

Application of Artificial intelligence in Digital Transformation of Indian Banking Industry

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ABSTRACT

India is putting into practise a number of strategies to enhance the performance of banking services to its valuable customers as it move towards the larger economy and towards its goal of becoming an economic powerhouse in this subcontinent because the banking sector is crucial to the efficient operation of the economy. At present Artificial Intelligence (AI) technology is helping banks in their transformation and improving services to their customers. In this research, we examine how several banking operations have changed as a result of the growing usage of AI. The purpose of the research is to assess the possible advantages and restrictions of AI applications in the banking sector. We analyse the adoption of AI in banking by doing a systematic review of relevant literature, reviewing industry publications, and analysing primary data from a survey of 203 participants. Our findings suggest that AI is driving significant innovation in the financial services industry. Artificial intelligence (AI)-powered Chatbots and Virtual Assistants are assisting banks in providing effective, individualized service to customers while speeding up response times and enhancing customer satisfaction. Additionally, banks are using AI algorithms for fraud detection and prevention to improve security protocols and protect consumer assets by detecting trends and anomalies in real-time. Additionally gaining up momentum is the use of AI in risk management and compliance. Large financial data sets can be analysed by cutting-edge AI models, which can also identify possible hazards and make precise predictions. This helps banks make informed decisions and adhere to regulatory standards. Additionally, AI-driven credit scoring and loan underwriting algorithms are enhancing the lending process. However, Key issues that need attention include ethical considerations, data privacy issues, and the requirement for algorithm transparency. To maintain customer trust and regulatory compliance, banks must build strong governance frameworks and ensure ethical usage of AI.

Keywords: Artificial intelligence, banking sector, customer experiences, operational efficiency, risk management.

INTRODUCTION

India is putting into practise a number of strategies to enhance the performance of banking services to its valuable customers as it move towards the larger economy and towards its goal of becoming an economic powerhouse in this subcontinent because the banking sector is crucial to the efficient operation of the economy.

Because of the ever-increasing pace of technological development, convenience is no longer a static concept. Customer expectations, regulatory requirements, technology, demographics, new rivals, and altering economics are all variable aspects that are concerned in the process of developing forces. The biggest threat is that clients will leave your bank for another that's simpler and more familiar to use.

How can you smoothly go from conventional banking to tech-enabled offerings while keeping your current clientele? Many financial institutions have taken digitalization to the next level because they see it as a game-changer. The digital revolution is giving consumers newfound agency and stimulating their interest in novel ways. In the process, technological advancements will allow for enhanced operations.

The introduction of artificial intelligence technology has enabled financial institutions to stay up with their competitors in terms of their capacity for gathering new information. Customers will find it simpler to complete their online transactions quickly as the usage of AI in the banking industry develops. Electronic financial transfers and artificial intelligence technologies have helped modernize the banking procedure.

Customer wants prompt service and a great degree of customization. The banks expect this to boost productivity, and it will also aid in enhancing touch points. The use of electronic payment methods including electronic clearing, mobile wallets, mobile banking, and debit cards at the point of sale has increased in India.

Rapid product and service delivery, enhanced governance, better risk management, strategic product placement, increased sales and marketing efficiency, and cost optimization are all ways in which this enhances the efficiency of institutions. Lending is just one industry where AI has shown to be an invaluable tool in the development of intelligent systems. Since lending at its core is a large data issue, it's a great industry to apply machine learning to.

The creditworthiness of the borrower is a factor in the amount of the loan. This is the business that looks into the loan. You can make a better informed decision regarding a borrower's creditworthiness if you have more data about them. The borrower's profile and creditworthiness of the clients are analysed by AI and machine learning, which also promises to analyse all of these data sources together to get a consistent conclusion. To mitigate default, companies like Capital Float and Monsoon Credit Tech have created artificial intelligence-based approaches to evaluating a small business's creditworthiness. Microfinance institutions like Finomena (Bangalore) are using AI and machine learning tools to construct risk portfolios for credit decisions. As a consequence, "creditworthiness" was highlighted as one of the financial industry's most potential applications of artificial intelligence. The most important component of all of these technologies, however, is the customer experience.

