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Adoption of Green Finance for Eco-friendly Banking – An empirical study on Environmental Impact of Digital Banking

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Abstract

With environmental deterioration challenges and a severe decline in natural resources, the need for involvement in environment-friendly practices has increased a lot. To avoid environmental detrition companies need to be socially responsible and avoid pollution causing by the companies and wastages. As the achievements in business development are based on stakeholders like customers, communities, suppliers, employees, and other stakeholders. Green financing is implemented to be socially responsible, accountable to environment and itself. The objective of green financing is to be eco-friendly, banking sector are highly adopting digital technologies for implementing green financing for conservation of natural and energy resources. The ultimate goal of the research is to analyse the challenges in implementing green finance, to establish the opportunities in digitalization of banking systems, to evaluate the impact of green finance on profitability and sustainability of banks. The research analyses with quantitative analysis using SPSS version 23.0, through survey assessment, gathering primary data from organization managers and CEO. A structured questionnaire survey is prepared, segregated, and distributed to the respondent. Purposive sampling approach is used for quantitative analysis and 218 responses are obtained. Correlation, descriptive statistics, mean, chi square and ANOVA analysis are used in the research to predict the outcome. The result reveals that there is a positive impact for sustainability of environment for implementing green financing in banking sector.

Keywords: *Green financing, financial sector, eco-friendly, pollution, fintech*

Introduction

Financial technology (fintech) and sustainability of environment are the blooming topics among researchers, also in business of banking, asset management and securities. Further governments have initiated various measures in favouring green finance to enhance sustainability of environment [1, 2]. Digitalization supports sustainable economies transformation by promoting growth and improving overall productivity, in digital banking and trade as significant role. Sustainability of activities in fintech has made the researchers to analyse the relationship among digital banking and sustainability of environment. Moreover, reliable adoption and digitalized efficient payment system both at cross border and national level is the significant strategy for decreasing the inequality and improving sustainability of environment [3]. Green finance and fintech are vital to regulation mainly in emerging countries to satisfy sustainable development goals and Paris agreement [4].

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Banking sectors are playing a vital role in attaining sustainable development of a country via adoption of digital technologies which includes digital banking, blockchain and green banking [5], also financing of different eco-friendly initiatives like clean technology, clean energy, green industry development and energy efficiency[6, 7].

Issues related with sustainability of environment, growth of economy and technology innovations are not novel yet integrating these in the research is flattering to be significant [8, 9]. Fintech is defined as business connected with financial service with innovative technology like blockchain [10]. Technological innovation is used in fintech to deliver people products and services in finance sector [11]. On the other hand, Green finance is described as financial investments in different eco-friendly activities and initiatives which assist business in attaining sustainability of environment and encouraging growth of sustainable economy [12]. Green innovation is illustrated as advancement in technology which reduces environmental degradation, reduces waste, reduces consumption of energy, reduces air pollution and utilization of oil, power and coal which also conserves energy [9]. Similarly Green innovation is significant in present corporate sector for mitigating hazardous effects due to change in climate [13]. This results green finance and fintech to contribute to environmental sustainability promotion in banking sector by integrating environmental friendly digitalized technology in their business operation such as digital banking, online customer care services, digital lending and mobile banking also financing to various eco-friendly initiatives like green industry enhancement, waste management, renewable energy and alternative energy.

Many studies are conducted to evaluate the association among performance in sustainability of environment in business and green finance [8, 14, 15]. The study G20 green finance [16] describes green finance as investment financing which delivers benefits to environment in context for sustainable development. These benefits include reduction of land, air and water pollution, greenhouse gas reduction, enhanced energy efficacy during utilization of prevailing natural resources. To attain goals regarding sustainable development it is significant to initiate green projects via green banks, financial bonds, carbon market tool apart from this the financial instruments and fiscal policy, new policies, central benefits, green funds based on community, fintech and enlarge investment financing which provide benefits to environments is referred to as green finance [17, 18]. On the other hand, finance sector is mainly utilized for the funding industrial products which significantly produces emission of carbon dioxide in huge amount through paper, cement, electricity, steel, textiles, fertilizers and pesticides. Alternatively, the finance sector acts as intermediary among environmental, economic and social conversation, hence developing corporate social responsible investments [19, 20]. Mostly emerged countries are attracted towards green banking and emerging countries are ignoring them [21] and in India green banking is undiscovered [22]. The institution efforts to utilize ideas related to environment that facilitate company to develop new products or practices among competitors, seize opportunities, reduce costs and become leaders in market [23]

