volatility shares are not more than 50% of the Nifty 50 index.

H03: R^2 High Volatile stocks and R^2 Low volatile stocks have the same variability.

H04: (R^2 High volatile stocks) is not significantly different from (R^2 Low volatile stocks).

3. Research Methodology

Study Period: The study period lasted from January 12, 2021, to January 12, 2022, and it employed 249 days' worth of data for all the variables. Secondary data was used in this research, which was collected from nseindia.com. Other good platforms, such as Yahoo Finance, Investing.com, and Ticker Tape, were also used.

Descriptive analysis, unit root test, simple linear regression model, F-test, and T-test were employed in this study's statistical analysis. SPSS, E-Views 12, and Microsoft Excel were utilized as research tools in this study. All the 50 stocks of the Nifty index are divided into two subsets, i.e.

- High beta stocks have a beta coefficient > 1.
- Stocks with a beta coefficient of one are considered low beta.

We compared the variability of R-squared values between high- and low-volatile stocks. To verify the equality of variances, the F test was performed. While the equivalence of R2 high volatile stocks and R2 low volatile stocks was examined using the t-test.

Analysis and Results

Unit Root Test

The essential prerequisite for performing any econometric analysis is data stationarity. If a time series does not exhibit a trend or seasonal effects, it is stagnant. If a change in time does not result in a change in the distribution's shape, a time series is said to be stationary. The unit root is a method for evaluating the temporal independence of a time series' mean, variance, and covariance. The Augmented Dickey-Fuller Test, or ADF test, is one of the most often used statistical techniques for determining whether a time series of data is stable. The Dickey-Fuller test is improved in the augmented Dickey-Fuller test. Applying the ADF test to raw data, we found the unit root exists

in the data. The probability values in the following result are all greater than 0.05 for each variable, and the t-statistic value is below each threshold of 1% and 5%, demonstrating that the data are not stationary. As a result, our first hypothesis about data stationarity is rejected.

Table 1. Unit Root Test

Null Hypothesis: Unit root (individual unit root process)

Series: ADANI_ENTERPRISES, ADANI_PORTS, APOLLO_HOSPITAL, ASIAN_PAINTS, AXIS_BANK, BAJAJ_AUTO, BAJAJ_FINANCE, BAJAJ_FINSERV, BHART_AIRTEL, BPCL, BRITANIA, CIPLA, COAL_INDIA, DIVIS_LAB, DR_REEDDY, EICHER_MOTOR, GRASIM, HCL, HDFC, HDFC_BANK, HDFC_LIFE, HERO_MOTOR, HINDALCO, HINDUSTAN_LEVER, ICICI_BANK, INDUSAND_BANK, INFOSYS, ITC, JSW, KOTAK_BANK, L_T, M__M, MARUTI, NESTLE, NIFTY_INDEX, NTPC, ONGC, POWER_GRID, RELIANCE, SBI_LIFE, SBIN, SUN_PHARMA, TATA_CONSUMERS, TATA_MOTORS, TATA_STEEL, TCS, TECH_MAHINDRA, TITAN, ULTRA_CEMENT, UPL, WIPRO

Date: 12/03/22 Time: 10:18

Sample: 11/01/2021 11/01/2022

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on AIC: 0 to 9

Total number of observations: 12610 Cross-sections included: 51

Method

Statistic Prob.**

ADF - Fisher Chi-square 109.86125... 0.2798566... ADF - Choi Z-stat -0.577247... 0.2818860...

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Table I Demographic Information

Series	Probability	Lag	Max Lag	Observations
ADANI_ENTER...	0.9809196...	1	15	247
ADANI_PORTS	0.2770430...	0	15	248
APOLLO_HOSP...	0.4248418...	0	15	248
ASIAN_PAINTS	0.2027772...	1	15	247
AXIS_BANK	0.0966039...	5	15	243
BAJAJ_AUTO	0.3405608...	0	15	248
BAJAJ_FINANCE	0.3581471...	0	15	248
BAJAJ_FINSERV	0.8029087...	0	15	248
BHART_AIRTEL	0.6776236...	0	15	248
BPCL	0.3452157...	0	15	248
BRITANIA	0.3294356...	0	15	248
CIPLA	0.9106910...	1	15	247

Series	Probability	Lag	Max Lag	Observations
COAL_INDIA	0.9178851...	0	15	248
DIVIS_LAB	0.1364303...	0	15	248
DR_REEDDY	0.1397653...	0	15	248
EICHER_MOTOR	0.9689541...	0	15	248
GRASIM	0.3599506...	3	15	245
HCL	0.5692467...	0	15	248
HDFC	0.1207685...	1	15	247
HDFC_BANK	0.0562626...	0	15	248
HDFC_LIFE	0.3085633...	0	15	248
HERO_MOTOR	0.2797463...	7	15	241
HINDALCO	0.6567442...	0	15	248
HINDUSTAN_L...	0.6338715...	0	15	248
ICICI_BANK	0.8489807...	0	15	248
INDUSAND_BANK	0.2767712...	0	15	248
INFOSYS 0.5915443...	0.5915443...	0	15	248
ITC	0.9784715...	0	15	248
JSW	0.1497127...	0	15	248
KOTAK_BANK	0.0194002..	0	15	248
L_T	0.6408848...	0	15	248
M__M	0.9754338...	0	15	248
MARUTI	0.5545356...	0	15	248
NESTLE	0.6122177...	7	15	241
NFTY_INDEX	0.2477776...	0	15	248
NTPC	0.9050224...	0	15	248
ONGC	0.3969316...	0	15	248
POWER_GRID	0.1031986...	0	15	248
RELIANCE	0.0416360...	0	15	248
SBI_LIFE	0.3956965...	0	15	248
SBIN	0.5832658...	0	15	248
SUN_PHARMA	0.8316111...	0	15	248
TATA_CONSUM...	0.0631770...	0	15	248
TATA_MOTORS	0.1638151...	0	15	248
TATA_STEEL .	0.2421993..	0	15	248
TCS	0.5588568...	0	15	248
TECH_MAHINDRA	0.8085560...	3	15	245
TITAN	0.6053691...	0	15	248
ULTRA_CEMENT	0.3644848...	0	15	248
UPL	0.0841882...	9	15	239
WIPRO	0.8156939...	0	15	248

4. Simple linear Regression Model (SLRM)

In this study, 50 stocks that make up the Nifty 50 index were categorized into two groups: shares with high volatility and shares with low volatility. Shares with a beta greater than 1 were regarded as very volatile, while shares with a beta less than or equal to 1 were regarded as having a low beta. As seen in the table below, 24 of the 50 shares fall under the category of high

volatility shares, while the remaining 26 fall under low volatility shares. So, our hypothesis is accepted that high beta shares are not more than 50%. High-beta equities may be chosen by investors with a high-risk tolerance power, to increase their return. But they also carry significant downside risk when markets decline, while targeting low-beta stocks is a great method to improve a portfolio's overall defense against volatility.

Table 2. SLRM

S.No.	Stock Name			R ²	% R ²	Reg. Significance F
1	Tata Motors	-0.0005	1.5573	0.570609	57.06093	7.11E-47
2	Bajaj Finance	0	1.4726	0.589397	58.93973	2.92E-49
3	Adani Enterprises	0.0038	1.3919	0.45607	45.60698	3.02E-34
4	Adani Ports	0.0008	1.3881	0.515452	51.54518	2.01E-40
5	IndusInd Bank	-0.0001	1.3579	0.411533	41.15334	4.88E-30
6	Tata Steel	-0.001	1.2675	0.324697	32.46972	1.15E-22
7	Hindalco	0.0004	1.2429	0.299672	29.96716	1.03E-20
8	HDFC	-0.0005	1.2111	0.574016	57.40162	2.67E-47
9	JSW	0.0001	1.19	0.323453	32.34532	1.45E-22
10	Bajaj Finserv	-0.0038	1.1886	0.049192	4.919241	0.00044488
11	Grasim	0	1.1774	0.51242	51.24203	4.33E-40
12	Tech Mahindra	-0.0013	1.1509	0.434918	43.49176	3.30E-32
13	SBIN	0.0005	1.0995	0.532586	53.25857	2.40E-42
14	Reliance	0	1.0932	0.483409	48.34085	5.29E-37
15	Titan	0.0006	1.0828	0.439335	43.93349	1.26E-32
16	I&T	0.0005	1.0801	0.5539	55.39003	7.75E-45
17	HDFC Bank	-0.0002	1.063	0.557613	55.76133	2.77E-45
18	Kotak Bank	-0.0003	1.0532	0.499403	49.94033	1.10E-38
19	HDFC life	-0.0009	1.04	0.425402	42.54021	2.58E-31
20	Axis Bank	0.0007	1.0369	0.393539	39.35386	2.00E-28
21	ICICI Bank	0.0005	1.0342	0.607653	60.76534	1.09E-51
22	Infosys	-0.0003	1.0132	0.442229	44.22286	6.65E-33
23	Wipro	-0.002	1.0093	0.429182	42.91821	1.15E-31
24	M & M	0.0018	1.006	0.377946	37.79459	4.56E-27
25	UPL	0.0001	0.9941	0.334019	33.40195	2.07E-23
26	Eicher Motor	0.0017	0.9899	0.347415	34.74155	1.68E-24

