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Research Article

1. An Empirical Study Of Customer Perception Of Ai In The Banking Industry With Particular Emphasis On Public Banking Institutions

***Dr. Amith Donald Menezes, **Dr Kavyashree K & ***Dr.Prasad Mahale**

***Assistant Professor, Mangalore Institute of Technology and Engineering, Moodabidri. Email: amithmnzs@gmail.com Phone:7829909622**

****Assistant Professor, Srinivas University, Pandeshwar.**

Email: k_kavyashree@yahoo.in Phone: 8105285317

***** Assistant Professor, Srinivas University, Pandeshwar.**

Email: prasadmahale.pm@gmail.com Phone: 9538579585

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ABSTRACT

Purpose: Artificial Intelligence (AI) is generally recognized as the imitation of intelligence exhibited by machines, imitating actions akin to those performed by humans. The current landscape underscores the growing significance of AI, characterized by a rapid increase in its adoption. The operational framework of AI is grounded in two key principles. Firstly, there is an emphasis on understanding the mechanisms of the human brain and grasping its cognitive processes. Subsequently, these insights are practically implemented through the application of machine learning methodologies.

This research study aims to investigate customer perspectives on the integration of AI within the Banking Industry. To achieve this objective, participants were specifically chosen from the customer bases of certain public sector banks.

Research Methodology/ Design: This research is based on primary data collected using a structured questionnaire. 385 respondents were considered for the study. The respondents were selected using a random sampling technique. Customers of selected public sector banks were chosen for the study. Data gathered underwent analysis through AMOS 26 and SPSS 21 versions.

Findings: This study shows that AI has a crucial role to play in the banking sector. It also observes the main factors or elements that influence the adoption of AI in the banking Industry

Practical implications: AI provides a wide range of opportunities for the banking sector. At the same time, it's not free from challenges. The present study helps policymakers to frame strategies by considering the opportunities available and the threats imposed by AI.

Originality/ value: The study tries to comprehend AI and its significance in the banking sector.

Keyword's: Artificial intelligence, customer perception, banking industry

Paper type: Research paper

2. INTRODUCTION:

The banking sector has witnessed significant evolution, progressing from its early stages, referred to as Banking 1.0, to the current phase, termed as Banking 4.0 (Noreen et al., 2023). This transformation signifies a shift from historical or traditional banking practices to the contemporary era marked by the widespread adoption of advanced technology across diverse banking domains. The process of this transition, requiring substantial investments in time, cost, and effort from various stakeholders in the banking industry, has posed challenges. Digital disruption, characterized by the emergence of payment banks and neo banks with technology-intensive platforms, has urged traditional banks to embrace tech-centric banking models (Singh, 2020). Key technological instruments like Blockchain, Machine Learning, or Artificial Intelligence (AI) are indispensable for Fintech sector, including banking.

The fourth industrial revolution brought forth innovative technologies like artificial intelligence, blockchain, machine learning, also internet of things. AI, in particular, played a crucial role in transforming various fields, utilizing computational procedure in creating an intelligent behavior and reduce manual intervention (Haenlein and Kaplan, 2019). The use of IT applications has experienced significant growth, with AI emerging as a critical component (Lee et al., 2018). Management analytics are evolving rapidly, driven by the transformative impact of AI and machine learning, simplifying solutions for complex business problems (Wiljer and Hakim, 2019).

Nevertheless, the banking industry and other Fintech firms face a substantial hurdle when shifting from their current setups to seamlessly integrating AI (Truby et al., 2020). This transition is a gradual and precarious process that requires meticulous handling due to its extended duration and substantial investment prerequisites (Bharadwaj, 2019). Despite the advantages AI offers to the banking sector, challenges persist, especially in the form of low awareness hindering the swift acceptance and adoption of AI across various banking functions (Noreen et al., 2023). This research focuses on addressing AI awareness and its perception by customers as a valuable tool for bank growth. The paper also explores crucial factors influencing AI adoption in banking and suggests ways to optimize their utilization for the benefit of banks.

