



“A Study on the Impact of Artificial Intelligence(AI) Technology-Enabled Digital Banking Services on Consumer Loyalty”- A Conceptual Framework

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ABSTRACT

In this tech era, the service industry, such as banks, becomes more digitalized, as they provide digital banking or online banking services additionally, in order to gain a competitive advantage and also achieve a significant market share. Artificial Intelligence (AI) is one of the more advanced form of technology used in computer designs that allow us to execute the task which generally needs the intelligence of human beings, including speech reputation, visible identification, translation of languages and hassle-solving. AI technology used in banking provides personalized and customized high-quality customer satisfaction and loyalty with effective and efficient services. The systematic literature review in this study covers the different trends in digital banking such as service-related quality dimensions, AI technology factors, customer satisfaction, and consumer loyalty. Personal demographic factors too, impact digital banking, and hence a conceptual model and its structure equation modeling (SEM) are proposed which validates the model so as to demonstrate the impact of AI technology on loyalty of banking customers. This study focuses on how AI-enabled banking devices might increase consumer loyalty. Service quality dimensions (Reliability, Assurance, Customization, Empathy and Responsiveness) and Technology Acceptance Model (TAM) factors (perceived usefulness, perceived ease of use, perceived risk, perceived trust & perceived benefits) significantly impacts customer satisfaction and consumer loyalty.

Keywords: Artificial Intelligence, Digital Banking, TAM, Service quality dimensions, Customer Satisfaction, Consumer Loyalty.

Introduction:

Artificial Intelligence (AI) is the system’s ability to correctly interpret external data, learn from such data, and use those learning to achieve specific goals and tasks through flexible adaptation (Kaplan and Haenlein, 1987). It is one of today’s most widely discussed concepts having a high-level understanding of the goals even banks are looking to achieve with AI from virtual assistants.

Kaplan and Heinlein, classified Artificial Intelligence into three different types of AI systems, which include the following:

(a) Analytical (b) Human Inspired (c) Humanized Artificial Intelligence

AI-enabled digital banking is an important service in increasing customer loyalty of the bank. A survey shows that nearly 20% of customers are willing to switch to another financial institution if their current bank does not provide online banking services (Guru, Shanmugam, Alam, & Perera, 2003).

Indian Banks Using AI:

K. Suresh Kumar et al., (2021), mentioned about 32% of banking sector is already using AI technologies like predictive analytics, voice recognition, etc., according to joint research conducted by the National Business Research Institute and Narrative Science. There are 12 Indian banks which have taken AI initiatives over the last few years.

The list includes: a) SBI b) BANK OF BARODA
 c) ALLAHABAD BANK d) ANDHRA BANK e) YES BANK
 f) HDFC g) ICICI h) AXIS i) CANARA BANK j) City BANK
 k) UNION BANK l) PUNJAB NATIONAL BANK
 m) INDUSIND BANK.

Artificial Intelligence technology is revolutionizing the banking services. Currently, following are AI Technology Enabled Digital Banking Services provided by the banks:

(i) Chatbots (ii) Smart ATMs (iii) KYC Processes (iv) EMI Alert system (v) Digital Safety Lockers (vi) Self-Service Bank Passbook Updation Kiosks (vii) AI-Powered Banking Mobile Applications (viii) Robot advice on Personalized Financial Services. These services are assumed to enhance Service Quality, Customer Satisfaction and Consumer Loyalty.

Need for the Study:

With the increasing usage rate of internet banking, there is a strong need for assessment of service quality, customer satisfaction & consumer loyalty of AI technology enabled digital banking services provided by banks on a continuous basis in India. Moreover, despite all the benefits enjoyed through digital banking, customers time and again complain of many persistent shortfalls such as; security issues, technical issues, the inability of users and banking technological upgradation, etc.

Significance of the Study:

AI has proven a crucial method for efficient risk reduction and the effective use of forecasting techniques in the financial and banking sectors. With significant data research, primary methods of data processing can become professional and efficient. Automation of the customer support system lets customers and banks interact 24x7. Besides technology, it offers customers round the clock access to their accounts. AI has seen a crucial role that can impact the future of banking.

Problem Statement:

The problem with the existing and outdated banking system is making a decision based on massive data. It is very expensive in terms of cost, and about twenty to thirty percent of made decisions go wrong due to incomplete and inappropriate information on the organizational plan. The AI system deals with these issues intelligently and monitors all the information related to stakeholders to process the reports. It also uses real time data to coordinate and guide the customer to make immediate decisions.