S.No.	Stock Name			R ²	% R ²	Reg. Significance F
27	Ultra Cement	-0.0005	0.9742	0.400267	40.02669	5.05E-29
28	Tata Consumers	-0.0002	0.9553	0.375914	37.59144	6.82E-27
29	Maruti	0.001	0.9256	0.300575	30.05752	8.80E-21
30	BPCL	-0.0013	0.9186	0.349816	34.9816	1.07E-24
31	Hero Motor	0.0001	0.8931	0.313702	31.37023	8.47E-22
32	Coal India	0.0016	0.8914	0.195921	19.59207	2.84E-13
33	HCL	-0.0004	0.8913	0.385647	38.56474	9.82E-28
34	Apollo Hospital	0.0003	0.8868	0.188796	18.87955	8.51E-13
35	SBI Life	0.0004	0.8623	0.352161	35.21609	6.84E-25
36	TCS	-0.0002	0.8449	0.437932	43.79323	1.71E-32
37	Asian Paints	0.0001	0.7715	0.255538	25.55382	1.99E-17
38	Bharti Airtel	0.0007	0.7704	0.319063	31.90633	3.21E-22
39	Divis Lab	-0.0012	0.7493	0.20824	20.82398	4.16E-14
40	Hindustan lever	0.0003	0.7288	0.290287	29.02867	5.36E-20
41	Bajaj Auto	0	0.704	0.268148	26.81479	2.40E-18
42	ITC	0.0018	0.6976	0.298194	29.81938	1.34E-20
43	NTPC	0.0013	0.6876	0.202403	20.24027	1.04E-13
44	Sun Pharma	0.001	0.6585	0.242007	24.20073	1.86E-16
45	Britania	0.0002	0.5666	0.200837	20.0837	1.32E-13
46	Nestle	0.0004	0.5479	0.243719	24.3719	1.40E-16
47	Dr. Reddy	-0.0002	0.5433	0.168637	16.86371	1.82E-11
48	Power Grid	0.001	0.4783	0.099987	9.998693	3.87E-07
49	ONGC	-0.0002	0.4725	0.046348	4.634796	0.00065838
50	Cipla	0.0011	0.2742	0.040214	4.021446	0.00153536

Only 6 equities have more than 50% R-squared value, according to the aforementioned table. ICI Bank has the highest R² (60.76534), while Cipla has the lowest R² (4.021446), indicating more and less variability that can be explained by the regression model, respectively.

Descriptive Statistics

Descriptive statistics in Table 3 include mean, median, standard deviation, variance, and skewness of R² for high- and low-volatility stocks of the Nifty 50 index. The table shows the standard deviation of R² Low volatile stocks is lower than the standard deviation of R² High volatile stocks. The skewness value

of both the R² is negative, indicating a larger left tail. Kurtosis in R² High volatile stocks is higher than 3, indicating the distribution is leptokurtic. In other words, the dataset's tails are thicker than those of a normal distribution.

Table 3. Descriptive Statistics

	R ² high volatile stocks	R ² Low volatile stocks
Mean	0.45015111	0.264068795
Standard Error	0.02487076	0.020284735
Median	0.4491492	0.279217271
Mode	#N/A	#N/A
Standard Deviation	0.12184133	0.103432261

Sample Variance	0.01484531	0.010698233
Kurtosis	3.91258209	-0.064061265
Skewness	-1.538551	-0.573318711
Range	0.55846099	0.397717853
Minimum	0.04919241	0.040214457
Maximum	0.6076534	0.43793231
Sum	10.8036266	6.865788664
Count	24	26

F-Test: Two-Sample for Variances

It was applied to test the equality of variances of two samples, i.e., R² (high volatile stocks) and R² (low volatile stocks). Our null hypothesis is that the variances of R² (High Volatile stocks and R²(Low volatile stocks) have no significant difference. Calculating the ratio of the two variances is necessary in order to compare two variances, v1, and v2. This ratio has the F distribution and is known as the F-statistic: $F = v1/v2$. Wherein v1 is greater than v2. In this instance, we used two-tail tests to ensure that the variability between the two variances was equal. However, we have also covered the effects of one tail. In essence, the one-tailed version just examines whether the variance from the first population is larger or smaller than (but not both) the variance from the second group.

Table 4. F- Test

Sample 1 : R² (High volatile stocks)	
Sample Size	24
Variance	0.01484531
Sample 2: R² (Low volatile stocks)	
Sample Size	26
Variance	0.1034
Calculations:	0.010698233
SD of sample 1 > than SD of sample 2, so first one will be S1 and second one will be S2	
F Test Statistic: s^2_1 / s^2_2	
df of sample 1	23
df of sample 2	25
F value	1.3876413
P(F<=f) one-tail	0.2120843
P(F<=f) Two-tail	0.4241686
F Critical one-tail	1.9738461

As it can be seen in Table 3, the p value of two tails (0.4241686) is higher than 0.05 at the 5% significance level, so our hypothesis that both the samples have the same variability is accepted, and we can indicate there is no discernible difference between the variability of R2 (high volatile stocks) and R2 (low volatile stocks).

T-Test: Two-Sample Assuming Equal Variances

This t-test was conducted to check whether the means of both samples, namely, R² (high volatile stocks) and R² (low volatile stock), have significant differences or not. As has been justified in Table 4, both samples have the same variability, so the pooled variance t-test is used in this research. Table 5 shows the outcomes of the pooled variance t-test performed in Microsoft Excel to compare the means of the two separate populations, R2 (high volatile stocks) and R2 (low volatile stocks).

Table 5. T-Test

	R ² High volatile stocks	R ² Low volatile stocks
Mean	0.450151108	0.264068795
Variance	0.01484531	0.010698233
Observations	24	26
Pooled Variance	0.012685374	
Hypothesized Mean Difference	0	
df	48	
t Stat	5.836611038	
P(T<=t) one-tail	2.2249E-07	
t Critical one-tail	1.677224196	
P(T<=t) two-tail	4.4498E-07	
t Critical two-tail	2.010634758	

As table 5 indicates, p values of one tail and two tails in both conditions are lesser at the 0.05 level of significance, so our null hypothesis that both means have no significant difference is rejected and we can interpret the samples' mean values as having varied significantly from one another.

Research Implications

The purpose of the article is to make the investors understand the differences between shares with high and low volatility. This might make it easier for investors with a low risk tolerance and appetite to choose the stock they want. The investor could choose better investments based on beta value and R2. It is impossible to say that the beta of a certain stock will always be the same because it depends on its profitability. Second thing, beta does not give adequate information about the fundamentals of a company.

5. Conclusion

The Augmented Dickey-Fuller test revealed that the raw data of companies did not exhibit stationarity at the level (Raw data). Table 2 shows that 24 shares out of 50 have a high beta, indicating high volatility, while 26 have a low beta. ICICI bank has the highest R² of 60.76534 and Cipla has the lowest R² of 4.021446, indicating the proportion of variance that can be projected by the independent variable. The results show that the beta values are not constant throughout time. As a result, investors should use caution when assessing systematic risk. In addition, it is strongly advised that market participants take the

time-varying behavior of beta into account while selecting individual stocks and managing their portfolios. Generally, a high R^2 is considered good in the regression model. The F test justified the fact that there is the same variability in the above mentioned variables. A T-test was applied to identify whether both samples have significantly equal means or not, and the test demonstrated that the means were significantly different.

Scope for Further Research

In the current study, beta valuation and R squared are significant factors in determining volatility of securities. The investor searches for both high- and low-volatility shares when they first enter the stock market. Investors with a high risk tolerance would invest in highly volatile stocks, while risk-averse investors would favor low beta stocks. Sharpe, Treynor and Sortino ratios can be used for further research to understand an investment's risk-adjusted return. Researchers can add Maximum drawdown technique in their research to measure stock price volatility. This technique is used by speculators and asset allocators to limit their losses. Different indices of nifty, such as nifty pharma, nifty bank, nifty auto, nifty financial services, nifty IT, nifty metal, etc., can also be used to conduct further research based on beta, R square, Bollinger Bands, PE ratio, and PB ratio.

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Women Empowerment with the Understanding of Personal Financial Statements

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Abstract

On 25-27 September, 2015, United Nations at New York were set the 2030 agenda for Sustainable Development. In this agenda, there are 17 Sustainable Development Goals and 169 sub goals. Women empowerment is one of the main theme of 2030 agenda. According to United Nations, "those who become empowered have the ability to take control of their lives and fortunes with the help of government and civil society." Without empowering women, the goal "Sustainability" can't be achieved. As long as women are dependent on others to take decisions, they cannot be called empowered. Here, decision making refers to financial decisions. Financial literacy and financial planning help them to take their own decisions. In India, it is found that even women are highly educated, posted on high posts, being professionals, yet they are depending on their father, husband and son for their financial decisions. Financial planning helps them to take decisions about setting goals, calculating net worth, saving, budgeting, investing decisions etc. knowledge of net worth play a crucial role in financial planning. To calculate net worth, personal financial statement helps. The study deals about the importance of Personal Financial Statements and Personal Financial Statements Knowledge among the working women. Descriptive research method adopted here to determine the reality among working women about their financial literacy. Women played a crucial role in a family, organization and in a society. Women empowerment begins with their individual decision making, Personal Financial Statement helps the women to plan and execute their works effectively. For this study, 150 working women are targeted and their responses were analysed by using chi square and weighted average.

Keywords: Women Empowerment, Financial Planning, Personal Financial Statements, women's perception

1. Introduction

In Indian perspective, men are the main earner of the family and women take care of the family. But women not take part in decision making. This is not right because women can play a vital role in formation of a healthy society, nation and the whole world. That's why government runs many programs to empower women. Empowerment may be defined as the process to access the opportunities and rights for women in various fields of society. It means enable women's self worth, influence, decision making, and choice and remove gender based discrimination. Financial literacy can make women empower strongly. It is proved in the previous researches that life expectation of women is greater than men and they need more finance in their old age. But that time they have very little earning. So they need to be financially literate. Today, women are more educated, more earner, more aware and trained. But yet they depend on others for their financial decision making. They earn money but doesn't think about money. Because of their low confidence, they don't want to take any risk with money and like to store money in her hands/purse not invest outside. But this is not right. Discrimination will continue till women do not have

knowledge about their rights. Financial literacy can help in removing discrimination in society. Financial literacy refers to the skill, knowledge that help in making effective decisions about money matter. As saving, budgeting, investing, calculating net worth etc. Calculating net worth is the one of the main part of the knowledge of financial literacy. But it is easy to calculate to whom who have commercial background. Women are educated but not aware and have little knowledge about net worth. Personal Financial statements can help to calculate net worth easily.

