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Research Article

Assessing the customer adoption and perceptions for AI-driven sustainable initiatives in Indian banking sector

Ranpreet Kaur[1], Sonali Prasad Dharmadhikari[1,*], Sonali Khurjekar[2]

[1] Bharati Vidyapeeth (Deemed to be University) Institute of Management & Entrepreneurship Development, Pune 411038, India

[2] Deccan Education Society's-Institute of Management Development and Research, DES Campus, Pune 411038, India

* Corresponding author: Sonali Prasad Dharmadhikari, sonali.dharmadhikari@bharatividyapeeth.edu

ABSTRACT

It is said, "Technology is a weapon and there is no escape from technology." Many businesses are getting growth and expansion because of the usage of technology. Banking sector is one of them. It is must for banking sector to exploit the available opportunities by using technologies to penetrate the urban as well as rural areas. Usage of artificial intelligence (AI) based tools products and services is contemporary developments in banking. Banks are achieving accelerated growth and expansion. AI applications can fetch the financially left out individuals into formal and structured financial services segment utilizing their exclusive characteristics such as speed, security, cost-effectiveness and customization. Transition in banking sector is getting implemented by use of AI enabled robots, mobile banking, chatbots etc. Artificial intelligence is making banking and financial institutions powerful by utilizing the technology and redefining the way they used to operate to achieve more efficiency and growth. It is clearly observed from the available literature that banking sector is utilizing artificial intelligence to grow and follow sustainable approach. The main objective of the present research work is to understand and acknowledge the customer's perception related to bank powered AI tools, products and services after analyzing the data collected through survey of customers through structured questionnaire. Research work aims to understand the customer review on usage of AI tools, technology and their adoption so that future strategies related to adoption of AI for banking can be erected. Research work mainly focuses on primary data by constructing the structured questionnaire. The outcome will assist bankers to apply, modify and upgrade the artificial intelligence tools to attract the population as well as to enhance customer satisfaction. The major findings of the research are the AI tools used by the banks should be user friendly and gender neutral.

Keywords: artificial intelligence; banking sector; customer satisfaction; services; technology; population

1. Introduction

In this technology era, the goal of banks is to make financial services available by applying artificial intelligence based products to the whole customer base including deprived and subjugated individuals at a reasonable price (N. Murugan, 2021)[1]. It enhances the opportunities to the banking and financial services to get more customer base and expansion. One of the objectives is to penetrate financial inclusion (FI). A composite financial inclusion index (FI-Index) is announced by the Reserve Bank of India (RBI) that is

grounded on numerous parameters to showcase the deepening and broadening for financial inclusion in the nation on 7th April 2021. It has been observed that for the period ending March 2021 FI index was 53.9 as compared to the time frame of March 2017 of 43.4. (VERMA, 2021)[2] The financial inclusion index includes of three extensive criteria i.e., usage (45%), access (35%) and quality (20%). Technologies are helping many businesses to get success and now the banking sector is also reconnoitering technology to exploit the accessible prospects. Use of artificial intelligence is one of the practices. Many financial institutions and banks have initiated the use of artificial intelligence to exploit the available opportunities and follow the sustainable approach. Artificial intelligence is making banking and financial institutions powerful by utilizing the technology and redefining the way they used to operate to achieve more efficiency and growth. (Gopalakrishnan, 2020) [3] It is observed that major products and services are offered in the form of chatbot, credit approval and assessment, loan appraisal, payments and transfers, risk management, bank enquiries, ATM related services, personalized services and product application by the top banks. AI tools come with various advantages and challenges. Chatbots are extremely helpful for customers as well as banks to resolve queries and fast communication and bringing untapped population into the banking system. The main challenges the banking sector is facing today are frauds and cyber-attacks which creates lack of trust. AI tools are developed for prevention of frauds. Mainly user friendly AI enabled tools helps in enhancing customer experience and loyalty. One more challenge is personalization of information / privacy. Banks should encourage customers' trust and loyalty while providing technology driven products and services.

2. Objectives

a) To study the concept and applications of artificial intelligence in Indian banking sector.

b) To know the usage of AI by top ten Indian banks.

c) To study customers' adoption and perception about AI powered sustainable banking products and services.

3. Structure of research paper

Researchers briefed the concept and applications of artificial intelligence in the first part of the research paper. Second part of the research work focuses on top 10 Indian banks' data to highlight the usage of AI in the form of various products and services. Last part of the paper discusses the customer usage and their perception for various AI powered sustainable products and services used by Indian Banks.