Sl.No	Research Questions	Research Objectives is to:	Research Hypotheses
1.	Does Service Quality Dimensions influence AI Technology factors?	assess the association between Service Quality Dimensions and AI Technology factors	Service Quality Dimensions has a positive influence on AI Technology factors
2.	Does Service Quality Dimensions impact on Customer Satisfaction?	analyze the effect of Service Quality Dimensions on Customer Satisfaction	Service Quality Dimensions has a positive influence on Customer Satisfaction
3.	Do AI Technology factors affect Customer Satisfaction?	determine the connection between AI Technology factors and Customer Satisfaction	AI Technology factors have no influence on Customer Satisfaction
4.	Is there is any relation between Service Quality Dimensions and Consumer Loyalty?	investigate the influence of Service Quality Dimensions on Consumer Loyalty	Service Quality Dimensions has a positive influence on Consumer Loyalty
5.	Does AI Technology factors related with Consumer Loyalty?	examine the relationship between AI Technology factors and Consumer Loyalty	AI Technology factors has no influence on Consumer Loyalty
6.	Does Customer Satisfaction affect Consumer Loyalty?	evaluate the impact of Customer Satisfaction on Consumer Loyalty	Customer Satisfaction has a positive influence on Consumer Loyalty
7.			Demographic Factors has no influence on Consumer Loyalty

Systematic Literature Review

AUTHORS & YEAR	TITLE	PLACE	RESEARCH METHODOLOGY	VARIABLES	FINDINGS
Shirie Pui Shan Ho, Mathew Yau Choi Chow, (2023)	"The role of Artificial Intelligence in Consumers' brand preference for retail banks in Hong Kong"	Hong Kong	Survey Questionnaire, Structure Equation Modeling(SEM)	Brand experience, brand preference and repurchase intention	The findings indicate that AI marketing efforts affected brand experience, brand preference and repurchase intention. Among AI marketing efforts, information, accessibility and customization exerted influence on brand

					experience, while interaction had no significant impact on it. The study will help retail banks to design AI marketing activities and branding strategies for customer acquisition and retention.
Domingos Mondego, Ergun Gide, (2022)	"The Use of the Technology Acceptance Model (TAM) to Analyse the Cloud-Based Payment Systems: A Comprehensive Review of the Literature"	Spain	The fitness of the model and SEM was the preferred research instrument for analysing the relationship among constructs, followed by regression analysis and multi-group analysis.	Trust, CBPS adoption, followed by perceived risk, perceived compatibility, perceived security levels and subjective norms.	The study draws the conclusion on the applied TAM to investigate the factors that have a positive or negative influence on Cloud-Based Payment Systems (CBPS) adoption.
Shirie Pui Shan Ho, Amy Wong, (2022)	"A Model of Customer Personality and its effect on Trust, Satisfaction & Customer Loyalty in premium banking services"	Hong Kong	Structured Questionnaire, PLS-SEM 3.3.3	Customer personality dimensions of conscientiousness, extroversion, agreeableness, trust, extroversion, satisfaction, loyalty.	Study clarified that the customer personality dimensions of conscientiousness, extroversion, and agreeableness affected trust, while extroversion affected satisfaction. Trust displayed a significant influence on both satisfaction and customer loyalty, while satisfaction partially mediated the effect on customer loyalty via trust. Also, the study addresses the void by elucidating the role of customer personality in CRM in a high-net-worth banking services context by clarifying the personality dimensions that affect trust and satisfaction.
Akash Yadav, (2021)	"How Artificial Intelligence is Transforming the Banking Industry? Data Analysis Review"	Mumbai, India	Descriptive Study & Exploratory Study; survey and random sampling	Usage of AI services, Customer awareness	The major contribution of this study includes that AI is slowly and steadily converging toward becoming an inevitable and indispensable part of banking and financial services. Incorporating AI technology in banks and financial services helps simplify hectic and tedious manual tasks through automation.
Addanki Akhil & Ch. Siva Priya, (2021)	"A Study on the Impact of Artificial Intelligence in Banking Sector - with reference to Chatbots"	Hyderabad, India	Survey research	Ho: The use of chatbot services and their comfort are significantly linked. Ho: The use of chatbot services and their reliability are closely related. H1: The use of chatbot services and their comfort are not significantly linked. H1: The use of chatbot services and their reliability are not closely related.	The study shows that future of banking with artificial intelligence explores AI's most relevant applications in retail banking, both in the front office and back-office operations.
A. Geetha, (2021)	"A Study On Artificial Intelligence (Ai) In Banking And Financial Services"	Chennai, Tamil Nadu	Survey and random sampling	Useful applications of AI (Voice Assistants, Authentication and biometrics, Fraud detection and Prevention,	The result of the study is that private banks and private financial institutions are using various AI services for the customers' benefit so