Users like the convenience of these tech-enabled banking options. They're at ease doing transactions without the help of the bank's technical team, and as a result, they're able to move through the site more quickly. By using technology and external partners, the bank may exhibit potential arising from the challenging environment, which will decide its future performance.

Information management, file organization, and data reporting are highlighted here. Data reporting and analysis are just one of the many areas where cloud-based services like Dropbox contribute. Many small and medium-sized businesses (SMBs) now rely heavily on technology to help them communicate with their millions of consumers. The use of technological innovations in the banking sector has resulted in greater productivity and reduced overhead. The entire IT budget is used for a wide variety of projects, including security improvements, system migrations, upgrades, the introduction of business intelligence tools, and the rollout of new social media and mobile banking features. Small and medium-sized businesses (SMEs) with a strong digital presence expanded twice as rapidly as their non-digital counterparts, according to research from Google and KPMG.

The data indicates that the middle market grew in 2019. The millennial generation is widely predicted to have the highest per capita discretionary income of all time. Among small and medium-sized financial institutions, there has been an upward tendency toward social media, video content, influence marketing, and mobile banking. As a result, the market for mobile advertising is expanding quickly. This digitization makes it possible for SMEs to adopt tactics for gaining access to digital material preferred by consumers. The usage of social media allows smaller and medium-sized banks to expand their customer base.

They have gone so far as to use analytics to help them reach a wide audience with better products. Core banking system pioneers now use improved payment options including RTGS, IMPS, and others to process client bulk payments. They accept a variety of payment options, including AEPS (Aadhar enabled payment system) and IMPS (instant payment service), which is used by many cooperative banks. One of the new features these banks are offering is the use of a universal payment interface (UPI). Customers of cooperative banks have access to all major unified payment interface (UPI) applications, including BHIM, PhonePe, Paytm, and Google Pay, for usage with their savings accounts. SMEs implement UPI in conformity with RBI regulations. Major urban cooperative banks have been early adopters of innovative systems.

The purpose of this article is to look at how Artificial Intelligence (AI) is being used to bring about a digital revolution in the Indian banking industry.

LITERATURE REVIEW

According to **Rathnakar Achary (2021)**, AI may be utilised for a variety of tasks, including analysing customers' creditworthiness and identifying fraud. When used to automate financial processes, AI increases intelligence on all fronts. It makes use of human-machine interface features to lessen business expenses and boost service delivery efficiency while catering to individual preferences.

According to **Mohamed Hussain Thowfeek (2010)**, AI does not inspire by itself and needs facilitation from a wide range of factors based on their study, "Drivers of Artificial Intelligence in Banking Service Sectors." The study has helped in highlighting the various challenges in complex implementation and quality assurance.

According to **Richard Baskerville (2020)**, banks must undergo a digital transformation in order to be competitive in a financial environment that is undergoing fast change. They do, however, issue a warning and advise banks to be aware of the difficulties brought on by digital transformation and try to overcome them through efficient regulatory compliance, data security measures, and cultural change. To stay ahead of the curve in the digital world, the authors advise banks to prioritise customer experience and make investments in new technologies.

According to **Carmen Cuesta (2015)**, as the banking industry becomes more digital, it would be desirable to develop pertinent indicators that are shared by the entire financial system and applied transparently to the market. This should be done on comparable terms across companies and nations so that it can be assessed if the investments made are acceptable and whether they provide the anticipated benefits. Financial institutions and the government alike would benefit from this activity because of the visibility it would provide into both parties' development.

According to **Sonja D. Radenković (2023)**, chatbots and virtual assistants are being developed that provide 24/7 customer care and tailored suggestions (11000). In order to increase efficiency and save costs, AI is also being utilised to automate a number of banking procedures, including document processing, loan approvals, and fraud detection. Large volumes of data are being mined for insights using data analytics powered by AI, enabling better customer targeting and more informed decision-making. Regulatory frameworks that are adapting to allow the use of these technologies while assuring compliance with current regulations are applicable to the application of AI in the banking sector.