4. AI Powered Banking products and services (A Lui, 2018)[4]

Chatbots: Use of chatbots by banks and fintech companies to resolve the queries, questions and doubts of customers is becoming very common these days. These Chabot's support banks and financial institutions in addressing the customer's concerns 24×7. This helps the service providers to extend their services to distant locations and the customers are no longer required to visit the bank in person. Thus, the banks are enabled to communicate with the unbanked populations.

Prevention of fraud: AI helps banks to detect fraud by combining supervised and unsupervised learning algorithms and thus helps to understand the customer's behaviour in a better way. This aids banks in customer verification and better identifies and prevents unauthorized activity. For example, with the assistance of AI it is possible to compare real time photos with the photo in the document. It helps to understand the purpose of transactions and detects any mismatch with the client's profile and spending pattern. AI helps to protect susceptible individuals against possible cyber attacks.

Credit scoring: The unbanked population being cash intensive users, are unable to make evident for earnings or credit history. Credit scoring service helps to bring this unbanked population into the banking and

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financial services sector. Before extending services like debit or credit cards, loans, mortgages banks always ask for records of previous income.

Use of credit scoring assists the unbanked population to access the credit facility without having the past record, this can help banks to get and expand banking activities and business.

Access affordable loans: As artificial intelligence assists in building the past credit history for the unbanked population so it helps in getting access to affordable loans to those as per their capabilities. Utilizing behavioral attributes accessible for everyone, like social media information, spending patterns, contact data (contact number lists, localities), bills, utilization of machine learning models for forecasting future individual reimbursements possibility. Many banks are using the data generated by AI to offer credit cards, loans, services related to digital wallets and understanding the spending patterns of customers to target them with focused products and services.

Improved customer experience and service: Artificial intelligence gives flexibility to banks to provide the various services at finger clicks without physically visiting the banks. This is helping banks to provide even 24×7 services in a more efficient manner. Better customer service and experience with intensive technology leads to attracting and retaining the customers.

Financial education: financial education can be boosted for the customers by usage of Artificial Intelligence based tools and products. Bank and fintech can proceeds as a consultative role for their clients, providing tools which permit them to achieve their financials goals and objectives, assisting in liquidity problems and maintaining solvency by making them aware and educate them about the various patterns associated with it.

As per market capitalization, the following are the top ten banks in India in 2022. Financial services provided to customers applying AI by top ten Indian banks are described below (**Figure 1**) (Jain, 2022) [5]
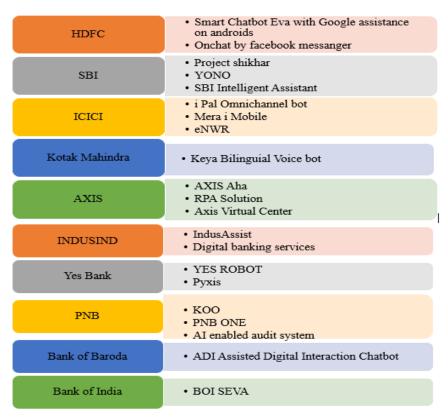

Figure 1. AI enabled banking products applied by top 10 Indian banks.

i.   HDFC:

HDFC is a leading bank applying AI based products as follows:

- EVA: This AI enabled smart chatbot is always available on website to resolve clients' enquiries and process their requests. It delivers better services which are user friendly. It is built by Senseforth. It has handled over 5 million queries with 85% accuracy rate.
- Onchat: This AI enabled chatbot is useful to customers for money transfer, online payment of bills, cards, loans and mortgages. The bank has also applied AI in competency mapping, and to and data workflow and business alignment. (HDFC BANK and CSC launch chatbot 'EVA' on Digital Seva Portal, 2021) [6]

ii.   SBI:

SBI has developed a strong portfolio of distinct products and services to provide personalized customer service by applying AI, ML and data analytics.

- Project Shikhar: The model is developed for credit card issuance.
- YONO: The services are delivered through YONO Cash, YONO Business, YONO Quick pay. It providing fantastic services to farmers, retail customers and corporate clients. YONO Krishi app is available in 12 Indian languages to help rural customers.
- SBI intelligent assistant: It is AI powered smart chat assistant which resolves customers' enquiries promptly. It also helps in every day banking tasks. (SBI online banking , n.d.) [7]

iii.   ICICI:

ICICI is a huge private sector bank offering diversified portfolio of financial products and services.