				KYC/AML, Smart Wallet); consumer's perceptions	that customers are satisfied with their services and that financial assistance improves services more effectively because some of them are dissatisfied with the banking services.
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Research Gap

The systematic review of the literature validates that most of the research had been carried out on various topics of AI in banking. Hence, the existing study intends to focus on the research gap which had been identified with a research title, "The Impact of Artificial Intelligence (AI) Technology - Enabled Digital Banking Services on Consumer Loyalty," in India.

Variables of the Study:

Independent Variables:

Service Quality Dimensions - Reliability, Assurance, Customization, Empathy & Responsiveness.

Technology Acceptance Factors - Perceived Usefulness, Perceived Ease of Use, Perceived Risk, Perceived Trust & Perceived Benefits.

Demographic factors - Age, Gender, Education, Occupation and Income.

Dependent Variables: Customer Satisfaction, Consumer Loyalty.

Theoretical background and Development of Hypotheses:

Theoretical Framework:

Digital banking (DB) transforms all traditional banking activities and services into a digital environment (Sarma, 2017). Digital banking is highly technologically demanding, including innovation in financial services for customers and commercial customers around mobile digital AI payment strategies, regtech, data, blockchain, API, distribution channels, and technology (Sarma, 2017). Customers do not have to come to physical branches of banks to make transactions and vice versa. Banks do not have to meet with customers to complete transactions (e.g., signing documents and tracking records).

Although DB is technology related, it is service-oriented, making service marketing theories important in its conceptualisation (Van Looy et al., 1998). Consequently, Hoehle et al., (2012) note that while the utilisation of DB channels has grown substantially, a prior study has yet to identify all the customer-related issues and may be limited due to fragmented findings and methods of study. Hence, this study presents a more comprehensive study in INDIA.

Relationship between AI-Technology factors and Service Quality Dimensions:

Service Quality

Service is defined in many ways depending on which area the term is use. An author defines service as "any intangible act or performance that one party offers to another that does not result in the ownership of anything" (Kotler & Keller, 2009, p. 789). Quality can also be define as the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs (Kotler et al., 2002, p. 831). One of the most useful measurements of service quality is the dimensions from the SERVQUAL model (Parasuraman et al., 1988) proven to be one of the best ways to measure the quality of services provided to customers. The SERVQUAL model has the following five dimensions, i.e., **RATER**.

Reliability: the ability to perform the promised service dependably and accurately

Assurance: knowledge and courtesy of employees and their ability to inspire trust and Confidence

Tangibility: physical facilities, equipment, and appearance of personnel

Empathy: caring individualized attention the firm provides to its customers

Responsiveness: willingness to help customers and provide prompt service

Although several attempts have been made to use the SERVQUAL instrument in traditional retail banking contexts across different countries (Arasli et al., 2005; Cui et al., 2003; Jabnoun & Al-Tamimi, 2003; Najjar & Bishu, 2006), there has been far less attention to its utility in assessing service quality and customer satisfaction in an internet banking context.

The modified SERVQUAL model, i.e., **RACER** (*Reliability, Assurance, Customization, Empathy, and Responsiveness*), and the hypotheses which guide this research are as follows:

Reliability

It involves two concepts, dependability and uniformity in performance. It also "refers to the correct technical functioning of a self-service technology and the accuracy of service delivery" (Weijters et al., 2005, p. 9).

Many authors have detected that reliability is significant in determining service quality (Bagozzi, 1990; Davis et al., 1992; Parasuraman et al., 1988; Zeithaml & Bitner, 2000).

Assurance

Assurance adequately increases the user's trust and decreases the risk while achieving any online transaction (Parasuraman et al., 1991). Higher assurance in an intangible service would indicate that the service consumption was communicated to the stakeholders involved effectively, thereby enhancing the positive effects of the service encounter. If assurance is low, usage satisfaction is also adversely impacted.

