

An Analytical Study of Applications of Artificial Intelligence on Banking Practices

Jomon Jose M.^{1&2} & P. S. Aithal³

¹ PDF Scholar, Institute of Management & Commerce, Srinivas University, Mangalore, Karnataka, India,

² Associate Professor, Holy Grace Academy Centre for Research & Development, Mala, Thrissur, Kerala, India,

ORC-ID: 0009-0003-4341-9936; Email: jomonjose83@gmail.com,

³ Professor, Institute of Management & Commerce, Srinivas University, Mangalore, India, OrcidID: 0000-0002-4691-8736; E-Mail: psaithal@gmail.com

Area/Section: Business Management.

Type of the Paper: Descriptive and Analytical Research.

Type of Review: Peer Reviewed as per [C|O|P|E|](#) guidance.

Indexed in: OpenAIRE.

DOI: <https://doi.org/10.5281/zenodo.7991823>

Google Scholar Citation: [IJMITS](#)

How to Cite this Paper:

Jomon Jose, M., & Aithal, P. S. (2023). An Analytical Study of Applications of Artificial Intelligence on Banking Practices. *International Journal of Management, Technology, and Social Sciences (IJMITS)*, 8(2), 133-144. DOI: <https://doi.org/10.5281/zenodo.7991823>

International Journal of Management, Technology, and Social Sciences (IJMITS)

A Refereed International Journal of Srinivas University, India.

CrossRef DOI: <https://doi.org/10.47992/IJMITS.2581.6012.0275>

Received on: 12/03/2023

Published on: 01/06/2023

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ORC-ID: 0009-0003-4341-9936; Email: jomonjose83@gmail.com,

³ Professor, Institute of Management & Commerce, Srinivas University, Mangalore, India, OrcidID: 0000-0002-4691-8736; E-Mail: psaithal@gmail.com

ABSTRACT

Purpose: *Artificial intelligence (AI) has the potential to enhance the creativity, adaptability, and flexibility of enterprises beyond their current capabilities. Many businesses are already leveraging AI to increase productivity and competitiveness, as well as drive digital transformation in various industries. In India, AI is assisting banks in upgrading their operations across the board, from traditional to digital banking practices. This study is based on the application of AI on various virtual assistants provided by public sector banks in Kerala as well as the recent advancements and emergence of virtual banking and modern banking trends.*

Design: *In this study, both descriptive and analytical research designs were employed. A standardized questionnaire was administered to 150 Bank employees to collect primary data and demographic information. To ensure the validity and reliability of the study, a pilot survey and Cronbach's Alpha test were conducted to assess the variables of measures. The collected data were analyzed using correlation analysis, multiple regression analysis, and Multicollinearity.*

Findings/Results: *The current research findings support the notion that artificial intelligence has a significant impact on various practices within public-sector banking. The study's results demonstrate that the independent variables, including Chatbot, Robo Advice, Predictive Analytics, Cyber security, and Credit Scoring, collectively serve as significant predictors (64%) of banking practices.*

Paper Type: *Descriptive and Analytical Research*

Keywords: Artificial Intelligence, Banking practices, Modern banking system, Virtual banking, Digital transformation.

1. INTRODUCTION :

Digital transformation is viewed as one of the most eminent drivers of organizations that contribute towards the conveyance of significant worth to their clients in a cutthroat, rapidly changing business environment (Kumari, A., et al. (2020) [1]). AI is currently acquiring wide acknowledgment as one of the most fundamental digital transformation-empowering influences among different businesses (Henkel, J., et al. (2020) [2]). Artificial intelligence (AI) helps in working with ventures to be creative, flexible, and versatile in the unique cutthroat business climate (Tekin, E., et al. (2021) [3]). The significant utilization of artificial intelligence is to upgrade the efficiency and intensity of an extensive variety of organizations that are driving toward digital transformation (Alzahrani, M., et al. (2021) [4]). Indian banking industries are exceptionally adjusting towards mechanical progressions by involving mechanical apparatuses and systems to serve new-age clients and grow their financial practices by guaranteeing quality services (Kshetri, N., et al. (2020) [5]). AI is playing a crucial part in overhauling the financial practices and tasks of different Indian banks in all cases, from accounting to sales to contracts and cyber security (Jindal, V., et al. (2020) [6]). In India, public sector banks play a predominant part in expanding different banking services, albeit throughout the long-term rivalry has