3. EXAMINATION OF EXISTING WORKS :

2.1 Artificial intelligence:

In 1956, John McCarthy coined the term AI, marking a pivotal moment in the field (McCarthy et al., 1956). AI, as per Kok et al. (2009), is any process capable of acting and thinking rationally like humans. It encompasses intelligence exhibited by machines, mirroring human cognitive traits. The General Problem Solver (GPS), identified by Newell and Shaw in 1958, was touted as the inaugural AI tool capable of solving problems akin to human problem-solving skills. Ransbotham et al. (2017) noted that AI served as a crucial tool, providing a significant competitive advantage for businesses. This observation was substantiated by approximately 85% of surveyed business executives.

2.2 Banking sector and AI:

The banking industry is actively leveraging technology, with artificial intelligence (AI) finding applications across various domains: front office (utilizing biometrics and voice assistants), middle or intermediary office (monitoring Legal and Anti Money Laundering activities), and back office (implementing smart contract infrastructure for credit underwriting) (Fares et al., 2022). Projections suggest that by 2023, banks could potentially save $447 billion through the adoption of AI technologies. A substantial 80% of US banks recognize the possible advantages presented by artificial intelligence (Digalaki, 2022). Enhancing customer experience is now achievable through the observation and understanding of customer behavior in various aspects (Schrotenboer, 2019). Currently, there is a discernible trend of banks making aggressive investments in AI to comprehend and analyze customer behavioral patterns.

Minimizing traditional assistance in lending, regulatory compliance decisions, and customer service is a strategy adopted in the banking sector (Schmelzer, 2019). Banks tailor solutions to customer needs,

and AI tools play a pivotal role in automatically adjusting these facilities (Mallawaarachchi, 2019; Vanneschi et al., 2018). The integration of AI allows for improved customer engagement in the current landscape (Nadimpalli, 2017). A noteworthy example is Bank of America's utilization of chatbot services as a commonly employed AI tool. These virtual assistants enable banking institutions to enhance operational efficiency, managing high volumes of information seekers concurrently and providing 24/7 customer support (Crosman, 2018).

Chatbots play a pivotal role in data collection, aiding banks in formulating strategies and identifying previously unnoticed marketing opportunities. AI contributes to fraud detection efficiently and economically by pinpointing outliers within data sets (Bharadwaj, 2019). Effectiveness of any technology integrated for service communication relies on the extent of interaction among automated technology & humans (Van Doorn et al., 2017). Despite heavy reliance of banks on technology, customers often exhibit hesitation in trusting AI-driven applications (Belanche et al., 2019). This emphasizes the crucial need to comprehend how customers perceive artificial intelligence under banking industry (Jung et al., 2018)

2.3 Attitude towards AI:

AI, a technology-driven technique, stands out as a crucial and highly effective tool, having witnessed significant growth in modern days (Lee et al., 2018; Baigh et al., 2021)). Experiencing a yearly expansion rate of around 20% (Wiljer and Hakim, 2019), applications of this system have the potential to significantly impact the labor market, potentially displacing many workers (Acemoglu and Restrepo, 2020). As noted by Vijai (2019), systems are continuously improving along with it becoming more astute over time, opening the door for numerous sectors to embrace AI for diverse uses.