Customization

Gagnon and Roh (2008) explained that customization is important in the service industry to provide the greatest satisfaction to customers and also, customization of service has a direct impact on service quality, customer satisfaction, loyalty and to ensure that operations run smoothly and efficiently (Kasiri et al., 2017). Lovelock & Wirtz (2004) suggest that firms can build a powerful customer bond through customization, leading to loyalty or higher customer retention.

Empathy

Empathy means caring, paying personal attention, and providing services to customers. The core of empathy is conveying the feeling that the customer is unique and special (Parasuraman et al., 2002). SERVQUAL model stated that quantitative studies that have identified service quality model dimensions had used security, credibility, and access to measure empathy which affects satisfaction.

Responsiveness

According to Sheng and Liu (2010) responsiveness refers to the promptness of reply provided by cyber-banking operators to service users. Suleman et al., (2012) researched while considering responsiveness as a significant determinant of digital banking quality to find its impact on user loyalty and satisfaction.

Artificial Intelligence

The term "artificial intelligence" (AI) was coined by John McCarthy in 1957 during a two month workshop at Dartmouth College (Russell & Norvig, 1995). The origins of AI can be traced to the "General Problem Solver" computer program that imitated human problem solving abilities, essentially giving the computer the ability to think like a human (Newell et al., 1958). The litmus test for AI is the "Turing test," proposed by Alan Turing in 1950. The question, Turing claimed, is not whether a computer can think but whether it can imitate humans (Turing, 1950).

Russell and Norvig, (1995), delineate four dimensions of AI: to think like a human, act like a human, reason and act rationally. For a banking customer, an AI needs to "do the right thing," such as depositing a check into the correct account. Therefore, it is the AI's behavior and the result that customers value. By narrowing the scope to whether an AI acts rationally, we are better able to understand consumer loyalty toward AI and empirically test AI models in the banking field.

Research Studies based on Technology-enabled Banking in India:

The scenario in India is almost the same—as is evident from a McKinsey (2011) report, according to which the use of the Internet for banking is on the rise. Kamakodi and Khan (2008) who conducted a study of e-banking channel acceptance by Indian customers found that most customers are very comfortable and willing to use e-banking channels. Malhotra and Singh (2009) used a sample of 82 banks operating in India to explore the determinants of the extent of digital banking services.

Theory of Technology Acceptance Model (TAM)

The theory of the Technology Acceptance Model (TAM) is a widely accepted model in the realm of Information Technology. TAM was developed by Davis (1989) to theorize the usage behavior of computer technology. The TAM indicates that user acceptance can be explained by two beliefs as perceived usefulness and perceived ease of use (Chuttur, 2009; Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017). Within the last two decades, the TAM has been tested, refined, and extended to better understand the intention to use technology.

Perceived Usefulness

Perceived usefulness is the degree of a person's belief that using an information system technology could enhance performance and cost effectiveness. It would not be wrong to define the concept of "perceived usefulness" as the benefit derived from using chatbots and other AI-enabled services. Therefore, if the users perceive that AI technology digital banking payments are more useful than other modes of payments, they should positively impact user satisfaction.

Perceived Ease of Use

Perceived ease of use refers to the degree to which a person believes using a particular system would be free from effort. The more effortless using a system is, the more it can improve work performance. Perceived ease of use affects users' attitudes towards technological devices, affecting their intention to use them. Perceived ease of use affects both customer satisfaction and consumer loyalty.

Perceived Risk

Perceived risk is "consumers' perceptions of the uncertainty and adverse consequences of buying a product or service." Customers face five types of risks: financial, time, psychological, social, and performance. Every transaction involves one or more of these risks. Customers should be aware of those risks and draw up plans and strategies accordingly. Customers may encounter privacy violations when doing transactions on AI enabled devices. There is always an inconsistency between users' judgments and the actual performance of the technology. The higher the risk a customer perceives for a banking transaction, the more negative experience he/she is likely to have.

Perceived Trust (PT)

Trust is used to identify how much risk is associated with financial transactions, i.e., trust is directly proportional to user satisfaction. Trust helps to maintain the transactional relationship between banks and customers (Peha & Khamitov, 2004). It was confirmed that consumers' trust in online technologies has a positive relationship with PEOU and PU. Considering all these reasons, the present study proposes perceived risk as the predominant factor for evaluating consumer loyalty in different types of banking.