significantly expanded because of the rise of the private sector and foreign banks. As of now, there are 12 public sector banks in India. Ongoing turns of events and the emergence of virtual banking, the application of AI in banking practices, and factors contributing towards the successful use of AI in various banking practices with special reference to public sector banks in Kerala are explained in this study. The researcher has taken the topic “AN ANALYTICAL STUDY OF APPLICATIONS OF ARTIFICIAL INTELLIGENCE ON BANKING PRACTICES”, to know how AI is fortifying the competitiveness of public sector banks in Kerala through its variables such as Chatbot, Robo Advice, Predictive Analytics, Cyber security, and Credit Scoring.

2. REVIEW OF LITERATURE :

Various researchers and specialists made sense of that Artificial Intelligence as a quick creation of innovation across the world and its applications in the financial business (Lu, X., et al. (2018) [7]). The banking sector is becoming perhaps the earliest adopter of artificial intelligence (Vatansever, V., et al. (2021) [8]). Artificial intelligence (AI) can possibly work with ventures to become more creative, flexible, and versatile than ever (Ghazanfar, M. A., et al. (2021) [9]). Artificial intelligence (AI) is being used to enhance productivity and competitiveness, as well as drive digital transformation in various industries (Wang, M., et al. (2021) [10]). In India, Artificial intelligence is aiding banks in updating their operations in all cases, from accounting to sales to contracts and cyber security (Sahu, S. K., et al. (2020) [11]). Various applications of AI in mining the monetary exchange information by the multiplication of advanced installments and other financial administrations for better checking, anticipating, and breaking down purchaser conduct towards computerized financial administrations (Aggarwal, S., et al. (2020) [12]). Artificial intelligence cannot just supplant human resources in that frame of mind to a limited extent yet additionally upgrade its presentation past human benchmarks (Brynjolfsson, E., et al. (2017) [13]). AI has been viewed as utilized by associations all over the planet for the location of abnormalities (Song, X., et al. (2021) [14]). It is used to establish optimal investment strategies (Liao, L., et al. (2021) [15]). Artificial intelligence comprises commonly two key thoughts. First, it includes concentrating on human cerebrums like how their point of view functions, and besides it helps to address those cycles through machine learning. (Le Cun, Y., et al. (2015) [16]). AI can fundamentally further develop fraud detection and anticipation by dissecting enormous volumes of information and distinguishing patterns of fraudulent behavior (Li, X., et al. (2020) [17]). Similarly, AI can support credit risk investigation by robotizing the course of credit scoring and decreasing the gamble of defaults (Li, S., et al. (2021) [18]). Moreover, AI-based chatbots can upgrade client support by giving customized and productive help to clients (Saha, S., et al. (2018) [19]). Artificial intelligence can work on the productivity of banking activities via computerizing monotonous undertakings and diminishing mistakes (Chen, J., et al. (2019) [20]). AI-based predictive analytics can also help banks to pursue more exact choices and further develop risk management (Wang, J., et al. (2020) [21]).

3. RESEARCH PROBLEM :

The researcher has identified the following research questions based on the problem discussion.

- (1) In what ways does AI aid banks in enhancing their banking practices?
- (2) To what extent do various applications of AI impact banking practices?

4. OBJECTIVES:

- (1) To analyze the impact of AI applications on banking practices in public-sector banks.
- (2) To develop a conceptual model of the factors affecting of AI in the banking sector.
- (3) To prove the conceptual model empirically by testing the hypotheses.
- (4) To compare the associations between AI applications and banking practices, as well as to differentiate the advantages of these associations.
- (5) To evaluate the final conceptual model developed using empirical study.
- (6) To analyze the conceptual model developed using ABCD analysis framework.
- (7) To suggest how to enhance banking practices using AI aids.