2. Literature Review

(Dr Tanu Tandon, 2016) stated that women's empowerment encompasses women moving into positions of 'power over', but also embraces their movement into 'power to, with and from within' – generative rather than controlling power. Women's empowerment involves changing the position of women in society by making them capable to make decisions.

(Gupta, n.d.) concluded in the study that the condition of the Indian women is not as good as it should be, in the present scenario. The attainment in the field of earnings, employment and in education, the scenario of women empowerment

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appears be comparatively bad and wishes to be check. The study concluded, “When women move forward the family moves, the village moves and the nation moves”. That’s why women empowerment in India is the need of hour.

(Giri, 2019) emphasis on the need of investment in the areas relating to health, education, employment, literacy and training of women. Education and freedom scenario of women is very pathetic. Without women empowerment social, economic and political progress of a country will be static.

(Kapur & Narayan, n.d.) stated that women continue to be relegated to household tasks, with little or no say in economic decisions. Levels of literacy, nutrition and access to health care continue to be poor, and social welfare parameters are lower in India than neighboring countries. There is a great need of women empowerment in India.

(D.A.T. et al., 2020) revealed that financial literacy has significant impact on women’s economic empowerment. The study concluded that financial literacy is a significant determinant of women economic empowerment.

(Arora, n.d.) shows that the general awareness about financial planning tools and techniques among women remains poor. The study suggests inadequate financial knowledge or women are unaware of basic money management principles also in their everyday life.

(Mishra et al., n.d.) found that financial literacy gives women decision making power related to finance and household, self dependent, prevention from financially frauds and debts, give respect and power in society.

(Arini, 2018) indicates that financial literacy can also be considered as a reference to participate in supporting the success of empowering women through microfinance activities. The study concluded that through financial literacy women are expected to be given proper guidance and financial information so that they become empowered.

(Victor, n.d.) stated that the essential purpose of Personal Financial Statement is to measure wealth at a specified date, to take snapshot of one’s financial condition. It presenting estimated current value of assets, estimated current value of liabilities and net worth. Without these information one can’t become a financial well being.

(Singh, 2017) found in the study that in spite of working at good position, women were not confidently while taking their financial decisions. They were depend on their family and friends for their investment decisions. This shows their low literacy level. And prove that lack of knowledge about financial instruments.

(Doda, 2014) conclude that men are more willing to take risk

while investing but women are risk averse in nature and behave in a different manner. The proverb “men come from Mars and women come from Venus” might be true because of their different decision making behavior. So if discrimination has to be removing, women should be financial literate.

(Sebastian & Appalla Raju, 2016) shows that majority of women have basic knowledge but not sufficient. Women decision making role in family is very limited. They depend on others for their decision making. There is a need of women financial literacy for women empowerment.

Objectives:

1. To study the level of knowledge of Personal Financial Statements.
2. To examine the role of Personal Financial Statements in women empowerment.

Methodology:

This research is a descriptive in nature. This is based on the survey of 250 working women. For data, both primary and secondary are used. Primary data are collected through questionnaire. Only 204 working women take interest in responding the questios. For analysation, SPSS software is used. To test the reliability of the questionnaire, Cronbach’s Alpha is used. Chi- square and average are used. Secondary data are collected through research papers, different web site, research articles and journals.

Age	Frequency	Percentage
21-30 Years	116	56.9
31-40 Years	62	30.4
41-50 Years	16	7.8
Above 50 Years	10	4.9
Education		
Bachelor	65	31.9
Master	70	34.3
Physician/Professional	47	23
Others	22	10.8
Income Level (Monthly)		
Less than Rs. 25000	75	36.8
Rs.25000 to 50000	74	36.3
Rs.50001 to 100000	40	19.6
More than Rs. 100000	15	7.4
Occupation		
Business	21	10.3
Services	75	36.8
Professions	28	13.7
Others	80	39.2
Saving (Monthly)		
Below 20%	91	44.6

20 to 50%	83	40.7
51 to 75%	20	9.8
More than 75%	10	4.9
Investments (of income)		
Below 20%	104	51
20 to 50%	65	31.9
51 to 75%	22	10.8
More than 75%	13	6.3

Source: Author's own sources

Findings and Results: The above table shows the demographic picture of the respondents. For testing reliability, SPSS software shows the value .651 which is higher than .5, proved the validity of the questionnaire. The study found that women's earning is very less as compare to men. Most of the women earn less than Rs 25000, which is not adequate. Mostly (44.6%) save less than 20 percent of her income and from investment point of view, more than half of the women invest below 20 percent of their income. This shows very few women take interest in investment decisions. For measuring the women empowerment, the respondents were asked four questions. And the survey found that out of 204, only 132 says that they take their decisions independently. only 139 (68%) said that they have rights to deal financial affairs of their home and business. 72 percent of them said that they can choose employment of their choice. 146 (71%) working women said that they have right to save and spend money from their earning. To know the level of knowledge about personal financial statements, four questions were asked from working women. The very surprising results come out as only 54 percent working women who are educated and skilled know about what is personal financial statements. 52 percent know how to calculate the net worth which is the main tool of financial planning. Only 31.4 percent of working women knows about their financial strength and weakness (the respondents were asked which of the followings statements show financial strength and weakness:1 Income Statements,2 Balance sheet, 3 Both of them and 4 don't know). Only 46.6 percent of the respondents knows all about Personal financial statements. The Chi-square value comes less than .05, which shows that the Knowledge of personal financial statements is highly influenced women empowerment. The study find that working women who make personal financial statements are taking their own decisions as well as financial decisions whether the decisions are related with their jobs, saving, investing or spending. These women are truly said to be empower. 40.7 percent of 204 working women invests less than 20 percent of their income. 51 percent of them invest less then 20 percent.

Conclusion: The study conclude that women without financial literacy can never be said to be empower. For their financial literacy they have the practically knowledge about the financial term as Personal Financial Statements. The researcher found

that the Knowledge of Personal Financial Statements have the great impact on the women Empowerment. So there is a need to change the previous method of financial decisions making. Women need to actively participate in making personal financial statements. Government should include the financial literacy in education from starting. Because whenever the women have not the knowledge about assets, liabilities, net worth, income statements, balance sheets, portfolio statements they can't be able to make financial decisions independently. And not said to be empower. In 2030 agenda of sustainable growth one of the main issues is women empowerment. As women is half of the total population in this world. They can play vital role in the sustainable growth of the whole world in each and every field. Today the main motto of the society/government is to remove the discrimination against women in the society and set justice and check out crimes against women.

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Rapid Digitalization in Indian health sector – Pragmatic way to achieve SDG3

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Abstract

“Good health and balanced mind are two of life’s greatest blessings” – Publilius Syrus. This is indeed the mantra of a good life, for there cannot be a greater treasure than being in the pink of the health and a positive mind. This philosophy of life is so important that Sustainable Development Goals (SDGs) too have adopted it and have taken it to another level with the digitalization of the health sector. Indian health care industry is expanding at a CAGR of 28.50% for 2022 – 2027. People are moving towards preventive healthcare after witnessing COVID-19 pandemic. Aging population and rampant increase in lifestyle diseases are serious concern in health care services. As per WHO, deaths from Non-Communicable Diseases (NCDs) will also increase to 55 million by 2030 in India. Recent pandemic accelerated the adoption of digital technology. In 2021, digital healthcare market in India was INR 524.97 bn and is expected to reach INR 2,528.69 bn by 2027. The objective of this study is to analyze the impact of digitalization in achieving SDG-3 in Indian health sector. Result indicates that government digital approach is making citizens more positive for healthy life. More vigilance, a strong eco health system and better surveillance will help in achieving SDG-3 by 2030. The government is also diversifying its investments in boosting innovation and growth in the health sector.

Keywords: SDG3, Strong eco health system, NCDs, Digital interventions, Health,

1. Introduction

Digital transformation is redefining health needs in India. Recently, India became most populous nation in the world, and this status poses challenge to citizen’s health. Studies have highlighted the strong interdependence of economic progress of nation and health of its citizens. Recent reports by the World Health Organization found that more than 17 % of Indian households bear exorbitant health expenditures due to high OPPE (out-of-pocket health expenditure) every year and approximately 55 million Indians on health impoverishes annually (Kar et al., 2019). The digital healthcare market in India is expected to reach INR 2,528.69 Bn by 2027 and showing impressive CAGR of 28.50% for 2022 - 2027 period (Netscribes (India), 2023). Rapid penetration of smartphones, speed of 5 G internet, supportive government policies and huge investment by private players are propelling the growth of the Indian healthcare market.

Human existence was identified on earth over 8 million years ago by Indian Vedas and other ancient scriptures and they emphasized the concept of consciousness. This ancient philosophy had been embraced by the United Nations too and is further carried by the Sustainable Development Goals. These SDGs are becoming strong trigger in developing new health policies for better accessibility of healthcare services among

different countries to every individual irrespective of their age, gender, caste, creed, income status as well as ethnicity. These health needs are not just confined to curative services but also it denotes preventive, rehabilitative, and palliative needs too.

1.1 SDG3: A roadmap to Health Accessibility

Millennium Development Goals (MDGs) have played their part in the role of working towards health accessibility. The term “Health Accessibility” highlights the timely usage of the various health services such as preventive, diagnostic, curative, palliative etc. by the masses irrespective of their economic and social background meant to attain the ultimate health outcomes (IOM, 1993). The MDGs acted as the foundation stone for the Sustainable Development Goals (SDGs) which turned out to be far more ambitious than the former. Because several MDGs have been included into the Sustainable Development Goals (SDGs), many of the observations and solutions presented may be applicable to SDG implementation. The bottlenecks observed in the MDGs were improvised in case of SDGs. Monitoring, evaluation, and other mechanisms for impact accountability were severely lacking in the MDGs. In contrast, the SDGs require to manage impact data which ensures timely acquisition with quality. In the case of MDGs, the technology had a limited part, while the digital component was intensively incorporated in SDGs.