The scenario described motivates us to empirically examine the role of green finance in protecting environmental quality. The primary goal of the study is to analyse the challenges in implementing green finance, to establish the opportunities in digitalization of banking systems and to evaluate the impact of green finance on profitability and sustainability of banks. The study meets the objective through a quantitative analysis and outcome of the study is inferred and the significance of study objectives and proposed hypotheses is statistically analyzed and validated.

The following Section 2 discusses the previous research literatures on adoption of green finance in finance sectors. The research design and proposed methodology is discussed in Section 3. The Section 4 provides the result interpretation of the demographic and statistical analyses. The overall conclusion of the empirical study is concluded in the Section 5.

1.1 Scope of the study

The present study investigates the green financing for ecofriendly banking. The green financing in firms is growing rapidly in the current era. Green finance is achieving priority because of quest to withstand society and banks against unforeseeable challenges regarding unpredictable climate crisis, financial occurrences, corporate scandals and social unrest. Aimed at the environmental development or performance of banking institutions, green finance plays a major role. Green finance concept is imperative in the finance industry as trust plays a key role in maintaining ecofriendly relationships. Green finance enhances the environmental performance in context to the society achieving long term growth. Nowadays, society not only expects goods and services from firms but also requires the firm to play a vital role in society that is limited to its traditional role.

The present research contributes a positive association with the organization implementing on green finance for ecofriendly and sustainable development. The investigation processes in firms to identify the organization's ecofriendly long term growth after implementing green financing. The research has brought out the factors such as profitability and sustainability growth, opportunities for banking sectors by incorporating green financing, and the societal play of firms.

1.2 Problem Statement

The firm has obligations to society beyond shareholders' revenues. Regardless of the type and size, businesses should be stable environmentally, competitive economically, and socially responsible [24]. From the perspective of stakeholders, the firm has an obligation toward stakeholders of firms, as they can negatively affect the company's practices and policies [25]. The risk perception based on evolution of technology and market development is the green investors' concern [26]. Further, fintech consider green investment projects are risky and reluctant to finance [27]. Many kinds of literature have pictured different opinions on the green financing in finance sectors, such as negative, positive and no effect [28-30]. Corporate management need to analyse the association. Most of the literatures have analysed impact of green finance on environment, yet have not

analysed the challenges in using among people, and opportunities of digitalisation among green banking. The present research will fill this gap and helps to identify the relation among environmental performances after integrating green financing in banking sector. Additionally the present research has attempted to provide significance of green financing and creating eco-friendly environment to the society.

2. Literature Review

The study of Jinru identifies vital role of green logistics and financing for sustainable production [31]. The study is based on quantitative approach and data is collected from 240 respondents from manufacturing industry in china. The findings of the study delivers that green logistics and green financing have positive impact for circular economy and sustainable production. Additionally the sustainability of production plays vital intermediating role between the variables. Moreover importance – performance map analysis delivers every builds performance also significant value to circular economy. The study has highlighted the purpose of every construct. Additionally, the findings inferred that green logistics and green financing must be incorporated into firm financing and procuring strategies required for sustainable goods and manufacturing green to achieve circular economy goals. The study of Muganyi has analysed on the green finance impact based on policy in china [32]. Using Semi-parametric Difference-in-Differences, the study has delivered there is reduction in emission of industrial gas by implementing green finance. Further, development of fintech reduces emissions of sulphuric acid which has significant impact on protection of environment. China is the leader in implementation of policy in green finance also the regulators need to quicken the formulation to enhance the financial institution capacity to propose green credit. To minimize the risk in fintech it is required to encourage fintech by policy makers in order to participate actively in protection of environment which encourage green consumption.