5. CONCEPTUAL MODEL :

By leveraging Artificial Intelligence, banks can effectively handle large volumes of data at high speeds to gain valuable insights. Additionally, the integration of digital payment systems, AI-powered chatbots, and biometric fraud detection technologies enables banks to provide high-quality services to a wider

customer base (Dumasia, J., (2021) [22]). In his study, he identified the five primary applications of artificial intelligence in banking as chatbots, robo-advisors, predictive analytics, cyber security, and credit scoring. AI-based chatbots can provide personalized and efficient support to customers, such as answering frequently asked questions, providing transaction details, and helping with account management (Liao, Q., et al. (2019) [23]). Chatbots can also help banks save time and costs by automating customer service tasks and reducing the need for human support (Gholami, R., et al. (2019) [24]). AI-powered robo-advisors can assist customers with investment decisions, such as suggesting suitable portfolios based on their risk tolerance and financial goals (Kim, K. J., et al. (2017) [25]). Robo-advisors can provide 24/7 investment advice and portfolio management, and can also help banks reach a wider range of customers who may not have access to traditional financial advisors (Agarwal, S., et al. (2018) [26]). AI-based predictive analytics can help banks make more accurate decisions and improve risk management by analyzing large volumes of data and identifying patterns and trends (Kusiak, A., et al. (2017) [27]). Predictive analytics can be used for fraud detection, credit risk evaluation, and customer behavior analysis, among other applications (Manikandan, M., et al. (2020) [28]).

AI-based cybersecurity solutions can help banks detect and prevent cyber threats, such as phishing attacks and malware, by analyzing network traffic and identifying suspicious activity (Gupta, A., et al. (2019) [29]). AI can also help banks monitor and secure customer data and transactions, and comply with regulatory requirements (Caron, P., et al. (2019) [30]). AI can support credit risk investigation by automating the process of credit scoring and reducing the risk of defaults (Chen, H., et al. (2019) [31]). AI can analyze a range of data sources, such as credit histories, income, and employment status, to provide more accurate and timely credit assessments, which can help banks make informed lending decisions (Bao, Y., et al. (2019) [32]).

Based on the theoretical framework and a review of existing literature, six postulates for the factors affecting of AI in banking sector are developed:

- (1) Postulate 1: Increased Chabot utilization can lead to the development of more advanced AI technologies and applications in the banking sector, as banks gain experience in implementing and optimizing Chabot systems.
- (2) Postulate 2: Robo-advisors can provide cost savings for banks, as they can reduce the need for human advisors in certain investment management roles. This can improve the overall profitability of banks.
- (3) Postulate 3: Increased use of predictive analytics in banking practices will lead to greater accuracy and efficiency in financial decision-making. Predictive analytics can help banks to analyze large amounts of data and identify trends and patterns that can inform investment, lending, and risk management decisions.
- (4) Postulate 4: The implementation of cyber security measures can reduce the risk of data breaches and cyber attacks, which can have significant financial and reputational impacts on banks.
- (5) Postulate 5: Credit scoring practices can help banks to stay competitive in the marketplace by offering more personalized and targeted lending products to customers.
- (6) Postulate 6: AI can help banks to make more accurate and informed decisions by analyzing vast amounts of data in real-time, allowing for more effective risk management, investment strategies, and customer engagement.

Using the above six postulates, a conceptual model was constructed to investigate which are the factors affecting of AI in banking sector and how the use of AI applications impacts banking practices in public sector banks in Kerala. In light of this study, research has designed the proposed conceptual model (Figure 1).