According to **Orçun Kaya (2019)**, "Artificial Intelligence: A Lever for Profitability with Limited Implementation to Date" believe that AI has the capacity to fundamentally transform a variety of aspects of contemporary life. The United States and China, in particular, have lately made major expenditures in AI. It's a mixed bag in Europe, with some countries boasting thriving AI ecosystems and others falling behind. The governments of Europe have set up strategies to promote AI work in their countries after realising the potential of the technology. The financial services sector might be greatly impacted by artificial intelligence. However, it hasn't gained widespread acceptance in the financial sector just yet. It may be challenging to adopt AI due to the highly regulated structure of the banking industry and the possibility of future legislative constraints on data privacy.

According to **Dr. Navleen Kaur (2020)**, AI is quickening the pace of change in the banking sector. Analytics, core banking, operational performance, and customer service are just few of the banking sectors that make use of AI technology. Artificial intelligence has expanded the concept of banking to include more than just traditional brick-and-mortar institutions. New financial services offered by modern banks contribute to the development and growth of the banking industry. Technology allows for more efficient use of resources, wider access to financial services, and the facilitation of low-value transactions. Banks may speed up their progress and expand their operations by making smart use of technology.

According to **Mauro Castelli (2016)**, "In this article, we present an artificial intelligence technique for anticipating a bank's degree of customer service." A common measure of service quality is how long a client must wait before receiving assistance. Managers may decide to add extra bank counters to meet customer demand based on the quality of the present service. The application is particularly significant because, in addition to increasing customer loyalty, providing high-quality service will also help businesses save operating expenses related to newly created bank counters. So, from a management standpoint, it is crucial to strike a compromise that enables ensuring a decent service quality while maintaining low operational expenses."

According to **Cristina Gallego-Gomez (2020)**, businesses today face difficult issues, such as managing massive amounts of information and having to respond quickly to customers, stakeholders, etc. Individuals look for more Humanized experiences are easier to find in artificial intelligence techniques, where technology and mass customisation meet. Given the aforementioned factors, as well as the restructuring of the banking industry and the implementation of policies aimed at bringing banks closer to customers, it is more important than ever to make investments in improving key aspects that can provide businesses a competitive edge. Artificial intelligence is therefore needed in order to assist banking organisations become more efficient.

According to **Dr. Shivraj Singh (2019)**, Many industries, including banking, are experiencing a digital surge right now, especially in the wake of demonetization. Artificial intelligence (AI), cloud computing (CLOUD), and block chain are just a few examples of the cutting-edge technologies that conventional banks are using to improve efficiency and minimize expenses. The banking industry is on the cusp of an AI revolution, even if the technology is still in its infancy. Productivity will increase at a cheaper cost as the AI business grows and develops. Managers in all sectors will need to devote more time and resources to training and development. The contemporary drive toward digitalisation is unquestionably having profound effects on established banking practices. But it has also made the institutions more exposed to recent innovations and advancements that have fuelled economic and industrial growth.

According to **Srihari Subudhi (2019)**, the traditional banking industry has changed, and more and more financial institutions are implementing cutting-edge technologies like AI, the cloud, and blockchain to reduce operational costs, improve customer service, and boost overall bank productivity. There is no doubt that advancements and developments in the AI sector will boost productivity in banks at a lower cost. The increasing push for digitization is having a dramatic impact on conventional banking models. However, it has also increased the banks' susceptibility to escalating cyber security issues. The use of AI in many financial areas may lead to the implementation of new technologies and methods, and banks must keep their staff employees informed about these developments.

According to **Nadire Cavus (2021)**, The model can assist marketers and app developers in determining the best methods for enhancing user experience and accelerating app growth. Overall, the study adds to the expanding body of research on mobile banking apps and offers useful advice for marketers and app developers who want to boost the long-term success of their apps. The study's conclusions can guide additional research in this field and further our knowledge of the intricate processes affecting app engagement and uptake.