The aim of Lamperti employ an agent based model to research relation among economic dynamics, credit, and climate change a test of policy mix interventions. The study finding delivers credit provision surges organisation financial fragility and productivity. The study further test on the green finance policy addressing risk based on climate change. The study states that policies reduce the emission of carbon alternatively result in climate impacts moderately. The study concludes financial policy cool downs the risk related to climate with policy of mitigation limiting emissions from economic activities [33]. The development of green finance is a comprehensive system based on three aspects environmental, financial and economic activities. The existing study evaluates the development of green finance system. The green finance internal development is transferred to three, Pressure, State and Response (PSR) subsystems and the score is calculated by entropy weight approach. The relationship among sustainable energy and green finance are analysed quantitatively. The result depicts that energy development can be encouraged via green finance development by different measures in economic development dimension, environmental and financial development [34].

The prevailing study analyses the influence of enterprises, customers, financial institutions and governments on development and changes of green financial market. An investigation is made among participating entities based on influence mechanism and participating strategy. The result depicts that there is a positive impact on development sustainability and green financial system. The study further delivers that government regulation are critical to strengthen, slash financial enterprises and institutions on production cost of green finance, reduces government supervision cost, and surges the compensation for customer pollution. Simultaneously, to integrity the system of green finance, finance enterprises and institutions, government and customer cooperation and participation are required among each other [35]. The study of Zhang analyses the relation among growth of green economy, customers spending on R&D and energy efficiency. The study uses panel BRI member countries for analysis and the approach used to reveal the outcome is generalised – method – of – moments and data – envelopment – analysis. The study reveals there is a fluctuation in growth of green economy during the attribution towards non serious government policy effects. Moreover, the study illustrates customers spending on green energy technology's R&D and human resource promotes for sustainability of green economy via technology, labour and production activities and various effects in various countries [36]. The existing study examines the relation among the emission of CO_2, green energy index, energy efficiency and green finance in ten economies to encourage green financing. The result of the study delivers a sustainable approach to encourage projects based on green energy to reduce the emission of CO_2 significantly. Simultaneously there is no connection among these variable. Hence to achieve sustainability on economic growth it is required to surge private participant in projects regarding green energy. The study delivers that this policy might be applicable after pandemic era when it is difficult to access green projects finance [37].

3. Methodology

3.1 Research Design

The present research is subjected on empirical and descriptive studies. The research embraces quantitative analysis technique and uses primary data. The primary data collection has been accomplished by survey with aid of questionnaires and then the gathered data is analyzed using the SPSS tool. The data is gathered from managers and CEO from 100 organizations. The Primary data collection accompanied nearly 218 respondents from the managers and CEO from different organizations. To establish the relation between the variables concerning the role of socially responsible management for financial development.

The primary stage of research design identifies the variables that contributed to the impacts or variations in the organizations. The factors influencing green banking practices for environmental sustainability is determined. The relationship between green financing and eco-friendly banking was explained. The research by design is quantitative and exploratory, seeking to uncover the underlying causes affecting of green financing in fintech for eco-friendly banking. The positive and

negative effects also impacts the development of firms.