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One of the 17 Global Goals of the 2030 Agenda for sustainable development is to ensure healthy lifestyles and promote wellbeing for all people of all ages. The objectives of SDG – 3 encompass all main health goals that is a part of the life cycle of an individual including reproductive health, maternal and child health, communicable and non-communicable diseases and health issues related to age (Hák et al., 2016).

1.2 Transformation of Health needs

The transformation of individual health needs has been influenced by various drivers such as social-economic, demographic, epidemiological as well as the digitalization in medical technology. As the world's population ages, so does the increase in demand for healthcare services is also increasing for non-communicable diseases such as diabetes, cardio-vascular, dementia, etc. This epidemiological change from communicable to noncommunicable diseases (NCDs) is altering population health requirements and is one of the primary causes of family impoverishments. These non-communicable diseases need long-term treatment, lifestyle changes, counselling, and specialized care. Nowadays, NCDs account for 63 percent of all fatalities globally (Ediriweera et al., 2018). While more than 41 million people die from NCDs each year, over 74 percent of NCD fatalities occur in poor and middle-income countries (WHO, 2022). Even the Indian sub-continent could not escape this major epidemiological shift which highlight the enhanced mortality of individuals due to the NCDs across all states between the period – 1990 to 2016 (Dandona et al., 2017). As per the report of 2016, 8.3 percent of deaths and 5 percent of total – Disability Adjusted Life Years (DALYs) was due to cancer (Kulothungan et al., 2022). The growing need for the treatment of NCDs made it essential that all the interventions should be directed at this point (Tiwari & Kumar, 2022). Thus, consumers' health needs are shifting from curative towards preventive, rehabilitation, and palliative care.

The present medical technology, genetics, and artificial intelligence advancements are allowing personalized medicine, which tailors healthcare to an individual's exact requirements. This has resulted in the rapid digitalization of the present healthcare landscape improvising it for addressing the changing health needs. Digital health is redefining healthcare delivery and changing health demands. Telemedicine, mobile health applications, and wearable devices, among other digital health technologies, provide remote monitoring, individualized health tracking, and remote consultations. Overall, the evolution of health demands drives healthcare innovation, resulting in creating ideal methods for healthcare delivery and prevention.

1.3 Transforming Digital Health Landscape

The digital health landscape is constantly evolving, with new technologies and innovations emerging all the time. The digital

health technologies are making healthcare more accessible to those who reside in distant or underserved areas or who have trouble obtaining the traditional mode of healthcare services. To enhance patient engagement, digital health technology can help patients become more active in their own health and will be this can be done by giving patients access to the health data following their progress and obtaining individualised health advice. Digital health comprises of techniques like telemedicine, mobile health applications online consultation etc (Shudes et al., 2021). For improvising the healthcare outcomes, digital health technologies such as artificial intelligence, predictive modelling and big data have played their role in assisting healthcare clinicians in analysing patient data and further developing individualised treatment plans. Further, the healthcare costs have been reduced by eliminating administrative procedures, enhancing the efficiency of healthcare delivery and minimalizing the need for hospitalization. This has also helped in reducing the burden on the tertiary sector of healthcare services which is one of the prime objective of SDG3. This practise was quite common during the pandemic era where the digital interventions took a major lead in bringing down the burden of the hospitals. The Digital health landscape revolution is surely trying to create a strong association between innovation and healthcare making health services more accessible, efficient, and effective. Hence, it can be stated that with the advancement of the technology digital health has the potential to transform healthcare delivery and enhance the lives of millions of people globally.

1.2.1 Global Perspective

During the age of digital technology, several interventions, revolving around m-health and e-health have been successful in delivering a wide range of health care services for people living with health issues which may be either communicable or non-communicable diseases. The World Health Organization (WHO) recognized the potential of digital health intervention to achieve universal health coverage and provide individuals with high-quality treatment. The WHO recognized the full potential of the digital health revolution at the 71st World Health Assembly (WHA) to enhance health service capacities and accelerate progress towards achieving health and wellbeing (UNITAR, 2022).

Various gadgets and electronic platforms such as mobile phones, websites and wearable devices are rapidly being used in healthcare and they are referred to as Digital Health. Using digital platforms such as mobile phones, portable computing devices, internet-based apps and social media interfaces. Precedence Research predicts that the global digital health business will increase at a compound annual growth rate (CAGR) of 27.9% from 2020 to 2027, reaching \$833.44 billion (Bernstein, 2021).

The telecommunication industry achieved substantial advancements between 2000 and 2015. Global mobile phone

subscriptions increased from 738 million to 7 billion, worldwide internet penetration increased sevenfold from 6.5 percent to 43 percent. As per the 2019 report, 32% of global mobile consumers used a smart phone to improve and monitor their health, which has summed up to a total of 1.6 billion members, an increase of 900 million from 2015. Moreover, there were over 500,000 IoT health connections by 2019, with 745 million IoT wearable connections (a 45% increase from 2015) (Tech Updates, 2015). All of these changes have enabled people to go about our daily lives in a new way, which has had a direct impact on the sector. The use of such advanced technology breakthrough is relatively low in poor and middle-income countries, which bear the major share of the global burden of NCDs; yet have limited resources and opportunity to capitalize on the benefits of digital health.

These interventions can provide preventive, diagnostic, therapeutic and palliative care. Numerous such therapies are being developed and deployed for patients suffering from NCDs. Such digital measures help patients with NCDs enhance their symptom evaluation, self-management, symptom distress reduction, knowledge of health issues, health provider – patient related communication, prompt care, follow-up and referral and quality of life.

1.2.2 National Perspective

The rise of digital health in India has been rapid over the last decade, spurred by the advancement of digital technology, the rising prevalence of smartphones, and the desire to enhance access to healthcare in a huge and varied country. In recent years, the usage of digital technology has grown in India. Bassi et al., (2018) conducted a comprehensive evaluation on the use of m health interventions in enhancing the entire health system in India, with a major focus on health care delivery.

In the initial years, digital health in India was mostly restricted to the use of computers to manage healthcare data and for medical education. Several hospitals and healthcare professionals have also begun to use telemedicine to give remote consultation services to patients.

The increasing use of smartphones in India fueled the development of mobile health (mHealth) apps and services that enabled patients to access healthcare information, communicate with healthcare practitioners, and manage their health via their mobile devices. Many efforts were established by the Indian government also helped in promoting digital health in the nation, including the National Health Stack, the National Digital Health Mission, and the Ayushman Bharat plan, which seeks to offer affordable healthcare to all residents. Further, artificial intelligence and big data are rapidly being utilized to evaluate healthcare data, increase diagnostic accuracy, and build individualized treatment strategies (Chatterjee et al., 2021).

Telemedicine services have grown dramatically in India,

especially during the COVID-19 epidemic, when actual consultations were limited. Numerous firms have sprung up around the country to provide telemedicine services to patients.

1.4 Challenges of Digitalization in Health Sector

Overall, the expansion of digital health in India has the potential to alter the country's healthcare system, making it more accessible, efficient, and cost-effective. To reach the full promise of digital health in India, however, issues such as poor digital literacy, limited healthcare infrastructure, and privacy concerns must be addressed.

2 Objective

Thus, this study is mainly focussed on analysing the impact of digitalisation in achieving SDG3 in Indian health sector.

3 Methodology

This extensive research has utilized the exploratory research design tool for analyzing the impact of the digitalization in the health sector on the attainment of the SDG3 goals. The SDG3 revolves around the fair access to quality healthcare services for all. SDG3 in their goals have tried to emphasize that different people at different levels have different health needs. Previously, the MDGs were mostly confined to basic maternal and child health care and communicable diseases. However, the SDG3 is far more ambitious and has extended their role from mere curative and preventive care to rehabilitative and palliative care.

To accomplish the objectives of the study, the researchers used both primary and secondary sources. A standardized questionnaire was used to collect primary data. The questionnaire includes demographic questions as well as questions regarding respondents' opinion towards various digitalization processes taking place in the health sector.

A simple random sampling approach was used to identify the sample for data collection. A total of 109 respondents were involved in the data collection process. This questionnaire was sent across many states using an online survey created with Google Forms. To achieve the study's aims, the acquired data was further examined using descriptive and inferential statistics.

Keeping the objective in mind, four hypotheses were postulated. For the testing of the hypotheses two-way ANOVA were utilized in the study. The following hypotheses framed for the study:

H01: There is no significant difference in opinion of the respondents towards the impact of digitalization in health sector on providing healthy lifestyle among the masses with respect to the level of education.

H02: There is no significant difference in opinion of the respondents towards the impact of digitalization in health sector on providing healthy lifestyle among the people of different income level.

H03: There is no significant difference towards the opinion – “Digital Inclusion enhances the accessibility of health services” among the respondents of different education groups.

H04: There is no significant difference towards the opinion – “Digital Inclusion enhances the accessibility of health services” among the respondents of different income groups.

4 Data Analysis and Data Interpretation

For the fulfillment of the objectives of the study responses have

been collected from diverse groups of respondents. Hence, Table 1 provides a detailed picture of the demographic profile of the respondents of the study. The researchers have attempted to have an equitable distribution of the respondents, especially in the annual income criteria. In case of education, majority of the respondents belong to the graduate and post graduate levels. For the analysis of the study, levels of education and annual income have been considered as major independent variables.

Table 1: Summary of the demographic distribution of the respondents

Name of the Parameter	Respondent Distribution	Name of the Parameter	Respondent Distribution
Gender		Annual Income	
Female	53	1 – 2 Lac	22
Male	47	2 – 4 Lac	22
Age		4 – 6 Lac	22
21 – 40	88	6 – 10 Lac	22
41 – 60	22	Above 10 Lac	22
61 and Above	03	Education	
Marital Status		Upto 12	08
Married	47	Graduate	46
Unmarried	62	Post Graduate	45
		PhD	09

4.1 Analysis of variation of opinion towards the impact of digitalization in health sector on providing healthy lifestyle with respect to education and income

To analyse the variation in the opinion of the respondents towards the impact of digitalization on providing healthy lifestyle, the study employed two-way analysis of variance (ANOVA). ANOVA is a statistical test that may be used to examine the statistical significance of three or more means groups

(Goswami et al., 2014; Liao & Lin, 2016). The two-way ANOVA test's purpose is to identify the influence of multiple factors analysed against the intended outcome (Chakraborty & Chowdhury, 2016; Liu et al., 2012).