According to **Okiriza Wibisono (2019)**, "The use of big data analytics and artificial intelligence in central banking" has significant potential benefits for the sector. The authors come to the conclusion that these technologies can offer central banks useful insights, allowing them to better comprehend economic patterns and risks, boost their capacity for forecasting, and improve their processes for making policy decisions. The authors also point out that the application of big data analytics and AI in central banking creates moral questions around data privacy, responsibility, and transparency. To guarantee that these technologies are utilised responsibly and openly, they stress the significance of creating suitable regulatory frameworks and ethical principles.

According to **Surender Mor (2021)**, the use of AI tools like chatbots, virtual assistants, and automated teller machines had an impact on the technical inefficiency of a sample of 47 Indian commercial banks. The findings show that foreign banks primarily benefit from having a high capital-adequacy ratio and business per employee, whereas public sector banks, although having the greatest levels of assets, deposits, advances, and interest income, incur significant losses due to high NPA. The outcome demonstrates that a bank's assets and its performance in terms of advances are positively correlated.

According to **Halil Ibrahim Erdal (2013)**, the two AI techniques that are most successful in predicting bank failures based on financial statistics are artificial neural networks and support vector machines. The scientists discovered that reducing the number of features using principal component analysis (PCA) did not enhance the functionality of the AI models. The research concludes that the following financial indicators are most important for forecasting bank failures (LLRNP): equity to total assets (ETA), capital adequacy ratio (CAR), non-performing loans to total loans (NPLTL), and loan loss reserves to non-performing loans.

RESEARCH OBJECTIVES

- To explore the application of AI in Banking industry
- To understand the complexity and constraints in implementing the AI in banking sector.
- To examine the employees' opinion on the application of AI in Banking functions

HYPOTHESIS:

H₀: Role of AI is not significant in the digital transformation of Indian banking sector

H₁: Role of AI is significant in the digital transformation of Indian banking sector.

RESEARCH METHODOLOGY

The descriptive research design is adopted for the study as it deals with describing the application of AI in banking industry. This research uses both quantitative and qualitative aspects, indicating that a mixed-methods approach was used. Quantitative and qualitative methods to the study topic are combined in mixed-method research. Using mixed methods research allows the researcher to fortify the connection and power of both quantitative and qualitative research methodologies. This allows for a deeper understanding of the subject at issue. The sources of data collection are both primary and secondary sources. Primary data was collected via a survey of a representative sample of banking experts and customers who have utilised the service in order to examine the impact of AI on the Indian banking sector. A total of 203 samples were collected through a questionnaire which consisted of different questions that aid in understanding the research objectives. And secondary data and information were gathered from reputable online resources, print resources, including online and print business publications. The researcher examined how AI is used in the banking sector and how it improves financial organisations' performance using secondary data. The evaluation tools used in analysing the data are Chi square tests using Jamovi, Two-way Anova using MS-Excel, Descriptive statistics using Jamovi, and Logistic regression using R programming language. The various tools are used for analysis and the insights are obtained on the results.

ANALYSIS OF DATA AND INTERPRETATIONS

Table: - 1

Can Artificial Intelligence Improve the Efficiency and Accuracy?

Descriptives	
AI can improve the efficiency and accuracy	
N	203
Missing	0
Mean	1.96
Median	2
Sum	397
Standard deviation	1.17
Variance	1.38
Range	4
Shapiro-Wilk W	0.719
Shapiro-Wilk p	<.001

Mean: The mean value of the variable is 1.96. This suggests that, on average, the efficiency and accuracy of AI in the dataset is close to 2.

Median: The median value of the variable is 2. This indicates that 50% of the observations have a value of 2 or less, and 50% have a value of 2 or more. When data is skewed, the median is utilized as a proxy for the middle value.