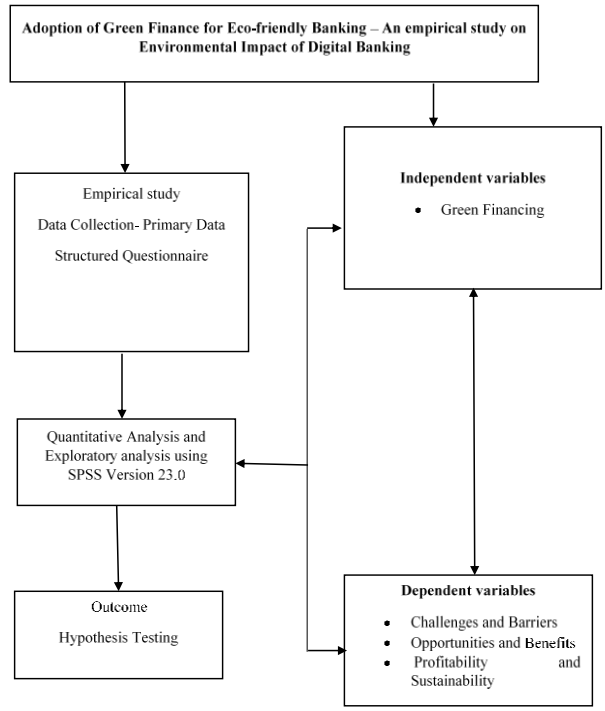

Figure 3.1 Research Design

The data is collected from the participants, such as managers and CEO from various organizations. Establishing the link and relationship between the variables selected in this research is performed by implementing ANOVA evaluation, correlation, and mean and chi square evaluation. The process involved in the research is illustrated in Figure.3.1. The independent variables are considered Green financing. The dependent variable is Challenges and Barriers, Opportunities and Benefits and Profitability and Sustainability.

3.2 Research Objectives

- To analyse the challenges in implementing green finance.
- To establish the opportunities in digitalization of banking systems.
- To evaluate the impact of green finance on profitability and sustainability of banks.

3.3 Research Question

- What are the challenges in implementing green finance?
- What are the opportunities in digitalisation of green banking?

- How does green finance impacts the profitability and sustainability of banks?

3.4 Research Hypothesis

H_11: The implementation of green financing system is encountered by barriers and challenges.

H_01: The implementation of green financing system is not encountered by barriers and challenges.

H_12: The digitalization of banking systems provide more benefits and opportunities for the banking sectors

H_02: The digitalization of banking systems do not provide more benefits and opportunities for the banking sectors

H_13: The bank profitability and sustainability are influenced by the green financing system.

H_03: The bank profitability and sustainability are not influenced by the green financing system.

3.5 Study Population

The valuable respondents for the survey were filtered using purposive sampling methods. The sample size for the research is 218 from 100 organisations. After collecting the data, it is fed as different variables and assessed through the tool called SPSS to accomplish the research aim.

3.6 Sampling Method

Purposive sampling method is adopted in this research for selecting the repliers. The current study utilizes the purposive sampling approach in the primary data sources. It is a non-probability sampling method where researcher decide who must be combined or obtained as the sample [38]. The respondents selecting process is expected to provide beneficial information for the research. The main reason for proceeding with purposive sampling strategy in the study is because the statement is constructed with respect to the objectives of the research that particular people may provide significant views required for the research questions and thus required to be combined into the sample [39]. The samples under this purposive sampling approach are obtained from 100 organizational managers and CEO.

3.7 Data Collection

The most important stage of research is data collection process. This is based on the emphasis on the objectives of the research to increase a logical knowledge on research questions. The main responsibility of a researcher is to choose the appropriate data collection method. The data has been collected from 100 firms to analyze green financing for eco-friendly banking. The data was collected from two participants, the manager and the CEO of the organization.

3.8 Research Instrument

The research tools are utilized in education, health sciences and social sciences to inspect students

and clients. The projected research uses a structured questionnaire from various respondents. The research instrument utilized in the study is the structured questionnaire, depicted as the survey questions. A set of questionnaires was designed and distributed to organizational managers and CEO of various firms. Every sample possesses the same probability as other research samples to be chosen, serving as a representation of the whole population.

3.9 Data Analysis

A systematic phenomenon for collecting and executing mathematical, statistical, and computational data is by Quantitative research analysis[40]. This method fetches data from management employees utilizing sampling techniques. Numerical results are obtained in the analysis.

With the support of framed questionnaire, the data are collected from the particular sample respondents, and quantitative methodology is utilized for the data analysis. The data will be recorded using an Excel sheet to reveal the variables. The software tool SPSS is used for the subsequent estimation stage to analyze the variables entered in Microsoft Excel. The outcomes are estimated using five evaluation approaches. The methods used by the researchers are correlation, chi square, mean, and ANOVA analysis. Correlation is applied to describe the association between the two variables. Regression is implemented to represent the influence of a single variable upon other variables. ANOVA is a statistical tool used to find the difference between the means of two independent collections by analysts. Descriptive statistics denotes the representation, collection, and formation of data. It is employed for briefing the characteristics of data sets.