Perceived Benefit

Perceived benefit is a consumer's belief about the extent to which he or she will become better off from the online transaction. Internet consumers report that they perceive many benefits (e.g., increased convenience, cost savings, time savings, and increased variety of products to select from) compared to the traditional mode of banking (L.Margherio, 1998). Customers who enjoy using a system are more likely to use it again. Thus, the more consumers perceive benefits related to an online transaction with a certain technology, the more likely they are to make online transactions leading to satisfaction and loyalty.

H₁: Service Quality Dimensions has a positive influence on AI Technology factors.

Customer Satisfaction

Satisfaction is a post-activity measuring index that measures the interior state of the customer's feelings about past purchases or services and experiences of using the services. Measuring the degree of satisfaction of customers is rather critical since satisfaction with the distribution service influences the customer's decision whether to continue using the channel. Oliver (1997) defined satisfaction as the consumer's fulfillment response.

Consumer Loyalty

Customer loyalty is a deeply held commitment to repurchase or re-patronize a preferred product/service consistently in the future, thereby causing repetitive same brand or same brand set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior (Oliver, 1999).

Purchase intentions (Boulding et al., 1993), word of mouth (Gremler et al., 2001), and commitment (Moorman et al., 1992) are the loyalty dimensions. Purchase intentions were defined as the propensity to purchase a product or service at some point in the future (Ranaweera et al., 2003). Word of mouth is an oral, person to person communication between a communicator and a receiver whom the receiver perceives as non-commercial with respect to a brand, product, or service (Arndt, 1967). Customer commitment refers to the strength of relational ties and the desire to maintain a relationship (Bansal et al., 2003).

Interrelationship between Service Quality, Customer Satisfaction & Consumer Loyalty:

In the current business environment of intense competition with the rapid market entry of new service concepts and formats, an in-depth understanding of the complex relationship between service quality, customer satisfaction, and loyalty has been intensified as an important factor for success, survival and the cornerstone of marketing strategy in the industry (Zeithaml, Berry & Parasuraman, 1996; Kandampully, 1998; Parasuraman, Zeithaml, & Berry, 1985). Zeithaml et al., (2009) developed a conceptual model associating service quality, customer satisfaction and service loyalty. The research finding by Bloemer et al., (1998), which concluded that service quality has an indirect influence through satisfaction on loyalty and satisfaction has a direct influence on loyalty.

H₂: Service Quality Dimensions has a positive influence on Customer Satisfaction.

H₄: Service Quality Dimensions has a positive influence on Consumer Loyalty.

Interrelationship between AI Technology Factors, Customer Satisfaction and Consumer Loyalty:

Davis (1989) believes there were two foremost dimensions in technology users' acceptance; perceived ease of use and perceived usefulness.

This study aims to add other technology factors such as perceived risk, perceived trust and perceived benefits to perceived usefulness and perceived ease of use so as to find out how the modified TAM model AI technology factors influences on customer satisfaction & consumer loyalty of the banking customers. In this regard the hypotheses which guide this research are as follows.

H₃: AI Technology factors have no influence on Customer Satisfaction.

H₅: AI Technology factors have no influence on Consumer Loyalty.

Relationship between Customer Satisfaction and Consumer Loyalty:

Douglas et al. (2017), studies revealed a positive relationship between customer satisfaction and customer loyalty. Banks are recommended to influence customer satisfaction positively to achieve customer loyalty. When customer satisfaction is higher, customers will have lower brand switching behavior; that is, customers will continue to buy the original product or service of the brand (Shukla, 2004).

H₆: Customer Satisfaction has a positive influence on Consumer Loyalty.

Influence of Personal Demographic Factors on AI technology enabled Digital banking:

According to (The business dictionary), demographic factors are the socioeconomic features of a population statistically expressed, which include Gender, age, income level, occupation, and religion of the customer service.

In the context of age demographic profile (Zeithaml & Gilly, 1987; Trocchia & Janda, 2000; Karjaluoto, 2002; Lee, 2002), younger persons are more likely to adopt internet banking which has also linked to age and adoption of technologies.