Standard deviation: The variance is 1.17 times the mean. Calculates the spread or dispersion of the data. In this case, it suggests that the efficiency and accuracy values of AI in the dataset vary by approximately 1.17 units around the mean.

Shapiro-Wilk W and p-value: The Shapiro-Wilk test is a test of normality. The W statistic is 0.719, and the p-value is <0.001. This suggests that the efficiency and accuracy values do not follow a normal distribution. The substantial deviation from normalcy in the data is shown by the modest p-value.

Table No: - 2

Has Artificial Intelligence reduced the workload?

Descriptives	
AI has reduced the workload	
N	203
Missing	0
Mean	2.15
Median	2
Sum	436
Standard deviation	1.04
Variance	1.09
Range	4
Shapiro-Wilk W	0.831
Shapiro-Wilk p	< .001

Mean: The mean is 2.15. This indicates that, on average, the workload reduction due to AI is estimated to be around 2.15 units.

Median: The median is 2. This indicates that for each pair of observations in the dataset, either the workload reduction is less than or equal to 2 or it is more than 2.

Standard Deviation: The standard deviation is 1.04. The dispersion of data with reduced workload relative to the mean is calculated. There is greater data variability if the standard deviation is larger. The dispersion of the data is shown by the departure from the mean, which is 1.04, and the variance, which is 1.09.

Shapiro-Wilk p-value: For the Shapiro-Wilk test, the stated probability is less than 0.001. This provides conclusive evidence against the normalcy hypothesis and suggests the data is not regularly distributed.

Table No: - 3

Is adapting to Artificial Intelligence Easier?

Descriptives	
Adapting to AI easier	
N	203
Missing	0
Mean	2.21
Median	2
Sum	449
Standard deviation	1.00
Variance	1.01
Range	4
Shapiro-Wilk W	0.873
Shapiro-Wilk p	< .001

Mean: The mean value of 2.21 indicates the average response or rating for "Adapting to AI" across the 203 observations. On average, the respondents have a rating of 2.21.

Median: The median value of 2 represents the middle of the data set when sorted in ascending order. Half of the respondents gave an average score of less than 2, while the other half gave an average score of more than 2.

Standard deviation: The 1.00 standard deviation from the mean indicates an even distribution of evaluations. The variation of the ratings for "Adapting to AI" is 1.01, which indicates that the ratings are somewhat dispersed around the mean of 1.00. It is a measure of the typical squaring of the standard deviation.

Shapiro-Wilk p: The p-value associated with the Shapiro-Wilk test is reported as $< .001$, indicating that the dataset significantly deviates from a normal distribution.

Table No: - 4

Artificial Intelligence has Higher Impact on banking sector.

Descriptives	
	AI has higher impact
N	203
Missing	0
Mean	2.11
Median	2
Sum	429
Standard deviation	0.961
Variance	0.923
Range	4
Shapiro-Wilk W	0.838
Shapiro-Wilk p	$< .001$

Mean: The average is 2.11 in this instance. This indicates that the variables in the dataset have a mean close to 2.11 which indicates that the respondents agree that the Ai has higher impact on the banking sector.

Median: There is a median of 2 in the data. Accordingly, half of the respondents in the dataset agreed to that AI has impact on the banking sector and the other half disagree to the same.

Table No: - 5

Will use of Artificial Intelligence in the banking industry lead to job losses?

Descriptives	
	Use of AI in the banking industry will lead to job losses
N	203
Missing	0
Mean	2.50
Median	2
Sum	508
Standard deviation	1.00
Variance	1.00
Range	4
Shapiro-Wilk W	0.899
Shapiro-Wilk p	$< .001$

Mean: The average in this situation is 2.50. This shows that, generally speaking, respondents believe that the adoption of AI in the banking industry will result in some job losses.

Median: The median value here is 2. Half of those polled are concerned about job losses as a result of increased use of AI in banking, while the other half are not.

Standard Deviation: We may deduce that the responses are strongly grouped around the mean value of 3, as variance is calculated by square rooting the standard deviation. In this instance, the variance is 1.00.