The use of SPSS software in this research makes the results effective and consistent in counting the values. The collected data was enumerated with the usage of Excel and SPSS software. Correlation, and ANOVA are accomplished to evaluate the organized hypothesis. The data estimation comprises 3 levels, namely, Microsoft Excel is used to incline the demographic variables, and the design of frequency distribution is done. To list the data analyzed by statistics to predict the median range and the mean and standard deviation of several variables in this research is a significant step. Hence SPSS software is employed in this research. Mean, chi square, ANOVA, and Correlation evaluation are employed to evaluate the research hypothesis.

4. Results

The analysis is done based on the responses of the managers and CEO in the organisation and various analysis has been done to meet the objective of the research.

4.1 Demographic Data and Inferences

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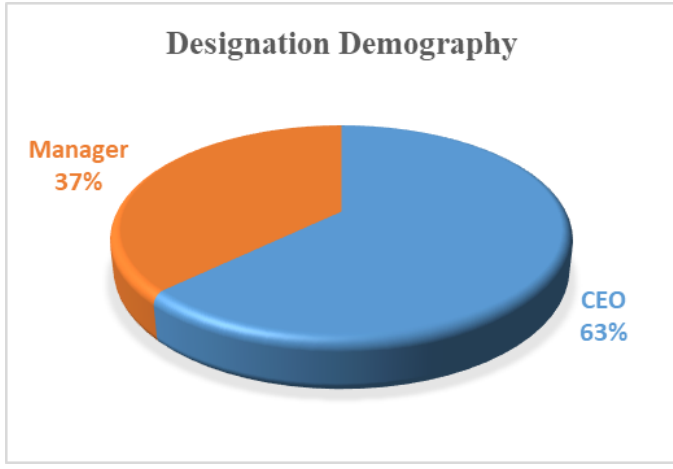

Figure 4.1 Designation Demography

The decisions in finance institution are mostly taken by management employees and CEO. Figure 4.1 illustrates the percentage of managers and CEO participants in the study. The figure clearly states that 63% of respondents were CEO and 37% of the respondents were Managers.

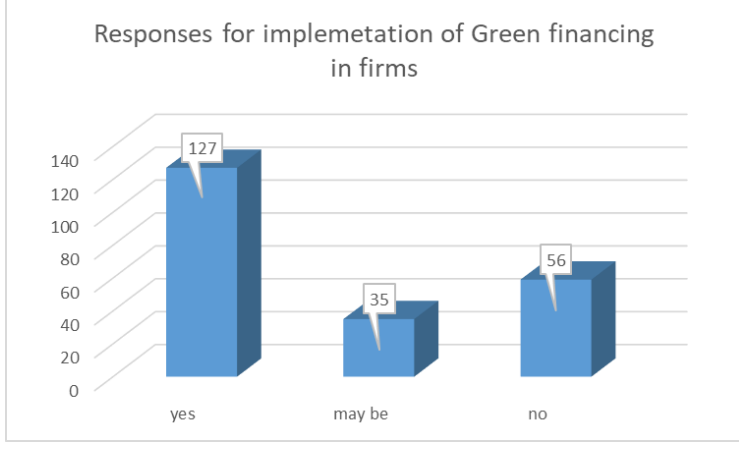

Figure 4.2 Responses for implementation of Green financing in firms

Figure 4.2 illustrates responses of participants on implementation of green financing in firms. Nearly 127 participants responded as "yes" for implementation of green financing, 35 participants responded as "may be" in future for integrating green financing and 56 participants replied as "no".

1.1 Statistical Analysis of Responses

The data collected through the questionnaires were analyzed through the SPSS software package.