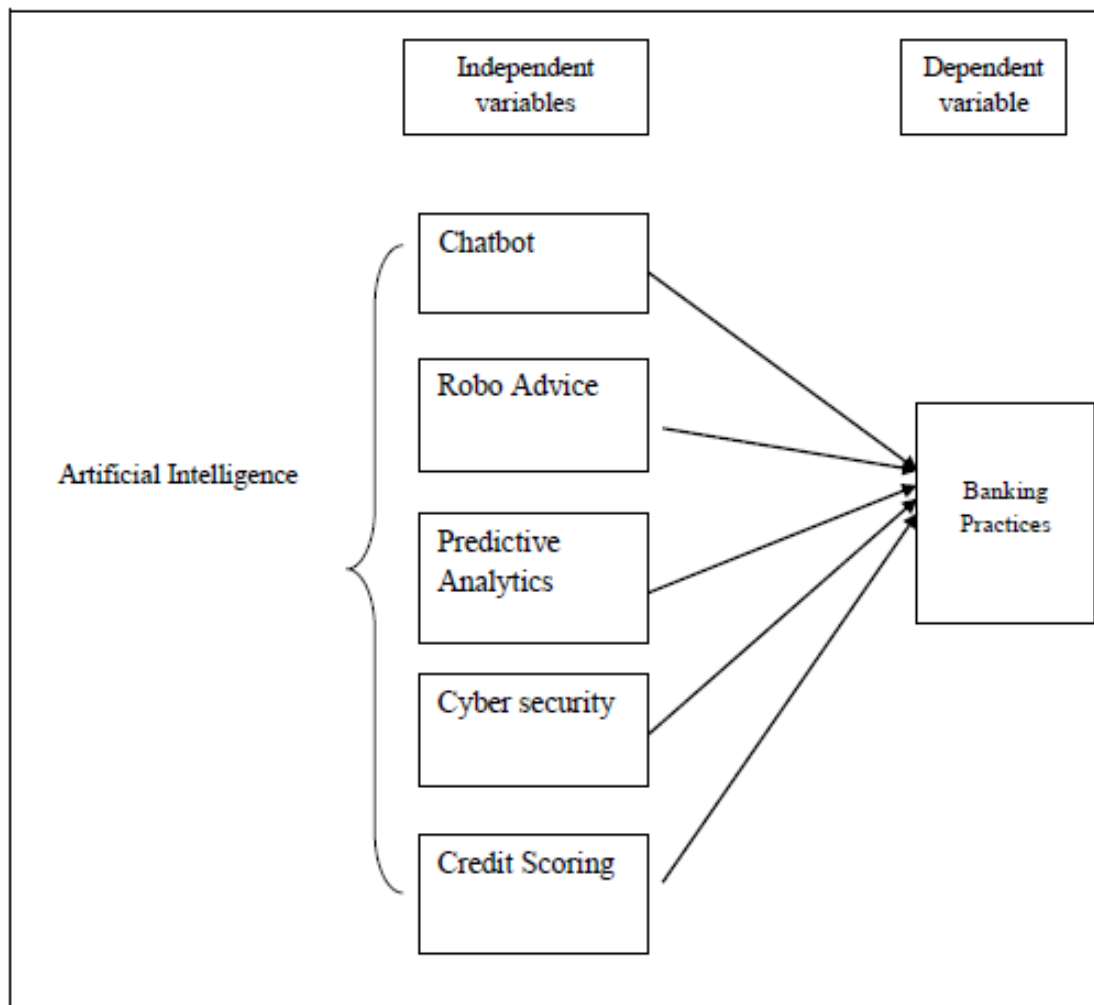


Fig. 1: Proposed Conceptual Model

To achieve the objectives of the conceptual model, the study proposes several hypotheses based on the factors affecting AI in the banking sector, including chatbots, robo-advisors, predictive analytics, cyber security, and credits scoring used are given below:

6. HYPOTHESES :

H1: There may have a significant positive correlation between chatbot utilization and banking practices.

H2: There may have a significant positive association between the use of robo-advisors and banking practices.

H3: There may have a significant positive link between the use of predictive analytics and banking practices.

H4: There may have a significant positive correlation between cybersecurity measures and banking practices.

H5: There may have a significant positive correlation between credit scoring practices and banking practices.

H6: AI has a positive impact on banking practices.

7. METHODOLOGY TO PROVE THE MODEL :

This study utilized a research design that incorporated both descriptive and analytical research methods. The primary data was collected through a pretested questionnaire method, which was modified based on the results of a pilot study. The data collection period spanned from August 2022 to October 2022, and the sample included 150 banking employees from various public sector banks in Kerala, India. To analyze the data, statistical tools such as correlation analysis, multiple regression analysis, and multicollinearity test were employed.

7.1 Reliability Test:

According to the information provided in Table 1, Cronbach's Alpha value is 0.795, which indicates that the reliability of the questionnaire is moderately good.

Table – 1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.795	.795	30

7.2 Validity analysis:

To test the validity of the data (Aithal, A., et al. (2020) [33]) the KMO measure and Bartlett's test of Sphericity were conducted. The KMO test resulted in a value of 0.798, indicating that the data is suitable for further analysis, as the KMO statistic is greater than 0.7.