Shapiro-Wilk W and p: The Shapiro-Wilk test is performed to determine whether the data have a normal distribution. The data may not be normally distributed, as indicated by the W value of 0.899. Data substantially deviates from a normal distribution, as shown by the p-value (<.001).

Table No: - 6

Will Artificial Intelligence replace Humans In Banking Sector In Future?

Descriptives	
AI will replace humans in banking Sector in future	
N	203
Missing	0
Mean	2.60
Median	2
Sum	527
Standard deviation	1.16
Variance	1.34
Range	4
Shapiro-Wilk W	0.893
Shapiro-Wilk p	< .001

Mean: The average is 2.60 in this instance, which means that more than half of the respondents believe that the AI will replace the humans in the banking sector in the future.

Median: In the above scenario the median value is 2, which means 50% of the responses lie below 2 and 50% lie above 2, which signifies that more than half of the respondents believe that AI can replace humans in banking sector in future.

Standard deviation: The data's standard deviation shows how much they deviate from the mean. The findings are likely to be closer to the mean if the standard deviation is lower. The variance is 1.16 standard deviations in this situation.

Variance: The variance is another indicator of data distribution. When the variance increases, it means the data is more dispersed. The variance in this situation is 1.34.

Shapiro-Wilk W and p: The Shapiro-Wilk test is a statistical method for determining whether or not a given dataset has a normal distribution. The W statistic and associated p-value are computed by the test. With a p-value lower than 0.001, the Shapiro-Wilk W in this example is 0.893. (Indicating it is less than the significance level of 0.05). That the dataset does not have a normal distribution is implied.

Table No: - 7

Adaptability of customers to Artificial Intelligence is Easy

Descriptives	
Adaptability of customers to AI is easy	
N	203
Missing	0
Mean	2.38
Median	2
Sum	483
Standard deviation	0.985
Variance	0.969
Range	4
Shapiro-Wilk W	0.870
Shapiro-Wilk p	< .001

Mean: The average score for the adaptability of customers to AI is 2.38. This suggests that, on average, customers have a moderate level of adaptability towards AI.

Median: The median score is 2. This means that half of the customers have an adaptability score lower than 2 and the other half have a score higher than 2.

Standard deviation: The adaptability scores have a wide range of variation, which is captured by the standard deviation. A number of 0.985 suggests a modest level of variation across scores and a high degree of concordance between them. As for the variance, it comes in at 0.969.

Shapiro-Wilk p-value: The Shapiro-Wilk test has a significance level lower than 0.001. All of this points to a rejection of the assumption that the data follows a normal distribution. This means that a normal distribution cannot be assumed for the data.

Table No: - 8

Has Artificial Intelligence Affected the Customer Experience?

Descriptives	
Artificial intelligence affected the customer experience	
N	203
Missing	0
Mean	2.14
Median	2
Sum	434
Standard deviation	0.896
Variance	0.803
Range	4
Shapiro-Wilk W	0.848
Shapiro-Wilk p	< .001

Mean: The mean value (Mean = 2.14) represents the average of all the observations. In this case, it suggests that, on average, the customer experience influenced by artificial intelligence is rated at 2.14.

Median: This means that half of the customers have customer experience rating of two or below and half have a rating of two or higher.

Standard Deviation: The standard deviation is a measure of how far apart the data points are from the mean (0.896). More dispersion in the customer satisfaction ratings is indicated by a larger standard deviation.

Variance: The variance also illustrates how the data points vary from the mean (0.803). It is the square root of the standard deviation, and it shows how much out of line each observation is with the overall average.

Shapiro-Wilk W and p-value: To determine whether or not a dataset is normally distributed, statisticians often use the Shapiro-Wilk test. Dataset considerably departs from a normal distribution, as shown by the Shapiro-Wilk W value (0.848) and the p-value (<.001). This provides evidence that the ratings of the customer's experience may not be normally distributed.