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The statistical analysis provides the relationship between the study variables and the objectives. This relationship enables us to understand the significance of objectives and validate the hypothesis. This study has performed two different statistical analysis procedures, the one-way ANOVA test and the Correlation test.

Anova Test

Table 4.1 Descriptive analysis

					95% Confidence Interval for Mean			
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
intenance of machines for digital transactions is tedious and complicated	Strongly disagree	148	1.20	.402	.028	1.15	1.26	1	2
	Disagree	35	1.00	.000	.000	1.00	1.00	1	1
	Neither agree nor disagree	18	1.27	.452	.079	1.11	1.43	1	2
	Agree	13	1.24	.449	.068	1.20	1.48	1	2
	Strongly agree	4	1.19	.397	.061	1.07	1.31	1	2
	Total	218	1.20	.403	.021	1.16	1.24	1	2
The digitalization of financing system enables eco-friendly banking environment	Strongly disagree	3	1.21	.695	.048	1.71	1.90	1	3
	Disagree	5	1.13	.829	.130	1.37	1.90	1	3
	Neither agree nor disagree	20	1.27	.452	.079	1.11	1.43	1	2
	Agree	38	1.64	.479	.068	1.20	1.48	1	2
	Strongly agree	152	1.81	.415	.064	1.08	1.34	1	2
	Total	218	1.61	.684	.035	1.54	1.68	1	3

Table 4.1 depicts the perception of respondents in banking sectors towards the implementation

of green finance. As denoted in table 4.1 the highest mean value is 1.27 acquired with respect to the respondents who rated for maintenance of machines for digital transactions is tedious and complicated. Also it is notes that this decision alone cannot influence the implementation of green finance. The highest mean value 1.81 is acquired in the digitalization of financing system enables eco-friendly banking environment.

Table 4.2 ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Maintenance of machines for digital transactions is tedious and complicated	Between Groups	2.796	4	.699	4.474	.002
	Within Groups	57.801	214	.156		
	Total	60.597	218			
The digitalization of financing system enables eco-friendly banking environment	Between Groups	22.240	4	5.560	13.473	.000
	Within Groups	152.694	214	.413		
	Total	174.933	218			

ANOVA analysis is executed to find the association among dependent and independent variable and is represented in Table 4.2. This research is generally executed to define the statistical variance among independent variables. The significant value attained for the measured concept is 0.00, and hence there exists a significant relationship among independent groups. Maintenance of machine for digital transactions and digital financing enables eco-friendly environment significant impact. The result clearly depicts that

Correlation test

Table 4.3. Correlation Test

	The adaptability to the use of advanced machines for digital transactions is very less among the senior citizens and less educated customers	The greenIn transaction system enables eco-friendly approach of the banking system will digitalize all the tasks performed by the banks and reduce the manpower, replacing with AI assisted technologies	future, the inavoiding long queues and hectic record maintenance in the banking processes

The adaptability to the use of advanced machines for digital transactions is very less among the senior citizens and less educated customers	Pearson Correlation	1	.348**	.443**
	Sig. (2-tailed)		.000	.000
	N	218	218	218
The green transaction system enables in avoiding long queues and hectic record maintenance in the banking processes	Pearson Correlation	.348**	1	.524**
	Sig. (2-tailed)	.000		.000
	N	218	218	218
In future, the eco-friendly approach of the banking system will digitalize all the tasks performed by the banks and reduce the manpower, replacing with AI assisted technologies	Pearson Correlation	.443**	.524**	1
	Sig. (2-tailed)	.000	.000	
	N	218	218	218

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

The correlation test is performed to validate the relationship between the variables and also to estimate the magnitude of the relationship. The relationship between the dependent, independent and moderating variables is analyzed through this correlation test and summarized in table 4.3. The significance of the hypotheses has been once again validated through this test. The significance was maintained below 0.05 throughout the analysis.

The possibility of The adaptability to the use of advanced machines for digital transactions is very less among the senior citizens and less educated customers, The green transaction system enables in avoiding long queues and hectic record maintenance in the banking processes, and In future, the eco-friendly approach of the banking system will digitalize all the tasks performed by the banks and reduce the manpower, replacing with AI assisted technologies, are the variables that were tested for validating the significance of correlation.