4. OBJECTIVES OF THE STUDY

This research was conducted to achieve the following:

I. To focus on Involvement of AI in the banking industry
II. To analyse customer perception about AI in banking

5. FACTORS OR VARIABLES HAVING AN IMPACT ON THE ADOPTION OF AI IN THE BANKING INDUSTRY

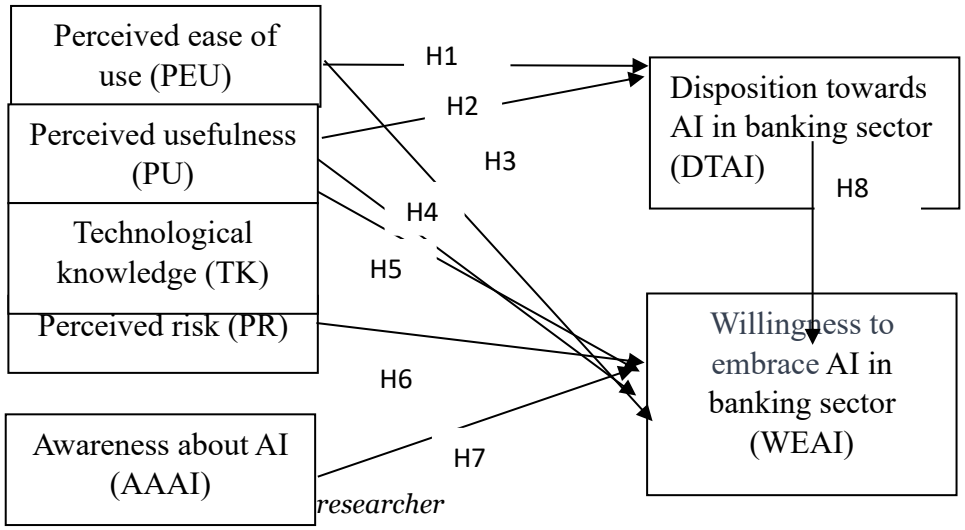
Technology is found in every field including the service sector and this forms the basis for innovation, strengthening the organisation to standardize, customize, transaction creation and relationise service (Huang, 2017). For organisations to provide better customer experience it is apt to provide proper service innovation through system usage (Grehna et al., 2017).

Technology added to its adequate knowledge has created umpteen number of new jobs as well as improved the quality of life of the workers (Barrat, 2013). Government and companies need to prepare by keeping technology, ethics politics and society in mind (Paul, 2017).

Lee and Chen (2022) emphasize the purpose to adopt M-banking apps is notably influenced by assumed risk. The positive attitude toward any system, particularly AI, adopts a pivotal way in driving M-banking usage or AI services within the banking sector (Manser Payne et al., 2017). Additionally, empirical studies suggest that perceived usefulness and ease of use act as strong indicators influencing the intention to use mobile banking or electronic payment services (Zhou et al., 2016).

The proposed research model and hypotheses for this study, derived from the literature review, are outlined below

4.1 Research Model



Based on above research model below mentioned hypotheses were framed:

H_1: The perceived ease of use significantly influences the Disposition towards artificial intelligence in the banking sector

H_2: The perceived usefulness significantly influences the Disposition towards artificial intelligence in the banking sector

H_3: Perceived ease of use has an Influence on the willingness to embrace artificial intelligence in banking sector

H_4: Perceived usefulness has an Influence on the willingness to embrace artificial intelligence in banking sector

H_5: Technological knowledge has an Influence on the willingness to embrace artificial intelligence in banking sector

H_6: Perceived risk has an Influence on the willingness to embrace artificial intelligence in banking sector

H_7: Awareness about AI has an Influence on the willingness to embrace artificial intelligence in banking sector

H_8: Disposition towards artificial intelligence significantly influences the willingness to embrace artificial intelligence in banking sector

4.2 Research Methodology

Concentration of this research is to assess the influence of AI on the banking industry, concentrating on customers of nationalized banks such as Canara Bank, SBI, Union Bank of India, among others, located in different districts of Karnataka. Employing a cross-sectional approach, the research gathered primary data through a survey conducted among bank customers. The data collection utilized a structured closed-ended questionnaire featuring a five-point Likert scale. The gathered data from the specified sample was subjected to various statistical tests to evaluate the eight hypotheses outlined in the study.