Table No: - 9

Are the Banks able to Use Artificial Intelligence to Its Full Capacity?

Descriptives

The banks are able to use AI to its full capacity	
N	203
Missing	0
Mean	2.32
Median	2
Sum	470
Standard deviation	1.00
Variance	1.01
Range	4
Shapiro-Wilk W	0.848
Shapiro-Wilk p	< .001

Mean: The mean, with a value of 2.32, is the median of the data. This would indicate that, on average, 2.32 percent of banks are making use of AI efficiently.

Median: The median is 2, then 50% of the data points have a value of 2 or less, and 50% have a value of 2 or more, which states that the respondents feel that the banks are yet to use AI to its full capacity.

Standard deviation: The standard deviation, which is equal to 1, measures dispersion or departure from the mean. The standard deviation will be minimal if the data are closely clustered around the mean.

Variance: The variance, which is 1.01, is another measure of the spread or dispersion of the data points. It is the square of the standard deviation.

Shapiro-Wilk p: Since the dataset has a Shapiro-Wilk p-value of less than 0.001, it is not normally distributed. Thus, the percentages of banks that make use of AI are not spread properly.

Table No: - 10

Chi Square test

Variables: -

- 1) Artificial Intelligence can improve the efficiency and accuracy
- 2) Designation

Contingency Tables

Contingency Tables

What is your designation?	AI can improve the efficiency and accuracy					Total
	1	2	3	4	5	
1	26	17	3	5	3	54
2	11	12	0	0	0	23
3	12	9	1	3	7	32
4	5	23	0	1	5	34
5	11	18	2	0	0	31
6	19	8	0	0	2	29
Total	84	87	6	9	17	203

χ^2 Tests

	Value	df	P
χ^2	50.2	20	< .001
N	203		

The actual and projected frequencies in the table of contingencies differ significantly, as shown by the chi-square value of 50.2. The variables are more likely to be connected if the chi-square value is higher.

The chi-square test's degrees of freedom (df) are equal to the number of columns and rows in the contingency table. In this case, there are 6 rows and 5 columns, resulting in $df = (6 - 1) * (5 - 1) = 20$.

The p-value is the chance, under the null hypothesis that there is no correlation between the variables, of witnessing the chi-square value that was obtained or a more extreme value (null hypothesis). When a p-value is presented as ".001," it signifies that the result is significantly less than the predetermined significance threshold () of 0.05. There is substantial evidence against the null hypothesis, indicating that the variables "Designation" and "AI implementation and adaptability" are significantly related.

The chi-square analysis shows that there is a substantial correlation between respondents' job titles and their belief that AI increases productivity and precision.

Table No: - 11

X² Test

The AI tools used by the banks and their impact on the benefits derived by the customers.

Variables	Value	df	Asymp. Sig. (two-sided)
chatbot * Customer service	17.161 ^a	2	.000
chatbot * Cash Withdrawal	16.622 ^a	1	.000
chatbot * Transparency	5.300 ^a	1	.021
chatbot * security	26.172 ^a	1	.000
ATM * Cash Withdrawal	34.244 ^a	2	.000
ATM * security	8.299 ^a	2	.016
ATM * Loan approval	7.164 ^a	2	.028
kioski * security	19.450 ^a	1	.000
kioski * Loan approval	6.368 ^a	1	.012
virtual assistant * security	13.321 ^a	2	.001
chatbot * speed	14.516 ^a	1	.000
chatbot * accuracy	13.380 ^a	2	.001
chatbot * 24/7 Availability	18.603 ^a	1	.000
chatbot * improved customer experience	9.502 ^a	2	.009
chatbot * backend operations	7.842 ^a	1	.005
chatbot * Reduction in operational costs	10.094 ^a	1	.001
ATM * 24/7 Availability	16.212 ^a	2	.000
ATM * Reduction in operational costs	6.246 ^a	2	.044
kioski * accuracy	6.435 ^a	2	.040
kioski * 24/7 Availability	11.559 ^a	1	.001
kioski * backend operations	17.469 ^a	1	.000

kioski * cost effective	12.943 ^a	2	.002
kioski * Improved security and compliance	4.854 ^a	1	.028
e payments * speed	3.960 ^a	1	.047
e payments * improved customer experience	4.056 ^a	2	.132
e payments * backend operations	5.586 ^a	1	.018
virtual assistant * accuracy	14.083 ^a	4	.007
virtual assistant * 24/7 Availability	13.608 ^a	2	.001