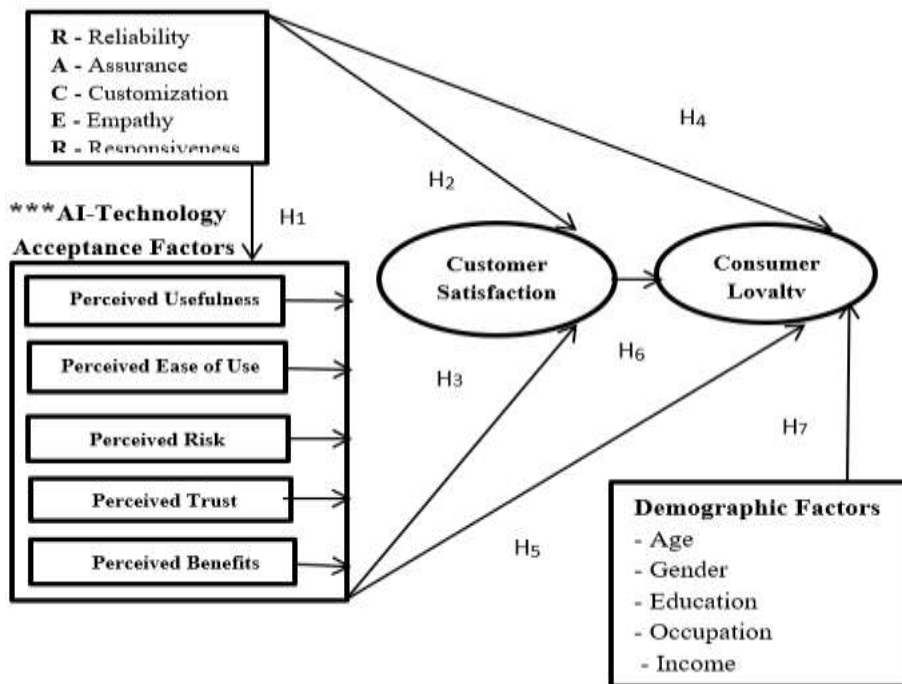
According to Parasuraman and Igarria, (1990), No difference is accounted for Gender. While Okeke & Okpala, (2014) indicated that Males are more inclined to use electronic banking services as they are more internet savvy.

According to Porter and Donthu, (2006), the role of education is as being associated with internet banking adoption. As per Nasri (2011), people with higher educational levels may have competence in computers and possess good information processing skills, which better facilitate internet use. Jiang, Hsu, Klein, and Lin, (2000); Hoppe, Newman, and Mugeru, (2001) found more experienced an internet user is, the more likely they are to adopt new internet technologies.

H₇: Demographic Factors has no influence on Consumer Loyalty.

Conceptual Framework

**** Service Quality Dimensions**



Source:-

** Modified Service Quality Dimensions – adopted from the studies of Zeithmal et al., (2002, 2000).

*** Modified TAM – adopted from the studies of Davis et al., (2000, 1989).

Research Methodology:

The first stage in this research is the exploratory phase to identify and define research problem and develop research instrument. Second stage is the descriptive phase where a quantitative research approach would be used. In this study survey method from the cross-section of the society with a structured questionnaire would administer to AI technology enabled digital banking users in India.

Sampling Design

A Purposive Sampling Method would be used for the study as the target respondents are the banking users. Purposive sampling is a nonprobability sampling technique used in qualitative research for the identification and selection of information rich cases for the most effective use of limited resources (Patton, 2002).

Sample size

Sample size of 1000 banking customers of public & private sector banks are targeted in Hyderabad and Secunderabad cities of Telangana, India.

Data collection

The study uses both primary as well as secondary sources of data. Primary data would be collected from banking customers through a structured questionnaire by survey method. The Secondary data would be taken from Bank's Annual reports, Academic journals and Websites, etc.

Data Analysis

The research model of this study would be tested by structural equation modeling (SEM) using SPSS 28.0 & AMOS or PLS7. SPSS and SEM are statistical techniques for testing and estimating causal relations using qualitative assumptions and statistical data (Kline, Rex B., 2016).

Conclusion:

The banking sector as always plays a very significant role in the modern economic world too. Traditional banking customer services were time-consuming processes. The current banking sector is witnessing groundbreaking changes, the foremost being the rise in customer-centricity. Today top Indian banks are exploring advanced technology, as it is making their service more users friendly, reliable, and scalable. Using AI, banks are approaching convenience banking, which makes it even easier for a customer to do transactions from any place and at any time without waiting in lengthy queues at the bank.

Hence, Artificial Intelligence aims to provide personalized and high quality customer fulfillment along with effective and time saving services. Banks must provide training to their employees and also awareness programs for their customers to equip them with the application of AI in banking services.

Thus, the proven model could help the banks to frame their strategies and also future course of actions.

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