4.3 Sampling and data collection:

Population of this research are the customers of certain nationalised banks like Canara Bank, SBI and Union bank. Convenience sampling was used to select the bank and customers representing various districts of Karnataka were randomly chosen for data collection. According to Cochran 1963, at 95%

level of confidence and 5% precision, n= z^2pq/ e^2, total sample is 384. Questionnaire is distributed to 500 respondents by using random sampling method. Analysis is conducted based on 439 complete responses. Hence, the sample size for the study is 439.

4.4 Statistical tools used:

This research analysis was done using SPSS 21.0 for result generation. Factor analysis was employed to recognize the underlying constructs. Similarly the endogenous variables were recognised with the use of Confirmatory factor analysis.

6. INVOLVEMENT OF ARTICIAL INTELLIGENCE IN BANKING INDUSTRY

Artificial Intelligence plays a pivotal role towards revolutionizing diverse facets of banking operations, encompassing customer service, risk management, and other critical functions. Its significance endures as a driving force within the banking sector, contributing to:

1. **Enhancing Customer Service:** AI entities like chatbots and virtual helpers provide continuous customer support around the clock, addressing inquiries, facilitating transactions, managing accounts, and providing product information, all without the need for human intervention.
2. **Fraud Detection and Security:** AI fundamentally analyzes patterns in activities and user behaviors to detect anomalies and potential instances of fraud, thereby bolstering security measures and mitigating risks.
3. **Personalized Banking Experience:** Through the analysis of customer data, AI empowers banks to generate personalized recommendations, services, and products customized to individual needs, ultimately enhancing customer satisfaction and fostering loyalty.
4. **Risk Assessment and Credit Scoring:** AI algorithms enhance the accuracy of risk assessment by scrutinizing extensive datasets, allowing banks to enhance their lending activities with better-informed choices while evaluating creditworthiness effectively.
5. **Process Automation:** AI automates repetitive operational works, like entering data, process document, and regulatory compliance, resulting in reduced operational costs, minimized errors, with increased efficiency.
6. **Predictive Analytics:** Predictive models powered by AI anticipate market trends, customer behaviors, and financial risks, assisting banks in making well-informed decisions and formulating proactive strategies.
7. **Algorithmic Trading:** AI engages in high-frequency trading, analyzes diverse market trends, and optimizes investment portfolios, thereby enhancing investment decisions and portfolio management.
8. **Regulatory Compliance:** AI aids in assisting, monitoring, and ensuring compliance with intricate regulatory requirements by analyzing extensive datasets and identifying discrepancies or non-compliance issues.
9. **Natural Language Processing (NLP) for Insights:** NLP tools driven by AI extract insights from specific data sources such as customer feedback, social media, and news, furnishing valuable information for decision-making.
10. **Robo-advisors:** AI-powered tools, like robo-advisors, offering automated investment recommendations tailored to individual financial situations, goals, and risk tolerance, contribute to making investment management more accessible and cost-effective.

In the banking sector, AI not only boosts operational efficiency but also enhances customer experiences, refines risk management, and streamlines decision-making processes. This ultimately results in improved financial outcomes for both banks and their customers.

7. DATA ANALYSIS:

The data collected underwent analysis using the SPSS software, and the pertinent descriptive statistics are shared below. Further the data has been analysed by using the approach of Structural Equation Modelling too.