- iPal: The bank has developed this omnichannel bot for virtual financial assistance. iPal is helping in answering customers' enquiries, products details, ATM services etc. The bank is applying AI to find out creditworthiness of clients without a credit score.
- Mera iMobile: It is available for rural customers in eleven regional languages with 135 services. The main feature of this service is multiple functionalities work without internet access.
- eNWR: Electronic Negotiable Warehousing Receipts helps the borrowers to get credit quickly. Farmers are using eNWR to get loan against underlying commodities. (ICICI Online Services, n.d.) [8]

iv.   **Kotak Mahindra:**

   Kotak Mahindra has implemented a smart AI-enabled chatbot to serve millions of customers with quick and available to answer banking queries round the clock.

- Keya 2.0: It is a bilingual VoiceBot with phone banking helpline which enhance interactive voice response. It has augmented human intelligence with machine learning for interactive banking experience of customers. (Kotak mahindra Bank, n.d.) [9]

v.   **Axis Bank:**

   Axis Bank has deployed chatbot powered by AI, RPA Solutions and Axis virtual center.

- Axis aha: The chatbot addresses numerous customers' enquiries in scalable way through automation.
- RPA solution: Robotic process automation solution is used from credit assessment to payment to prevent frauds. The process helped Axis Bank to reduce turnaround time drastically.
- Axis virtual center (AVC): Digital banking and AVR has helped in growth of granular deposits. The emergency saving planner (ESP) launched by Axis bank guides the customers to calculate

their emergency corpus and enhance saving habit to reach final corpus within stipulated time. (Axis Bank, n.d.) [10]

vi. Indusind Bank:

The bank has always focused on procuring solutions by leveraging latest technology. (Indusind bank online banking, 2018) [11]

- IndusAssist: The bank has applied AI based virtual assistant Alexa skill IndusAssist. It enables voice based banking transactions with ease on tip of figure on smartphone.
- Digital banking services: Various services like indusmobile, Samsung pay, indus smart are provided to the customers.

vii. Yes Bank:

Yes Bank has invested in robot services and AI based products for loan and other banking services.

- YES ROBOT: It is AI enabled banking bot, personal banking assistant available 24×7 through Facebook messanger on mobile phone.
- Pyxis: Yes Bank has invested in AI based personalization tool Pyxis for personal loan campaign. (bank, 2019) [12]

viii. PNB:

PNB is having the following AI enabled products. (E services of PNB, 2022) [13]

- KOO: PNB is applying KOO, AI enabled chatbot to provide services to customers 24×7.
- AI enabled audit system: To improve security in banking system, PNB has procured AI enables audit system to prevent frauds.
- PNB ONE: It is a mobile banking application where all banking facilities are available at one platform.

ix. Bank of Baroda

Bank of Baroda has adopted usage of technology rigorously in its business.

- The bank has adopted chatbots internally and externally. The bank has developed chatbot assisted digital interaction (ADI). It is still in process of implementing other AI enabled applications for processing trade documents of cross border trade transactions. (BoB, 2020): [14]

x. Bank of India:

Bank is using technology to address the customers' requirements and enhance business.

- The bank has applied chatbot BOI Seva available 24×7 to resolve all queries of customers and provide speedy service. (Bank of India, n.d.). [15]

5. Review of literature

Researchers did extensive literature review for the research work and referred various indexed databases and web sources to understand the related research work already done on the subject of AI powered sustainable banking products and services. The summary of review of literature is as follows:

(Benlian1, 2021) [16]The authors have developed research design to examine how anthropomorphic design cues (ADCs) and the foot-in-the-door (FITD) technique affect customer. Today the customers' expectations are changing and AI based chatbots are lagging in satisfying them. Through the AI based chatbots, customers are not inclined to complete the requests made by chatbots. (Elizabeth. Manser, 2021) [17] The researchers have studied the relationship between value co reaction process and comfortability of consumers with AI, Mobile

banking services. The outcome of the research is a conceptual model to know perception of AI based mobile banking by analyzing primary data by applying structural equation modeling. Service dominant logic (SDL) framework has been used to find worth in usage perceptions of AIMB. The finding of the research is as AI is introduced, providing service and customer's role in value cocreation is changed drastically. (Gopalakrishnan, 2020) [3] The research article focuses on changing scenario in the machine age era in banking, service and fintech industry. AI has to be part of their business strategy and operations. The article has explored dynamics of AI ecosystem in banking sector and financial services. Currently fintech in assistance with AI assists in finding credit scores of customers based on digital footprint. Thus, customer service can be enhanced by applying AI. (A Lui, 2018) [4] This article uses various sources and a case study to depict that inventions in AI is going on in banks and FinTech start-ups. AI has achieved high popularity in the financial sector because of its capability to deliver customers with cost effective, effectual and personalized services. There are challenges like lack of trust among consumers, there is observation that discrimination is there against certain races and gender. AI regulation will be inter-disciplinary in future. (Hicham Sadik) [18] The paper has taken review of how AI can be used for credit analysis Creditworthiness assessments can be done with AI models with the development of computing power creates novel sources of information (big data) available.