The researchers have postulated two hypothesis which were tested though the two-way ANOVA test. The result of the two-way ANOVA is displayed in the table 2.

Source of Variation	SS	Df	MS	F	P-value	F crit
Level of Education	11.96	3	3.986667	1.678596	0.178215 (NS)	2.718785
Annual Income	3.14	4	0.785	0.330526	0.856681 (NS)	2.485885
Level of Education * Annual Income	19.34	12	1.611667	0.678596	0.766992	1.875262
Within	190	80	2.375			
Total	224.44	99				
N.B.: * - Significant at 5% level (P<0.05), Not Significant at 5% level (P>0.05).						

The Table 2 states the results that has been obtained on application of the two-way ANOVA with respect to Levels of education and Annual Income over the opinion of the people towards the impact of digitalization in health sector on providing healthy lifestyle among the masses. The non-significant (P<0.05) P Value shown against Level of education (0.178215) indicates

the variations in the opinion of the respondents towards the impact of digitalization in health sector on providing healthy lifestyle among the masses with respect to the level of education of the respondents may not be different. Hence the null hypothesis – “H01: There is no significant difference in opinion of the respondents towards the impact of digitalization in health

sector on providing healthy lifestyle among the masses with respect to the level of education is accepted.”

Similarly, the non-significant ($P < 0.05$) P value shown against annual income (0.856681) indicates that variations in opinion of the respondents towards the impact of digitalization in health

sector on providing healthy lifestyle by different income levels may not be different. Hence, the null hypothesis – “H02: There is no significant difference in opinion of the respondents towards the impact of digitalization in health sector on providing healthy lifestyle among the people of different income level is accepted while the alternative hypothesis is rejected” (Chatterjee et al., 2021).

Table 3: Analysis of Variation on the opinion of the respondents towards Digital Inclusion enhances the accessibility of health services in respect of Level of education and Annual Income of respondents.

Source of Variation	SS	df	MS	F	P-value	F crit
Level of Education	8.75	3	2.916667	1.068376	0.367306837 (NS)	2.718785
Annual Income	10.74	4	2.685	0.983516	0.367306837 (NS)	2.485885
Level of Education * Annual Income	18.7	12	1.558333	0.570818	0.367306837	1.875262
Within	218.4	80	2.73			
Total	256.59	99				
N.B.: * - Significant at 5% level ($P < 0.05$), Not Significant at 5% level ($P > 0.05$).						

The Table 3 states the results that has been obtained on application of the two-way ANOVA with respect to Levels of education and Annual Income over the opinion of the people towards the statement “Digital Inclusion enhances the accessibility of health services”. The non-significant ($P < 0.05$) P Value shown against Level of education (0.367306837) indicates the variations in the opinion of the respondents towards the statement “Digital Inclusion enhances the accessibility of health services” with respect to the level of education of the respondents may not be different. Hence the null hypothesis – “H03: There is no significant difference towards the opinion – “Digital Inclusion enhances the accessibility of health services” among the respondents of different education groups is accepted. Similarly, the non-significant ($P < 0.05$) P value shown against annual income (0.367306837) indicates that the statement “Digital Inclusion enhances the accessibility of health services” by different income levels may not be different. Hence, the null hypothesis – “H04: There is no significant difference towards the opinion – “Digital Inclusion enhances the accessibility of health services” among the respondents of different income groups is accepted while the alternative hypothesis is rejected (Kodali & Das, 2021).

4 Discussion

While discussing Sustainable Development Goals, the most important philosophy is “Quality Health Services”, which is the right of every individual, and this has been clearly inferred from the responses collected through the study. Hence, the prime challenge of any health system should be to enhance the accessibility towards various health services and help people to lead a healthy life, a life devoid of diseases with mental wellbeing. The Sustainable Development Goal 3 have been working towards the same and digitalization is a great accelerator.

The present era has witnessed a great impact of digitalization on the effective performance of the health sector. These innovative digital inclusion in the health industry has assisted individuals in leading better lifestyles. Digital tools like medical websites, smartphone apps, and wearables have made it convenient for people in getting health information and helped them in making better health decisions. This involves keeping track of physical activities, keeping a healthy diet, and managing chronic diseases. People can now obtain prompt medical treatment through telemedicine and virtual consultations (Labrique et al., 2020).

Many companies are increasingly developing wellness programs that use digital technologies to assist employees in maintaining healthy lives. Fitness challenges, dietary guidance, and stress management strategies are examples of such programs (Howarth et al., 2018). This has led to the growth of the e-Health Industry across globe and even India has not remained untouched from its impact. The study clearly states that most of the respondents have been using a variety of health-related mobile apps for leading a healthy lifestyle and even for getting medical solutions sitting back at home. The response of the survey further highlights that among the various mobile apps which are a part of the digital inclusions, Apollo 24*7 has the higher preference followed by Tata 1 Mg and Practo. This can be related to few of the online ratings where Apollo 24*7 is the most preferred ones (Similarweb, 2023).

Apollo 24*7 is a centralized ehealth platform that provides various health services ranging from e-consultation to providing e-diagnostic and e-pharmacy services. Tata 1mg is an additional online health platform that offers services such as e-pharmacy, diagnostics, e-consultation, and health information. Practo is a healthcare platform that offers telemedicine, online appointment scheduling, and health record management. Since its inception in 2008, the site has attracted over 200,000

certified doctors and has facilitated over 20 million consultations (Dutta, 2021).

The growing health consciousness among the people have also encouraged them to avail such health gadgets and devices along with the mobile apps. Further, the study also infers that among the various Digital Public Goods (DPGs), smart fitness trackers and mobile applications are the most preferred ones. The growing preference towards the smart fitness devices and mobile apps is due to various reasons. Firstly, smart fitness devices help in enhancing the consciousness of masses towards fitness scheduling. Secondly, mobile apps have been helping in enhancing the convenience of the people towards availing of the health services. These has been brought up in the results of the study.

One of the most important aspects of the mobile health app was the e-consultation, availed by most of the people. The demand for e-consultation enhanced during the pandemic. However, the patients are moving back to the physical consultation. This can be inferred by the responses of the respondents in their opinion towards the usage of e-consultation. The study denotes that most of the respondents have agreed that through mobile apps it is difficult to get an access to all the good doctors which may be because the doctors are not that easily available on call. However, in this case too, there is a percent of 38 who have shown a neutral response, emphasizing their less awareness and in competencies of the masses in this regard. This may be because even today a majority of people are still not comfortable with these DPGs and hence are unable to get the best of the benefits out of it.

Overall, digitization has the chance to significantly contribute to the promotion of healthy lifestyles. Digitalization can help people make educated health decisions and move towards a better lifestyle by boosting access to information, enabling individualised health management, and improving access to treatment. This has been clearly denoted through results of the study. The study highlights that the respondents irrespective of their income and education have shown a uniformity towards the impact of digitalization in health sector on providing healthy lifestyles to individuals (Chatterjee et al., 2021). It also emphasizes the opinion of people accepting that this rapid digitalization does have an impact on the enhancement of the health accessibility (Al Dahdah & Mishra, 2023).

6 Conclusion

In India, health requirements are growing at rampant speed, therefore, healthcare systems must also adapt to meet population change in health demands by embracing new technology, implementing patient-centered methods, and addressing socioeconomic determinants of health. Government, private players, and e-health portals must act in synergistic way to address these new health needs. Though with

change in Indian health policy in 2017, government is determined to achieve universal healthcare through Ayushman Bharat, digitization of health records and Mission Indradhanush. It becomes imperative to cater to these growing health needs through digitizing medical records, automating manual processes, leveraging data analytics and implementing ML/AI/IOMT for enhancing personalized care and patient experiences. In the Indian healthcare sector, several trends have emerged that are employing cutting-edge technology for improving the patient experience.

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The Impact of Digital Economy on Economic Growth Based on Regression Analysis: Evidence from India

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Abstract

Purpose: The relationship between digital economy and economic growth is crucial to analyze the impact of digitalization on economic growth of India. The study investigates that whether the digital economy promote economic growth in India or not.

Design/Methodology/Approach: The digital economy index is composed in the study that covers three dimensions of the digital economy; access, use, and skills in India. The duration of the study is from 1990 to 2022. Data source used for the study is world development indicator (WDI). Data analysis and visualization are performed in the STATA statistical software. The time series linear regression model is used to test the null hypothesis. Further, stationarity test (Augmented dickey fuller) is used to test stationarity of data series. Also, autocorrelation test, heteroscedasticity test and multicollinearity test are used to satisfy the classical linear regression model assumptions.

Findings: The study suggest that digital economy has a significant relationship with economic growth in India. Advancement of innovative and new technologies related to the digital economy, such as increase in accessibility to mobile and internet communication, increase in usability of mobile and internet communication, and strict implementation of compulsory education, has a significant contribution to the economic growth of India, from 1990 to 2022.

Originality/Value: The study is original and a great contribution to the literature as there are few studies available in this area for other countries but not for India. No such study is available for India that analyze the impact of digital economy on economic growth of India from 1990-2022; this makes it a unique study with reference to India.

Keywords: Digital economy; economic growth; India; Regression model; digital economy index

1. Introduction

Digital economy first evolved in the 1990s, with the growth of the internet (Barefoot et al., 2018); it is defined as “networked intelligence, where it is not only about the networking of technology, smart machines but about the networking of humans through technology that combine intelligence, knowledge, and creativity for breakthroughs in the creation of wealth and social development” (Tapscott, 1995). Further, economic growth is defined as the production of goods and services over a period.