Table 1: Descriptive statistics

N= 439			
Variables	Code	Mean	SD
Perceived ease of use	PEU1	4.250	.9532
	PEU2	4.204	1.0346
	PEU3	4.204	1.0478
	PEU4	4.204	1.0421
Perceived usefulness	PU1	4.241	.9984
	PU2	4.253	.9613
	PU3	4.212	1.0292
	PU4	4.194	1.0562
Technological knowledge	TK1	4.220	1.0294
	TK2	4.216	1.0529
	TK3	4.186	1.0723
	TK4	4.208	1.0563
Perceived risk	PR1	4.206	1.0779
	PR2	4.204	1.0534
	PR3	4.208	1.0711
	PR4	4.200	1.0781
Awareness about AI	AAAI1	4.520	1.0941
	AAAI2	4.510	1.1085
	AAAI3	4.529	1.0794
	AAAI4	4.514	1.0906
Disposition towards artificial intelligence	DTAI 1	4.533	1.0498
	DTAI2	4.516	1.0706
	DTAI3	4.508	1.0780
	DTAI4	4.506	1.0961
willingness to embrace artificial intelligence	WEAI 1	4.510	1.0651
	WEAI 2	4.522	1.0543
	WEAI 3	4.519	1.0743
	WEAI 4	4.533	1.0662

Source: Generated by the researcher

Factor Analysis:

The current relationship between items and latent variables was established using a measurement model. The model includes five exogenous variables - perceived ease of use, perceived usefulness,

technological knowledge, perceived risk, awareness - and two endogenous variables - attitude towards AI and intention to adopt AI. These variables are loaded onto the 28 elements comprising the proposed model in this study.

The KMO test yielded an outcome of 00.854, indicating that the sample is adequate. All scale items were included in deriving the latent variables for data analysis. The initial CFA model revealed a satisfactory fit without a need to eliminate any dimensions for the creation of a more suitable measurement model. The evaluation of fit indicators from the primary pattern assessment suggests retaining the original model's findings as the final model. The CFA results indicate that $\chi 2=10767.060$, p.001, suggesting that the data align with the reviewed model.

The reliability and validity of this research were evaluated through calculations of various factors , Cronbach **α** , CR, also AVE. The various types of factor loadings, surpassing 0.600, indicate that factors extract adequate variance from the variables. All composite reliability values exceed 0.600, signifying robust internal reliability for the latent variables. Convergent validity is confirmed by AVE values exceeding 0.800 (Fornell C & Larcker F, 1981).

Table 2: Model Statistics

Variables	**Loadings of factor**		**SE**	**Squ. Multiple R**	**Cronbach α**	**CR***	**AVE****
	EFA	**CFA**					
PEU					0.777	0.674	0.883
PEU1	.711	.893	***	0.715			
PEU2	.763	.807	0.052	0.803			
PEU3	.700	.762	0.061	0.642			
PEU4	.607	.738	0.029	0.62			
PU					0.723	0.671	0.899
PU1	.682	.918	***	0.329			
PU2	.673	.992	0.05	0.644			
PU3	.722	.989	0.029	0.63			
PU4	.695	.811	0.055	0.749			
TK					0.733	0.661	0.811
TK1	.713	.901	***	0.007			
TK2	.817	.781	0.112	0.078			
TK3	.896	.630	0.05	0.783			
TK4	.770	.931	0.03	0.842			
PR					0.772	0.664	0.783
PR1	.718	.893	***	0.715			
PR2	.769	.807	0.052	0.803			
PR3	.700	.762	0.061	0.642			
PR4	.607	.738	0.029	0.62			
AAAI					0.754	0.679	0.912

AAAI1	.796	.853	***	0.564			
AAAI2	.801	.901	0.038	0.673			
AAAI3	.802	.912	0.04	0.762			
AAAI4	.836	.715	0.025	0.774			
DTAI					0.771	0.621	0.853
DTAI1	.754	.902	***	0.211			
DTAI2	.753	.978	0.049	0.974			
DTAI3	.839	.863	0.053	0.374			
DTAI4	.891	.712	0.053	0.666			
WEAI					0.764	0.632	0.917
WEAI 1	.750	.844	***	0.732			
WEAI 2	.703	.752	0.029	0.883			
WEAI3	.854	.756	0.028	0.881			
WEAI4	.693	.833	0.027	0.271			
Cumulative(%)	71.760						
KMO	0.844						
P-value	0.000						

CR= Composite Relaibility, AVE= Average Variance Extracted.