(Jung Chieh, 2022) [19] Lee and Chen have explored use of concepts based on AI observed intelligence and anthropomorphism to identify users' implementation of mobile banking app based on stimulus organism response (SOR) theory. The authors have developed research model on users' AI mobile banking app implementation. (Suhartanto, Syarief, Nugraha, Suhaeni, & Masthura, 2022) [20] The authors have studied factors of loyalty of millennial customers of Islamic banks towards mobile banking enabling AI. The study emphases on how to enrich the quality of service. To increase the loyalty, it was suggested to comply with Islamic law strictly. (Elizabeth. Manser, 2021) [17] The authors have examined changing customers' role in value co-creation due to introduction of AI.

(Tulcanaza, 2023) [21] The article focuses on the customer perception factors and AI-enabled customer experience relation in the Ecuadorian banking industry. The researchers have considered five factors to measure perception of customers, trust, loyalty, satisfaction, convenience and personalization. Six hypotheses are tested in the paper which has studied the relation of variables on customer experience. A model is presented customer perception factors and customer experience. The analysis tools applied are demographic analysis, exploratory factor analysis (EFA), reliability analysis, validity analysis, correlation analysis, and regression analysis. The main observation of the study is that all five factors have positive and substantial effect on AI enabled customer experience. The results are also aligned with findings from UK, Canada, Nigeria and Vietnam.

(Arora, 2023) [22] The study emphasizes on customer's perception of Fintech services applying AI. Fintech has brought revolutionary changes in the experience of customers in financial sector. The variables identified for the study are trust commitment, personalization, usefulness, vulnerability, convenience and service quality the researchers have followed empirical and descriptive approach for the study. The major findings are the efficiency gets increased by AI applied tools of Fintech. There is very significant impact on customer experience of application of Fintech AI tools. The strategies should be developed to motivate customers to use AI.

(Noreen, 2023) [23] The article elaborates on customer perception from Asian countries. The deciding factors of the study are awareness, usefulness, attitude and knowledge of AI. To develop strategies, the findings of the study are helpful. The application of innovative AI technologies can be used to improve services offered to the customers and increasing overall revenue. Six hypotheses are tested focusing on awareness, Attitude, Subjective norms, perceived risk, perceived usefulness and knowledge of AI technology with intention to adopt

AI based technology. Econometric model has been developed after data analysis. The authors have derived Empirical results to measure the reliability through Cronbach's Alpha, descriptive statistics, correlation, multiple regression, and one-way ANOVA by using the EVIEWS-12 and SPSS-24. The major finding is there is direct relationship in use of AI in banking sector and trust amongst the customers. However, perceived risk shows a negative relationship to adopt AI enabled banking tools.

(Ryzhkova, 2020) [24] The article analyzes impact of AI on banking development. The efficiency of application of AI is based on consumers' attitude and loyalty towards use of technology. Lack of privacy is the main concern for customers.

(Bouhadi, 2022) [25]The paper studies how artificial intelligence methods can be used to enhance the decision making process. The authors have made comparison between traditional models and advance artificial intelligence algorithms. The main contribution of the study is forecasting models to use to model make market movements. The multiple useful applications of AI are explored like fraud detection, risk management.

(Correa, 2022) [26] The study is carried to explore how to enhance financial inclusion by automated banking services through Fintech. It has developed a new framework which helps to analyze low income consumers' nature to use automated banking services. The study has been carried out in Colombia.

6. Research gap:

After going through the available extensive literature, it is observed that Indian banks are investing huge amount in the AI based products and services to enhance customers' experience. Chatbots are mainly available and popular AI powered service that is used to address customer query 24×7 easily. These products are used for automation of banking functions which saves manpower and time.

This arose the interest of researchers about what is the perception of customers about it? Thus, through primary data the researchers have made attempt to prepare customers usage report.

7. Research methodology:

Researchers have done extensive literature review to understand the research gap as well as to find out the major variables related to customer usage of AI powered banking products and services. To collect the primary data, a structured questionnaire was constructed that was circulated to retail individuals banking customers in the Pune location. Before collecting the final data, pilot study was done with 55 existing customers and informal discussions were also done. Their suggestions are incorporated before finalizing the questionnaire. Reliability and validity test was also done to check the suitability of the questionnaire. Cronbach alpha was calculated to check the reliability and content validity test was done to check the validity.