8. ANALYSIS AND RESULTS :

8.1 Correlation analysis:

Table 2: Correlation analysis

S. No.	Hypotheses	Coefficient of correlation	Interpretation
1	There may have a significant positive correlation between chatbot utilization and banking practices.	0.667	Moderate positive correlation
2	There may have a significant positive association between the use of robo-advisors and banking practices.	0.665	Moderate positive correlation
3	There may have a significant positive link between the use of predictive analytics and banking practices.	0.585	Moderate positive correlation
4	There may have a significant positive correlation between cybersecurity measures and banking practices.	0.676	Moderate positive correlation
5	There may have a significant positive correlation between credit scoring practices and banking practices.	0.643	Moderate positive correlation

The table presented above displays the results of the correlation analysis conducted to examine the relationship between the applications of artificial intelligence and banking practices, in accordance with the hypotheses of the study. The Pearson correlation coefficient was used to determine the strength of the relationship between the variables. Based on the correlation analysis, it can be observed that there exist moderate positive relationships between the applications of artificial intelligence and banking practices.

8.2 Multiple Regression Analysis:

Table 3.a: Model Summary: Artificial Intelligence and banking practices

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.798 ^a	.641	.634	2.46438

a. Predictors: (Constant), Chatbot, Robo Advice, Predictive Analytics, Cyber Security, and Credit Scoring. Source: Survey Data

Table 3.a indicates that the R Square value is .641, indicating that 64.1% of the variations in banking practices are accounted for by the five independent variables, namely Chatbot, Robo Advice, Predictive Analytics, Cybersecurity, and Credit Scoring.

Table 3.b: Coefficients: Artificial intelligence and banking practices

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.	Collinearity Statistics	
	B	Std. Error	Beta	t		Tolerance	VIF
1 (Constant)	4.467	1.026		4.217	.000		
Predictive Analytics	-.088	.067	-.101	-1.484	.126	.285	3.276
Chatbot	.277	.089	.232	4.171	.000	.472	2.086
Robo Advice	.335	.061	.277	4.567	.000	.344	2.802
Credit Scoring	-.030	.044	-.007	-.360	.612	.657	1.436
Cyber Security	.546	.054	.480	9.671	.000	.565	1.737

Source: Survey Data

Table 3.b displays the coefficients for various variables and their relationship with banking practices. The unstandardized coefficients for predictive analytics (-.088) and credit scoring (-.030) are negative, which means they have a negative impact on banking practices. On the other hand, Chatbot (.277), Robo Advice (.335), and Cyber Security (.546) have positive unstandardized coefficients, indicating a positive relationship with banking practices. The p-values for Chatbot, Robo Advice, and Cyber Security are 0.000, which means they have a significant influence on banking practices. However, Credit Scoring and Predictive Analytics have high significant values (0.612 and 0.126 respectively), indicating that they have no effect on banking practices. The tolerance values for all the predicted variables are between 0.285 and 0.657, which indicates that multicollinearity has no effect on the results. Furthermore, the VIF values for all the variables are between 1 and 10, which indicates that there is no multicollinearity. Therefore, it can be concluded that all the artificial intelligence variables are statistically independent of each other.

9. FINDINGS & DISCUSSION :

The main focus of this study was to investigate the relationship between AI and banking practices among banking employees working in different public sector banks located in Kerala. The research findings suggest that AI is a significant technique for banking practices, particularly in the current progressively aggressive and dynamic workspace. The results of the study provide support for the notion that AI is a huge element that influences banking practices among employees working in various public sector banks. The hypotheses formulated and tested by using Correlation analysis are shown in table 4.