8. RESULTS

The data has been analysed and the hypotheses tested, find below the various statistical values and the decisions regarding the acceptance or rejection of these hypotheses.

Table 3: Summary of the hypothesis

Hypothesis	**P value**	**Accept/Reject**
H_1: The perceived ease of use significantly influences the Disposition towards artificial intelligence in the banking sector	0.57	Accepted
H_2: The perceived usefulness significantly influences the Disposition towards artificial intelligence in the banking sector	0.23	Accepted
H_3: Perceived ease of use has an Influence on the willingness to embrace artificial intelligence in banking sector	0.49	Accepted
H_4: Perceived usefulness has an Influence on the willingness to embrace artificial intelligence in banking sector	0.42	Accepted
H_5: Technological knowledge has an Influence on the willingness to embrace artificial intelligence in banking sector	0.07	Accepted
H_6: Perceived risk has an Influence on the willingness to embrace artificial intelligence in banking sector	0.67	Accepted
H_7: Awareness about AI has an Influence on the willingness to embrace artificial intelligence in banking sector	0.05	Accepted

H_8: Disposition towards artificial intelligence significantly influences the willingness to embrace artificial intelligence in banking sector	-0.65	Rejected

Source: Developed by the researcher

the above summary of hypotheses states that majority of the hypotheses are accepted and are having a positive impact except for the last hypothesis which states that the disposition towards artificial intelligence significantly influences the willingness to embrace artificial intelligence in banking industry.

9. DISCUSSIONS

This study was conducted for determining relationship between certain variables like perceived ease of use, perceived usefulness and disposition towards artificial intelligence. The study attempted towards identifying the association between technological knowledge, perceived risk, awareness about AI and willingness to embrace AI. Perceived ease of use, perceived usefulness, technological knowledge, perceived risk and awareness about AI were taken as independent variables. Tests were conducted to determine how these factors affect disposition towards artificial intelligence and willingness to embrace artificial intelligence.

The study result showed favourable correlation among perceived ease of use along with disposition towards artificial intelligence. Easy usage of technology leads to the positive disposition towards AI. Customers are happy about the intervention of AI in banking sector. This positive attitude has led to embracing of artificial intelligence within banking industry. Perceived usefulness also has a positive influence on disposition towards AI and willingness to embrace AI. Customers believe that AI can improve the banking performance and has hence developed a favourable disposition towards AI and also shows a favourable willingness to embrace artificial intelligence.

Perceived risk also has an association on willingness to embrace artificial intelligence. Awareness about the risk and security measures can make customers adopt and adapt to AI technology. The study result showed a negative association between attitude towards AI and willingness to embrace artificial intelligence in banking sector. This proved that though customers had a favourable disposition towards artificial intelligence they showed a negative willingness to embrace artificial intelligence. This could be because of the perceived risk or due to the lack of awareness about AI and its uses.

10. LIMITATIONS OF THE STUDY AND AVENUES FOR FUTURE RESEARCH

In spite of the innumerable theoretical and practical findings and contributions it is apt to acknowledge the research limitations and set direction for future research. Firstly, sample selected was from Karnataka State in India further studies can be conducted in various other states or as a pan-India activity. Further this steady was limited to only the nationalized banks and hence opportunity exists for testing this model in private sector banks. Also, this study schematized only five main aspects that impact the embracing of AI, namely perceived usefulness, perceived ease of use, technological knowledge, perceived risk, and awareness about AI. Nevertheless, there is scope for future researchers to look beyond these factors for a comprehensive study.

11. CONCLUSION

AI can help the banks by automating their work and can also eliminate data fraud and competition from FinTech competitors. AI plays and remains to significantly contribute to the advancement of bank by requiring limited human participation. Reduction in human participation can also help the banks in cost reduction and efficient rendering of services. This indirectly leads to the increasing customer satisfaction which in turn increases customer base for a bank, but to achieve this creating awareness about the usage of AI in inevitable.

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