- The significance of the independent variable in relation to the dependent variable is assessed using the CHI-Square test.
- The variable “Chatbot” i.e., the use of chatbot has significant impact by the variables like customer service, cash withdrawal, transparency and security.
- The variable “ATM” is impacted significantly by the variables like cash withdrawal, security and loan approval.
- “Virtual assistant” is significantly impacted by the variable’s security, accuracy and 24/7 availability.
- The variable “KIOSKI” is impacted significantly by the variables like security and loan approval.
- The E-payment is impacted by the variables such as speed, improved customers and backend operations.

Conclusion: AI tools are largely benefitting in terms of security, transparency, 24/7 availability, speed and improved customers service and backend operations

Table No: - 12

Variables	Value	df	Asymp. Sig. (2-sided)
chatbot * Customer service	17.161 ^a	2	0
chatbot * Cash Withdrawal	16.622 ^a	1	0
chatbot * Transparency	5.300 ^a	1	0.021
chatbot * communication	4.480 ^a	1	0.034
chatbot * security	26.172 ^a	1	0
ATM * Cash Withdrawal	34.244 ^a	2	0
ATM * Transparency	3.340 ^a	2	0.188
ATM * security	8.299 ^a	2	0.016
kioski * security	19.450 ^a	1	0

kioski * approval	Loan	6.368 ^a	1	0.012
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Challenges faced during the implementation of AI tools into the banking sector.

- The “chatbots” are highly impacted by the variables such as customer service, cash withdrawal, transparency, communication and security.
- The “ATMs” are impacted highly by the factors like Cash withdrawal facilities, transparency in transactions and security about the credentials of the stake holder.
- The “kioski” machines are used and impacted highly on the factors like security and loan approval by the banks.

Conclusion: The implementation of AI tools is impacted by the challenges such as issues in transparency, withdrawal facilities, loan approval procedures, faulty communication, etc

9.CONCLUSION

There is immense potential for artificial intelligence (AI) to transform the banking industry and improve customer service. Through the analysis of customer data, AI algorithms can provide personalized and efficient services, enabling banks to enhance customer experiences and streamline operations. The use of AI-powered chatbots and virtual assistants has already shown significant improvements in customer support and response times. Additionally, AI can help in fraud detection and prevention by identifying patterns and anomalies in real-time, leading to enhanced security measures.

AI use in banking is not without its difficulties and concerns. Maintaining customer trust and regulatory compliance requires addressing ethical issues like data privacy and algorithm transparency. Additionally, for AI to be successfully implemented, banking professionals and AI experts must work together to verify that the technology is in line with the institution's unique demands and objectives. The future of AI in the banking industry is very promising. With improvements in machine learning and natural language processing, AI is able to continuously learn and adapt, producing predictions and suggestions that are increasingly sophisticated and precise. It has the potential to spur innovation, enhance risk management, and let banks use data to inform their decisions.

It is important to keep in mind that AI cannot replace human judgement and understanding. The human touch is still essential for developing relationships with clients, making complex judgements, and displaying empathy in delicate situations, even when AI can automate mundane activities and speed operations.

In conclusion, careful planning, funding, and cooperation are required for the ongoing process of integrating artificial intelligence (AI) into the banking sector. When used wisely, AI has the potential to totally alter the banking sector by enhancing client experiences, enhancing operational performance, and strengthening risk management. It is crucial for banks to remain at the forefront of AI innovation, adapt to shifting client expectations, and utilise the power of AI safely and ethically as technology continues to advance.

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