Table 4: Testing of Hypotheses

S. No.	Hypotheses	Test	Result
1	There may have a significant positive correlation between chatbot utilization and banking practices.	Correlation analysis	H0 Accepted
2	There may have a significant positive association between the use of robo-advisors and banking practices.	Correlation analysis	H0 Accepted
3	There may have a significant positive link between the use of predictive analytics and banking practices.	Correlation analysis	H0 Accepted

4	There may have a significant positive correlation between cybersecurity measures and banking practices.	Correlation analysis	H0 Accepted
5	There may have a significant positive correlation between credit scoring practices and banking practices.	Correlation analysis	H0 Accepted
6	AI has a positive impact on banking practices.	Multiple Regression Analysis	H0 Accepted

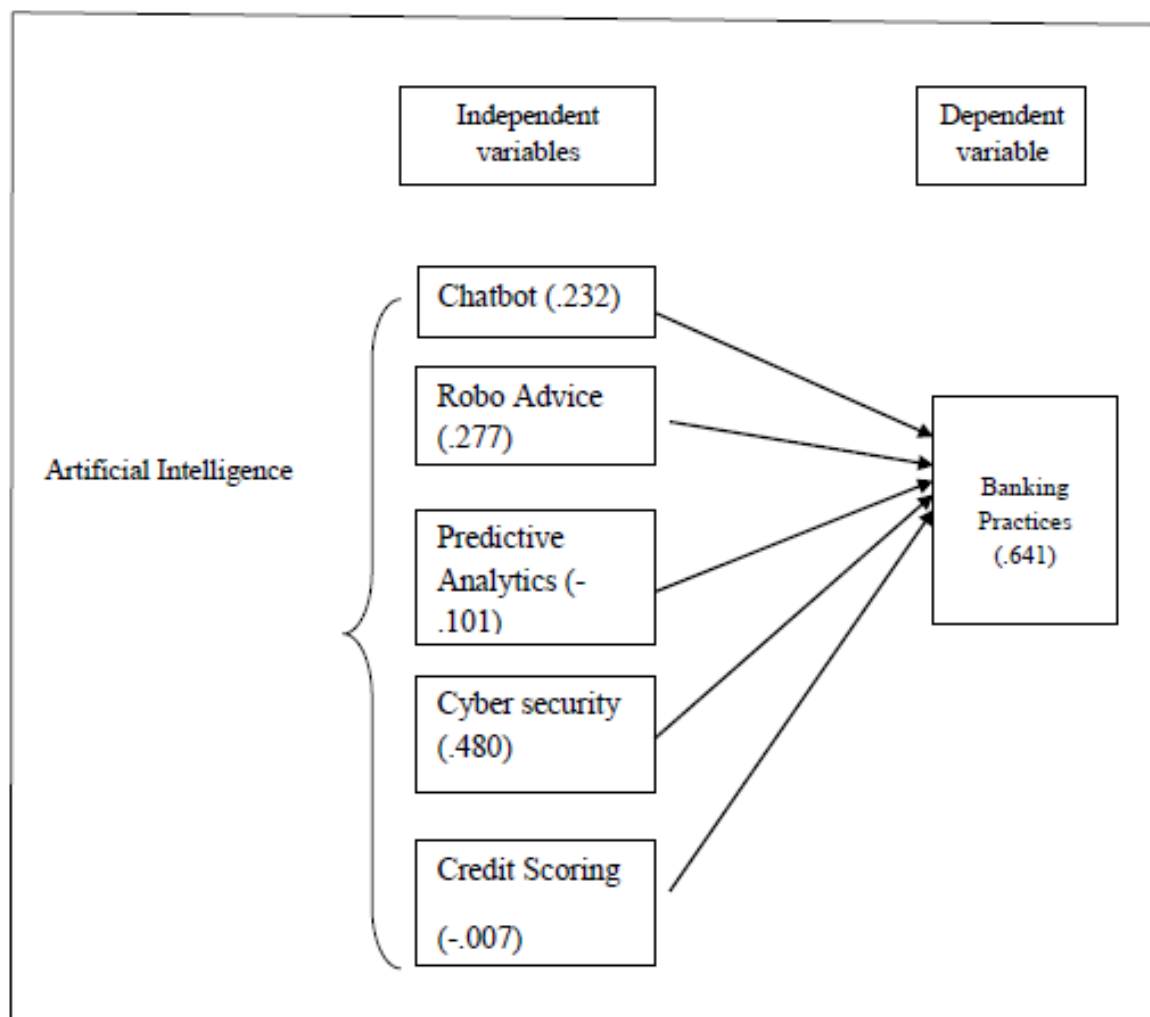


Fig. 2: Final Accepted Conceptual Model

Based on Multiple Equation Analysis, the impact of AI on banking practices was tested by examining the relationship between several independent variables, namely chatbots, robo-advisors, predictive analytics, cyber security, and credit scoring, and a dependent variable, namely banking practices. The analysis utilized standardized regression weights to illustrate the relationship between the variables. The graphical representation (Fig. 2) of these weights showed that the five AI variables explained 64.1% of the variation in banking practices.