Many researchers elaborated the economic growth, such as “an increase in the quantity and quality of the economic goods and services that a society produces and consumes” (Roser Max, 2013). In this study, the focus is on the relationship between digital economy and economic growth in a developing country like India. Past research has indicated that both developed and developing nations view the digital economy as the primary engine of economic progress. Economic growth is facilitated by

the digital economy, which is mostly based on digitalization.

There are several studies that illustrates the role of digital economy in the economic growth of many countries (Ahmad Zafrullah Tayibnapis, 2018; Gomes et al., 2022; Limna & Siripipatthanakul, 2022; Watanabe et al., 2018; Zhang et al., 2022a). A study (Armstrong, 2020) explained this relationship as “the digital economy is a term that captures the impact of digital technology on patterns of production and consumption. This includes how goods and services are marketed, traded, and paid for.”

Our study is carried out to investigate that digital economy promotes economic growth in India or not. The study is original, and it would contribute to the research area related to digital economy and economic growth. The paper is divided in the following sections i) literature review- to study the relationship between digital economy and economic growth; ii) methodology of the study; iii) data analysis and results; iv) conclusion.

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2 Objective

This section is dedicated to the reviews of studies relevant to digital economy and economic growth. Several studies have been conducted on this theme. Therefore, we first reviewed the theoretical literature; followed by empirical literature on digital economy and economic growth.

Theories on Digital economy and Economic Growth

The association between digital economy and economic growth has drawn a significant amount of interest in economics, both theoretically and empirically. Considering this, we have reviewed the following theories related to digital economy and economic growth.

Firstly, the classical theory of Joseph A. Schumpeter argued that the process of creative destruction promotes the economic growth. He claimed that boom and recessions are unavoidable and cannot be fixed without hampering the production of new wealth through innovation (Schumpeter, 1934). Study of (Guo & Chen, 2023) supports the theory of Schumpeter and explained the relationship between digital economy and economic growth. Study confirms that digitalization contributes to the innovation of the manufacturing industry.

Secondly, the neoclassical growth theory of Solow highlighted the importance of digital economy in the economic growth of a country. According to Solow model the technical changes leads to the positive economic growth (Solow, 1978). Some studies such as (Caraiani, 2007; Gregory Mankiw David Romer David Weil et al., 1990; Mankiw et al., 2015; Sharipov, 2015) followed Solow model to explain the association between digital economy and economic growth.

Digital economy, economic growth, and hypothesis development

Apart from the theoretical view of the digital economy effect on economic growth. Many empirical studies have been conducted at the macro-level on the relation between digital economy and economic growth. With different views, these empirical studies have produced different results, which have been attributed to the different econometric methodologies used and the scope of the studies. Some of the earlier studies elaborated that broadband and mobile telecommunication have positive contribution to the economic growth on the region of Sub-Saharan Africa and Organization of Economic Corporation economies (Myovella et al., 2020). The rise of the digital economy can boost the nation's economic growth, attract investors and researchers, and promote the development of human capital. With double-digit rates of annual growth in the global economy, the digital economy is a revolutionary, and significant phenomenon in the modern world (Niyazbekova et al., 2021). The significance is that, in a world of competition, the

growth of a nation's digital economy is seen as a critical component of economic growth.

Another study (Bulturbayevich & Jurayevich, 2020) explained that the economic growth plays a vital role in improving the living standards of citizens and digital economy plays an important role in integrating the economies globally. A study (Chakpitak et al., 2018) emphasized that implementation of digital economy to boost economic growth is not possible overnight, such as in a country like Thailand has a potential to grow more in economic terms as digital technologies are not fully utilized. Therefore, it is must for countries to channelize the digital technologies and implement digital economy to promote economic growth.

Also, a study of (Barata, 2019) indicates the similar results for Indonesian economy and emphasized the fast-paced development of information and communication technology (ICT) gives the Indonesian economy a new look as it shifts from a traditional economy to a digital one. As a result, economic growth, higher incomes, and the creation of jobs have the potential to eliminate poverty and inequality since the long-term effects will further support sustainable national economic growth. Further, study of (Strogonova & Novikova, 2020) provided the empirical evidence of Ural microregion of Russian Federation to show that digital economy is the primary driver supporting the economic growth of the region. From the perspective of developed nation, a study (Dutzler et al., n.d.) on Europe region elaborated the development of new business models using digital platforms and the creation of digital supply chains will lead to a thriving venture capital sector and accelerate economic growth.

Digital technology not only helps in minimizing cost, and improving financial inclusion, but it also helps to help in significant improvements in economic growth (Chen et al., 2021). In this digital era, the way we work, do business, engage in international trade, and interact with one another as individuals and communities in the 21st century is heavily influenced by digital technologies and the digital economy. Moreover, the recent health crisis has provided more evidence that this tendency will further strengthen the importance of digitalization in sustainable development and economic progress (Yi Xiaozhun, 2020).

After the review of the studies, we have identified that there is a need to study the association between digital economy and economic growth in case of India. The following section is on the methods used in the study to establish the association and to check that how much digital economy facilitate economic growth in India.

3 Methodology of the study

This study is constructed a comprehensive digital economy

index and applied a time series regression model to analyze the impact of digital economy on the economic growth of India. In order to assess the role of digital economy in economic growth of India, the study needs to measure the digital economy of India. First, we build a comprehensive digital economy index based on three dimensions; i) access, ii) use and iii) skill (Abendin & Duan, 2021).

Table 1 represents the variables included under these three dimensions to build a comprehensive digital economy index (DICONOMY). The following equation (1) represents the framework of digital economy:

$$DICONOMY = f (FTSPHI, MCSPHI, SISPOP, POPUI, FBBSPHI, COMEDU) \dots\dots\dots (1)$$

After this, the time series regression model is applied on the economic growth (dependent variable) and digital economy (independent variable) from 1990 to 2022. Before regression analysis, the stationarity of the series is checked using the augmented dickey fuller unit root test in STATA. Data on these variables are collected from World Development Indicator (WDI) published by the World Bank. To validate the regression model, all the assumptions of classical linear regression model (assumptions on autocorrelation, heteroscedasticity, multicollinearity) are satisfied using STATA.

Table 1. Comprehensive digital economy index		
Access factors	Use factors	Skill factors
1. Fixed telephone subscription per 100 inhabitants (FTSPHI) 2. Mobile cellular phone subscriptions per 100 inhabitants (MCSPHI) 3. Secure internet servers per one million people (SISPOP)	1. Percentage of people using the internet (POPUI) 2. Fixed broadband subscriptions per 100 inhabitants (FBBSPHI)	1. Compulsory education duration (COMEDU)

Source: Author's calculation

4. Results and Analysis

In this section, the study illustrated the results of the stationarity test, descriptive statistics to check variation in the time series data, and results of the Ordinary least square (OLS) estimation.

Stationarity: Augmented Dickey Fuller Test

Augmented dickey fuller test is carried out in STATA to check the stationarity of time series data (1990-2022). The following hypothesis is set up to test the stationarity of both the variables (digital economy and economic growth).

Null Hypothesis (H0): Series is non-stationary, or series has a unit root.

Alternate Hypothesis(H1): Series is stationary, or series has no unit root.

First, we compare the calculated test statistics to the appropriate critical value (5% critical value); and we failed to reject the null hypothesis, implies that the DICONOMY series has unit root. Next, we run an additional dickey-fuller test to verify that the ln (DICONOMY) does not have a unit root. Table 2 represents that we do reject the null hypothesis at the 10 percent level (because $-1.521 < -2.623$) and the approximate p-value $0.5229 < 0.10$. This implies that the digital economy data series (ln (DICONOMY)) does not have unit root and the series is stationary.

Table 2. Stationarity test of Digital Economy and Economic Growth				
	Test statistics	1% Critical value	5% critical value	10% critical value
ln(DICONOMY)	-1.521	-3.709	-2.983	-2.623
MacKinnon approximate p-value for Z(t) = 0.5229				
ln(fd_economic growth)	-3.070	-3.716	-2.986	-2.624
MacKinnon approximate p-value for Z(t) = 0.0289				

Source: STATA results calculated by Authors

The regression model illustrates that there is a positive relationship between economic growth and digital economy ($b = 0.693$).

For the regression model, we tested the heteroscedasticity using the Breusch-Pagan test. The following hypothesis is tested using STATA: H_0 : Constant variance (homoscedasticity).

Results of the Breusch-Pagan test for heteroscedasticity explained that the p value is more than 5 percent (p -value = 0.1078; refer table 4), hence we do not reject null hypothesis and the model has constant variance. This implies that no heteroscedasticity in the regression model. Further, we tested the problem of autocorrelation using the Durbin Watson test in STATA. Results of the Durbin Watson test for autocorrelation explained that there is no autocorrelation (d -statistic = 2.0018; refer table 4). Further, VIF is carried out to check for multicollinearity and results in table 4 indicate that there is no multicollinearity among variables.

5. Conclusion

This study constructed a comprehensive digital index and used Ordinary least square estimation to measure the impact of digital economy development on economic growth of India from 1990 to 2022. Our findings show that: (1) the data is stationary, (2) the regression coefficient is significant, (3) there is no heteroscedasticity, (4) there is no auto correlation, (5) there is no multicollinearity in the regression model. It means that the time series linear regression model explains that digital economy has a significant positive effect on economic growth of India. It can stimulate economic growth by promoting digital structure upgrading. Accordingly, this study proposes the following implications:

(1) India should identify its strengths and weakness based on digital economy index/development score, to formulate effective development strategies and paths to strengthen research and development support for digital technologies and improving environment for digital economy.

(2) We need to pay attention to the driving effects of the digital economy. To promote the deep integration of the digital economy, we need to enhance the digital management and operation of traditional industries through ICT technology, optimizing the efficiency of industrial resources allocation, and by improving their economic efficiency.

(3) India should strengthen the cooperation in the digital economy and promote the deep integration of the real economy and the digital economy, industrialization and informatization. Demand for digital life is increasing day by day, so we must optimize and modernize the layout of information infrastructures as well as the growth strategies for the digital economy. Further, there is a need to create a favorable

environment for the digital firms should be established to support them to boost investment in digital technologies.