The significance correlation within the variables were all observed to be at the level of 0, thereby satisfying the 2-tailed significance condition of the bivariate correlation test. Hence, the correlation test also has proved that the independent, dependent and moderating variables possess significant correlation with one another.

Mean

Table 4.4: Mean

The promotion of green financing system creates positive awareness on eco-friendly banking and attracts more customers	Mean	N	Std. Deviation
Agree	2.69	67	.633
Neutral	1.11	125	.425
Disagree	2.00	26	.400
Total	1.70	218	.868

The outcomes shown in the table 4.4 are the results intended by considering the responses of the managers and CEO in financial sectors. The mean of promotion of green financing system creates positive awareness on eco-friendly banking and attracts more customers is the mean value among the participants compared. The table reveals that the highest mean is 2.69, which is rated for agreeing green financing system creates positive awareness on eco-friendly banking and attracts more customers. Also, it is noted that these decisions are based on the perception of an organization's management employees (CEO and manager).

Chi-Square Tests

Table 4.5: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	236.715[a]	4	.000
Likelihood Ratio	226.662	4	.000
Linear-by-Linear Association	95.271	1	.000
N of Valid Cases	218		

The chi-square technique is also termed as Pearson's chi-square analysis or the association test, is utilized to identify the relationship between two categorical variables. Table 4.5 illustrates the relation between implementation of green transaction system enables in avoiding long queues and hectic record maintenance in the banking processes and simple and quick transaction process of the digital banking system enables the banking management to handle clients from any place

in the world. As depicted above when the significant value is lower when compared with the significant P value that is 0.05, then the analysis is agreed to be a significant one. It has high Pearson Chi-square value of 237.715 and the significant value is less than 0.05. This concludes that the considered variables have strong relationship with one another. Hence, it is proved that Green financing has benefits related to quick transaction process and avoids in maintenance of records in banking process.

Discussion

Most of the literatures has been researched green financing based on the sustainable production, impact on policy, limits CO_2 emission, sustainable environmental, financial and economic development [31-35, 37]. The research has been limited to examine the challenges in implementing green financing on customer basis and analysing the opportunities in integrating green financing. The present study has analysed the challenges and these challenges can be reduced by their benefits. The result from ANOVA analysis delivers that the challenge in maintaining digital technology is a tedious process is analysed with digitalization of financing system enables eco-friendly banking environment states that there are more benefits than challenges. Further these challenges can be reduced gradually. The result from correlation test, the considered variable suggests that there is a negative impact on adaptability to the use of advanced machines for digital transactions is very less among the senior citizens and less educated customers but there is a significant influence on green transaction system enables in avoiding long queues and hectic record maintenance in the banking processes. Adaptability towards green financing can be increased gradually as there are many benefits. Additionally the result delivers that in future, the eco-friendly approach of the banking system will digitalize all the tasks performed by the banks and reduce the manpower, replacing with AI assisted technologies by implementing green financing. From the mean analysis the responses agreeing towards promotion of green banking are depicted. Furthermore from the Chi square analysis delivers that there is a significant advantage in incorporating green financing in banking sector.

Conclusion

Green financing is a significant factor for achieving sustainability of eco-friendly environment and economic growth in an organisation. Most of the literatures has depicted there is a positive impact on environment by implementing green financing in banking sector. The process of implementation of green financing is strongly acceptable and implemented in emerged countries. Further no literatures have analysed the challenged faced by the customers in integrating green financing in banking sector. To fill this gap the present study has investigated on challenges in implementing green financing in emerging country India. Also the research has analysed the impact of green financing technology maintenance and eco-friendly banking. The study enunciates empirical support to the previous researcher that indulging in green financing significantly enhances environmental sustainability and economic development. The present

study clearly shows that green financing improves economic growth of an organisation and creates a reputed image in society. Future studies should evaluate on the policy, standards and regulation of green financing in banking sector and urge to execute a monitoring system to progress in greening the environment for sustainability.

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