10. ANALYSIS OF THE CONCEPTUAL MODEL DEVELOPED :

Analysis of research results refers to the process of examining and interpreting gathered information or developed conceptual models. It is essential to analyze the developed conceptual model for its use in solving similar types of problems. In this section, we have analyzed the use of this newly developed conceptual model on the impact of AI on banking practices from its stakeholders' point of view. There

are many analysis frameworks used in scholarly research which include SWOC analysis framework for internal analysis (Aithal, A., et al. (2015) [34]) & (Frederick, D. P., et al. (2021) [35]), PESTEL analysis framework for external analysis (Ho, J. K. K. (2014) [36]) & (Song, J., et al. (2017) [37]), and ABCD analysis framework for stakeholder analysis (Aithal, A., et al. (2015) [38]) & (Aithal, P. S. (2016) [39]). The advantages, benefits, constraints, and disadvantages of the developed model are listed here as per ABCD analysis framework ((Aithal, P. S. (2017) [40], (Aithal, P. S. et al. (2016) [41]) & (Aithal, P. S. et al. (2016) [42]).

10.1 ABCD Listing from Banking Customers' Points of View:

(A) Advantages:

- (1) Personalized customer experience
- (2) Improved security
- (3) Faster and accurate decision making
- (4) Cost reduction

(B) Benefits:

- (1) Fraud detection and prevention
- (2) Improved efficiency
- (3) 24/7 availability
- (4) Faster loan approvals

(C) Constraints:

- (1) Technical complexity
- (2) Job displacement
- (3) Integration and implementation challenges
- (4) Ethical considerations

(D) Disadvantages:

- (1) Lack of human interaction
- (2) Privacy and security concerns
- (3) Limited understanding of complex situations

10.2 ABCD Listing from Banking Service Providers' Points of View:

(A) Advantages:

- (1) Automation of routine tasks
- (2) Cost reduction
- (3) Improved fraud detection
- (4) Data-driven insights

(B) Benefits:

- (1) Enhanced risk management
- (2) Personalized customer interactions
- (3) Automation of compliance and regulatory processes
- (4) Improved customer service

(C) Constraints:

- (1) Technical complexity
- (2) Data quality and availability
- (3) Regulatory compliance
- (4) Ethical considerations

(D) Disadvantages:

- (1) Customer acceptance
- (2) Limited interpretability
- (3) Reliance on historical data

11. RECOMMENDATIONS & SCOPE FOR FUTURE RESEARCH :

While the banking sector has for quite some time been technology-dependent and information-concentrated, new information-empowered AI technology has the ability to drive advancement further and quicker than at any other time. AI can assist with further developing proficiency, empower a development plan, help separation, and oversee risk and administrative requirements, and decidedly impact customer experience. Over 60% of bank customers' accept customized services as one of the key factors for them to have trust in their banks. As per the latest reviews, only 30% of public sector banks offer personalization that addresses clients' issues in a fitting overall setting. Consequently, banks should contribute like never before to customize the administration's proposal to clients and, thus, hold their trust and steadfastness. Banks should utilize data-driven AI abilities to lead miniature divisions of existing clients and possibilities. This degree of granularity can help banks all the more precisely anticipate client and prospect need and ways of behaving. In view of the findings, the recommendation has been advanced to help key and strategy drives in this subject and area worldwide.

12. CONCLUSION :

The developing adoption of AI vows to lastingly affect the banking industry. Banks are coming to perceive the progressions that trend-setting innovations can cultivate, and, all the more significantly, they are embracing them. In the long haul, it is possible that banks' cutthroat highlights could rely upon building technological establishments and cycles to completely understand the advantages that AI vows to convey. In conclusion, these studies exhibit the possible advantages of AI in the public banking sector, including further developed effectiveness, exactness, the risk to the board, and client experience. Notwithstanding, there is a requirement for fitting guidelines and moral contemplations to guarantee the dependable and secure execution of AI in banking practices.

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