6. Conflict of Interest

All authors declare that they have no conflicts of interest.

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Lot And Blockchain For Sustainable Supply Chains: An Order Management Simulation

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Kishore Kunal **
MJ Xavier ***

Abstract

IoT technologies, which are a vital facilitator for sustainable growth, have begun to exert an impact on society as a whole. To analyze the relationship between sustainability and IoT, this study will provide critical analysis of recent literature. The research technique includes a survey of the literature on the subject of IoT innovations and their positive effects in various industries, such as agriculture or sustainable urban planning. The objective is to present a thorough, in-depth review of the different ways that IoT might aid in resolving existing environmental problems around the world and promoting sustainable growth. The digitalization of supply chains must completely modify management procedures and advance numerous sustainability-related factors. For example, Industry 4.0 plans aim to digitize many processes by utilizing cutting-edge technologies like RFID, blockchain, and IoT. The purpose of this research is to demonstrate how technological innovations may be used to enhance processes for order and interruption occurrences, and how this impacts how sustainability is enhanced. The analysis of 2 simulation experiments between 3 parties in the supply chain for cheese forms the basis of the study. In particular, a first conventional scenario is modeled using no emerging innovations, and it is contrasted with a second conventional scenario that incorporates RFID, blockchain, and IoT. The findings indicate a rise in time efficiency for managing both flawless and non-compliant orders. The paradigm that has been created emphasizes how technological advances affect sustainability issues while demonstrating additional management consequences.

Keywords: RFID, blockchain, supply chain, digital technologies, IoT, sustainability.

1. Introduction

Scientists have been raising awareness of the environmental disaster we are currently experiencing since the turn of the twenty-first century. Changes are required in the practices that have led to this situation: unprecedented atmospheric greenhouse gas emissions, excessive resource usage, and ongoing environmental and natural world damage. [1] The COVID-19 epidemic, post-Brexit difficulties, and shifts in CSR have also brought to light the significance of placing environmental sustainability at the center of present and future growth and development. Global warming, loss of habitat, and the impending water problem are a few of the most important environmental worries. [2] Today, nations and governments from all around the world are trying to create sustainable strategies and solutions. The 4th industrial revolution sometimes referred to as "Industry 4.0," describes the idealized future of manufacturing systems. [3-5] The German government originally proposed and put into practice the concept of Industry 4.0 in 2011 to boost digitalization in the manufacturing sector. The goal of Industry 4.0 is to connect all manufacturing sectors' systems through automation to attain sustainability. [6] Emerging innovations like IoT devices are

numerous (IoT). This indicates that all equipment, machinery, and operations in supply chains are digitally linked via an internet connection and exchange real-time data about every operation. [7] Advanced techniques, including sensors, networks, methods, and applications, are integrated by the IoT. Businesses may increase efficiency and their network of supply chains with the IoT. Another key technique of industry 4.0 would be the cyber-physical system (C.P.S.). Many sectors, including logistics, medical, and the auto industry, can use C.P.S. [8- 10] In terms of operations, any company that participates in supply chain movements must have a crucial role called logistics. The network of supply chains can employ networking, processing, and physical methods to provide value to the manufacturing process and boost competitiveness thanks to a CPS. [11] A.I. technology was used to make decisions in automated guided vehicles so that they can operate independently. A.G.V. was a one-time investment that offers numerous benefits to the company, including reduced labor expenses, improved performance, reduced injury risk, and increased safety. Industry 4.0 also introduces the idea of a digital factory, also known as smart manufacturing. A digital factory is a futuristic intelligent factory with a fully automated, human-free manufacturing

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technological adoption, intricacy, scale deployment, and data management continue to remain issues.

2.2. IoT for Sustainable Energy

The debate of power and sustainability makes it evident that technological advancement is required to achieve worldwide energy availability. The creation of solid options for dependable lower power access may increase the effectiveness and operation of the current energy systems. Therefore, by using next-generation hardware and sensing technologies, the community's desire for affordable energy can be met (Fig.1). IoT technology that can efficiently deliver a cheap electrical source is needed to meet this basic human need for energy. IoT in sustainable power systems is expected as the networking of power things all through the complete electrical grid system, services distribution networks, and human capabilities to meet the future needs and the challenges of clean energy accessibility in the 21st century. This concept can develop the next generation of energy systems by connecting various energy technologies and innovative solutions on a worldwide scale. The Internet of Things (IoT) has a lot of potentials to make the current power infrastructure more resilient and sustainable. Through the development of cutting-edge, secure, and efficient energy technology and infrastructure, may also reduce energy hazards in the future. With the deployment of clean, renewable energies that are widely available and flexible for the sustainable supply of affordable sources of energy, the IoT in power systems enables a range of techniques and pathways to global energy accessibility.

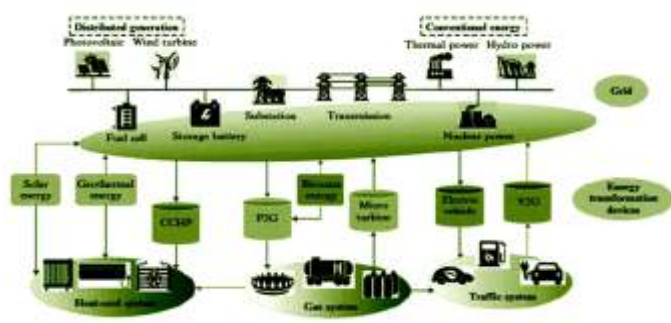


Fig. 1 IoT for sustainable energy

2.3. Risk to security and privacy

Security was the maintenance of data's validity, secrecy, and security and also the defense of sensitive information from the online vulnerability. It is claimed that users will maintain management over sensitive information in the security context. To give their customers a secure environment, AI systems should focus on user data, improvements in privacy approaches, and regulations on maintaining users' and items' identities. In recent times, there haven't been many attempts to explicitly define

"privacy rights." Some experts believe that privacy rights "should not be viewed as a separate legal right." They argue that the present privacy laws ought to be sufficient in most cases. A workable description of "privacy rights" is as follows: The privacy right refers to the power to defend the area that encompasses all aspects of who we are, including our bodies, belongings, homes, secrets, emotions, thoughts, and identities. Our privacy right allows us to limit which parts of our webpage are available to visitors and also the extent, manner, and time of such usage.

Due to technology advancements, particularly in social media, the current environment presents many drawbacks to disclosing one's identity online. Internet contacts, picture and location streaming, as well as group actions to make one's personality and character visible to others, are only a few of the numerous aspects of these problems. Posting on social media undermines openness, security, and exposure, and research shows that users have little control over their data, chats, identities, or photos on these platforms, leading to many security and privacy risks. The UK has recently been aware of the safety and privacy worries that teens and kids have when utilizing social media sites. Recently, worries concerning the information generated by the use of AI devices have been raised. The first issue involves businesses that must use prudence while storing personal data that they independently collect. The second concern, though, is how to safeguard such information against attacks and other malicious actors.

2.4. Problems with Accountability

Businesses using AI and IoT technology now face significantly more responsibility and legal problems than they did in the past. In addition to the problems with data security and safety, the deployment of AI techniques in all businesses has additional legal ramifications. Accountability is one of the main legal issues with the use of AI technology. When artificial intelligence (AI) starts to make decisions on its own, it stops being just a complementary tool, and the issue of whether its creator or developer can be held accountable for the decisions AI makes arises. If the AI device is discovered to have committed a mistake, who'll be held accountable? is the issue of responsibility. AI's decision-making processes are fully datadriven, and the system is already programmed with its algorithms. In terms of the way it makes decisions in different circumstances and considers diverse concerns, the human mind cannot be mimicked by AI or IoT devices or networks. The benefits of these instruments are that they make selections swiftly and precisely even though they are the only algorithms that can perform preprogrammed repetitious choices. Humans are unable to filter all the data and make decisions regarding a large quantity of data in every situation because their brains frequently focus on evident data and draw conclusions depending on a particular set of facts that is simple to access. The ability to quickly and thoroughly analyze all data, irrespective of volume,

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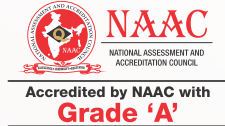


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from all viewpoints before concluding is made possible by AI and IoT sensors. Humans often are unable to accomplish this.

2.5.Simulation Design

The following elements must be provided in a simulation study: the number of replications, the number of input variables, the number of model outputs, the length of the warm period, and the operating time of the system. Table 2 displays the specific characteristics of our simulation investigation.

Table 2 lists the simulation test variables.

MODEL RUNTIME	VARYING INPUT PARAMETERS	OUTPUT PARAMETERS	NUMBER OF RUNS
a total of 5 years. The simulation model starts without a warm up phase	time for the order management of the producer checking time for the retailer time to handle disruption events	average delivery time for perfect orders. average handling time for incorrect orders. Average time saving	In total, 3500 replications for each model with relatives precision 0.01

2.6.Description of a conventional situation

In the conventional scenario, Excel is used, together with phone conversations and email correspondence, to coordinate orders between the production and the store. Because the activities are not standardized, managing procedures takes extra time. The command between the 2 players in this situation is given manually, which ties them to human resources. Furthermore, production and reply times are long as a result of the time-consuming manual tasks needed for each order. The producer accepts and authorizes the retailer's order. The order management division first confirms that the items are in stock before planning the dispatch. As a result, a single worker is modeled using a normality test to handle order processing.

This step's activities cover the length of time needed for the order to be received, and accepted, for the products to be verified as being available, and for the goods to be prepared. The goods are put in a reception area where the carrier may arrive after the producer has organized the order. The carrier then packs the merchandise into his vehicle and drives it to the retailer. A normality test is used to model delivery times, with a median of 30 minutes. The parameter was unaffected by the usage of the investigated technologies and is identical for the two situations, allowing extrapolation of the findings even if this time is fairly brief and only takes into account retailers who are quite near to the manufacturer.

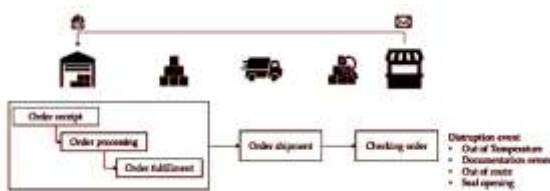


Figure 2 Conventional scenario's scheming of the material and information flow.

2.7.Smart contracts, blockchain, IoT, and RFID scenario

The 2nd instance compares and verifies the outcomes of the first scenario and is dependent on the utilization of developing technology. Each actor in this scenario has access to the blockchain, IoT equipment, and RFID sensors. The products are completely traced and validated in this way. RFID sensors are specifically employed to record information on the physical state of the goods in the producer's storage and the carrier's vehicle. Data must be transferred from the RFID sensors placed adjacent to the items to the distributed ledger via the IoT network. Lastly, blockchain ensures that data is recorded safely and forever and that players can see all activities. Since the transferred information has been sent inside a distributed ledger rather than a centralized server-client system, the usage of blockchain in this situation specifically resolves the criticality of managing data by preserving it in a safe and immutable manner without being readily tampered with.

Table 3: Parameters for each simulated scenario's data entry

Input parameter	Phase	Probability distribution	Traditional scenario	Blockchain, IoT and RFID scenario
Order management (P)	Order receipt			
	Order processing	Normal distribution (Mean, SD)	(8 h, 1 h)	(8 h, 30 min)
	Order shipment			
Order management (R)	Order shipment	Normal distribution (Mean, SD)	(30 min, 5 min)	(30 min, 5 min)
	Order check	Triangular distribution (Min, Max, Mode)	(20 min, 40 min, 30 min)	-
Disruption event management	Out of temperature	Triangular distribution (Min, Max, Mode)	(10 min, 25 min, 20 min)	-
Disruption event management	Documentation error	Triangular distribution (Min, Max, Mode)	(10 min, 30 min, 20 min)	-
Disruption event management	Out of stock	Triangular distribution (Min, Max, Mode)	(1 h, 2 h, 1.5 h)	-
Disruption event management	Seal opening	Triangular distribution (Min, Max, Mode)	(5 min, 15 min, 12 min)	-
Disruption event management	Wrong packaging	Triangular distribution (Min, Max, Mode)	-	(1 min, 5 min, 3 min)
% Level of error			5%	5%
% Out of temperature			7%	7%
% Documentation error			7%	7%
% Out of stock			7%	7%
% Seal opening			7%	7%
% Wrong packaging			-	7%

As a result, it is feasible to continuously track changes in the condition brought on by outside sources. Smart contracts have made it possible for the two players to control orders automatically. The shop initiates a smart contract to deliver the order request. A password is given to both the receiver and the sender via the smart contract. This password will be connected to the producer's order, and the retailer will need to give it to the delivery driver to get the products. As a result, the entries are validated and verified, and there is no chance to manipulate the network. In this case, real-time synchronization of the physical and virtual warehouses is made possible by the employment of blockchain, IoT network, and Rfid system. As a result, the time required to request an order and check its availability is decreased, and they are modeled using a normal dispersion.

The carrier's delivery times for the items stay the same, but in the second instance, the deployment of IoT and RFID technology within the vehicle allows for continuous product monitoring. Finally, the carrier requires the retailer's passcode to unlock the

order once the products have been delivered to them. In this case, since the products are constantly under observation, any interruption event is quickly notified to the participants in the supply chain, and the products are then returned to the producer, who will then send replacement products. In addition, the paperwork is given in a digital format, unlike the conventional scenario.

3. Result and Discussion

The consequences of activities in the two situations are compared in Table 4 over 5 years. Since the likelihood of the disruption occurrences occurring was identical in both situations and since these occurrences are independent of the adoption of innovations, a service level of 96% was maintained for both to compare the outcomes equally. The mean number of noncompliant requests is identical for each example given that the disruption occurrences are expected to represent the same %. The cause is improved automation of order administration utilizing smart contracts, as well as ongoing oversight of the overall process. The period between the retailer's order launch and the producer's completion of the quality inspection is known as the average duration for perfect sales.

Table 4 Each scenario's Main Performance Metric.

Key performance indicator	traditional scenario	scenario with emerging technologies	time saving (h)	time saving (min)	%
Average number of perfect orders	695	695			
Average number of out of temperature	7	7			
Average number of opening seals	7	7			
Average number of out of route	7	7			
Average number of documentation error	7				
Average number of wrong passphrase		7			
Average time of perfect order (h)	52.61	51.18			
Average time of out of temperature (h)	52.6	51.84	1.6	47	2.50%
Average time of opening seal (h)	52.89	51.64	1.97	69	3.20%
Average time of out of route (h)	53.15	51.88	2.38	86	4.30%
Average time of documentation errors (h)	53.11		3.29	242	6.20%
Average time of wrong passphrase (h)		51.93	2.22	77	3.70%
Average time of disruption events (h)	53.08	51.83	2.45	92	4.30%
Average total time saving (h)	52.08	51.87	2.1	83	4.00%

In the very same way, disruption occurrences are delineated as the period between the start of the retailer's sequence and the completion of the waste disposal, which can vary depending on various factors like air temp, documentation mistakes, out-of-the-path, opening lock, or accessing the incorrect passphrase code. According to the conventional scenario, only in the check order stage, when the merchant is in charge of the delivery of the items, can interruption occurrences be evaluated? The parameters and documentation of the goods are rather reviewed in real-time during the second case, and if issues are found, the goods are taken off the market, and administration is improved. In both situations, it takes roughly 2 days from the time the order

is placed until the merchandise is delivered to the retailer.

The findings indicate a 4.2% decrease in the typical processing time for disturbance situations. In addition, the typical handling time for excellent orders has been decreased by 2.1%. About 72 minutes are saved on average when executing an order. The outcomes demonstrate the potential influence of the second instance on the handling of interruption events.

3.1. Impact on the employment market

The revolution in information technology already has significantly changed the work landscape, and emerging technologies can have even more of an impact. According to some assessments, 121 million employees in Thailand will have to be displaced over the next 19 years due to AI and IoT, while 589 million new employees will need to be generated over the next 14 years. Significant industry-wide process robotics may lead to job shortages, but it may also open up new chances for well-qualified individuals, particularly in developed countries. The possible benefits and drawbacks of AI and IoT adoption for workers are listed in Table 5.

Table 5 The effects of the latest tech on employment.

New opportunities arguments from implementation of AI and IoT	Job losses arguments from implementation of AI and IoT
<p>New job opportunities requiring high skills;</p> <p>Augmentation of human capacity and the effectiveness of human potential;</p> <p>Freeing up capacities of the employees to engage in non-routine decisions and tasks [; Simplification of the work tasks at the level of skilled work;</p> <p>Developing expert systems as a tool for qualified skilled workers;</p> <p>Employees could focus mainly on social interactions, collaboration, continuous improvement, and innovation;</p> <p>High-skill jobs will become more intrinsically motivating, diverse, enabling more skills, and decentralization.</p>	<p>Jobs may become redundant or reduced through automation and the digitization;</p> <p>Reduced demand for mid-skill workers; Providing quicker, more accurate and fact-based performances comparing to human work;</p> <p>Limitation of the autonomy of accomplished skilled workforce;</p> <p>Reduced motivation for middle-skill jobs due to fewer tasks and skills, more centralization and monitoring;</p> <p>The qualification requirements of new jobs will be more strict;</p> <p>Elimination of a possible human error source;</p> <p>Lower qualified personnel can be quickly deployed at lesser wages;</p> <p>Reduced extended on-the-job training for lower qualified workforce;</p> <p>Vast numbers of job seekers will require financial support to catch up with new jobs;</p> <p>Decrease of demand for manufacturing work in high-income countries;</p> <p>The skill sets for today's jobs will be totally changed.</p>

3.2. Sensitivity Analysis

Below, a sensitivity study is carried out to take into account the impact of structural response on model outputs. To analyze the impact of various model variables, factor prioritization was used because there are various kinds of sensitivity evaluation depending on the aim of the investigation. The average date of delivery to the store, reorder period, and amount of products sought in order were the three structural criteria taken into account. Table 6 in particular displays the values of these parameter changes.

Table 6: Time savings % changes as a result of the sensitivity study

PARAMETER	VALUE	% TIME SAVING
AVERAGE DELIVERY TIME TO RETAILER	30MIN	2.5
	36MIN	2.7
	46MIN	2.4
	50MIN	5.20%
TIME TO REORDER	2 DAY	10.80%
	3DAY	9.30%
	5DAY	8.10%
	6DAY	4.80%
NUMBER OF PRODUCTS REQUESTED IN AN ORDER	3	6.20%
	4	7.10%
	6	9.50%
	7	10.90%

The sensitivity analysis's findings indicate that while differences for short timeframes are unimportant, the mean delivery date to store has a substantial impact on saving time when the order shipping phase takes longer. This association makes sense given that longer distances traveled and better real-time identification have a bigger influence on time savings. The significance of the time between orders diminishes as the time intervals grow. The order processing unit has more trouble processing orders fast the lower the reorder durations are. However, smart contracts and blockchain contract solutions will enable the automation and standardization of many processes, which will lighten the load on staff.

4. Conclusion

The effects of combining technologies like blockchain and IoT on order administration and disruptive event management have been investigated in this document. The body of knowledge about blockchain and supply chains is expanding rapidly. The actual quantitative gains from the perspective of operations administration are, however, rarely highlighted. This study demonstrates the time savings that emergent technologies can have on supply chains in the present. The study demonstrates how continual surveillance and supply chain accountability can have positive effects on the economy and the environment. Because it tries to confirm if the qualitative traits of blockchain claimed in the literature accomplish advantages, this work adds to the body of literature. The model of the production chain also acquires symbolic value. As consumers demand more and more data about the items they purchase, many traceability efforts are concentrated on agri-food goods. Without the need for outside intermediaries, the usage of blockchain ensures the authentication and verification of the finished product.

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