Major variables identified in literature review and from secondary data study for why banks are using the AI tools are financial advice, chatbots, prevention of fraud, credit scoring, access affordable loans, better customer service, financial education/literacy, risk management and for customers usage are financial advice and virtual financial assistance, financial education/literacy, prevention of fraud and risk management , credit scoring, ChatBots and VoiceBot, Affordable loans and loan Appraisal, better customer service with AI assistance, mobile apps. Customers' level of satisfaction for these services are also taken into account.

Questionnaire was drafted in three parts. First part consists of demographic profiles of the customers. In the second part of the questionnaire customer awareness related to AI powered banking products and services was emphasized as whether their banks are using and for what products and services. In the third part of the questionnaire, questions related to AI powered banking products and tools were asked in terms of usage by them, their level of satisfaction and suggestions to improve the better usage.

Secondary data was collected from existing research papers, news articles, banks website, and RBI reports and from books. Total 430 customer's data was collected. After collection of data, it was analyzed with the help of SPSS.

Population for the research work is all individuals using banking services and having bank account. Sampling frame consists of all the Individuals using banking services and having bank account belonging to different demographic characteristic of the age group of the 18 to 65 in Pune region. It is difficult to clearly determine the population so it is considered infinite. 384 is the accepted sample for infinite population as per Cochran's formula and Krejcie and morgan's table. It can be said for 5 % margin of error and 95 % Confidence level suggested sample size is 384. Researchers have taken 430 as sample size.

Universe was too large for Individual banking customers with a diverse population, so for collection of samples non-probability sampling was used. For the collection of primary data of individual banking customers' Purposive sampling is used as only those customers were taken who do banking for their individual purpose and using AI powered banking tools. Sampling unit is the retail individual banking customers in Pune region.

8. Data analysis and interpretation

430 banking customers are taken as respondents' for the research purpose. Sample data is collected from Pune region. The researchers made effort to make sure that diverse segments of the respondents were included in the sample collected. The collected data was abbreviated and entered in SPSS 20.0. To analyze the questionnaire responses, it was coded into different variables. ANOVA with Friedman's Test using SPSS 20.0 was used to test the hypothesis for collected data.

Reliability and validity Test—Reliability test is used to test the consistency of a research study. It is defined as degree to which a test consistently measures whatever it measures. Cronbach's alpha is calculated to do the reliability test of the research work questionnaire, Internal Consistency reliability method. The calculated value of Cronbach's Alpha is 0.713 **(Table 1)** and Cronbach's Alpha based on standardized items is 0.700. Value equal to 0.7 and more than 0.70 is acceptable. As calculated value is 0.713 so it can be stated that collected data is reliable in questionnaire.

Table 1. Reliability statistics.

Cronbach's Alpha	Cronbach's Alpha based on standardized items	*N* of items
0.713	0.700	8

Case processing summary (**Table 2**) is found, first of all that shows the valid cases as collected data is from 430 banking customers. 430 is the value of *N*. To do data analysis all cases are included thus entire cases used in are 430 as sample includes data collected form 430 respondents.

Table 2. Case processing summary.

		N	*%*
Cases	Valid	430	100.0
	Excluded[a]	0	0.0
	Total	430	100.0
a. Listwise deletion based on all variables in the procedure.			

Hypotheses tested are:

H0: Banking customers are not using and satisfied with AI powered sustainable banking products and services.

H1: Banking customers are using and satisfied with AI powered sustainable banking products and services.

To do the analysis of primary data, ANOVA with Friedman's test (**Table 3**) is conducted. Friedman's chi square is used for the null hypotheses considering the 95% level of Significance, $\alpha = 0.05$. The *p*-value (Sig.) of $0.000 < 0.05$, Hence it can be stated that the *p*-value less than to the significance level, then the null hypothesis should be rejected. Here calculated value is 135.805 that is more than the value at 95% level of significance, $\alpha = 0.05$. This suggests that alternative hypothesis should be selected and null hypothesis should be rejected. Therefore, it depicts that banking customers are using and satisfied with AI powered sustainable Banking products and services.

Table 3. ANOVA with Friedman's test.

		Sum of Squares	df	Mean square	Friedman's chi-square	Sig
Between people		1640.530	429	3.824		
Within people	Between Items	155.669[a]	7	22.238	135.805	.000
	Residual	3294.581	3003	1.097		
	Total	3450.250	3010	1.146		
Total		5090.780	3439	1.480		

Grand mean = 3.7110

a. Kendall's coefficient of concordance W = 0.031.

8.1 Demographic profile

70% are male respondents and 30% are female respondents in the collected data. 50% of the respondents belongs to age bracket of 30–40 and 20% from 40–50 age bracket and remaining from other age groups. Business and service category is more in collected data as 20% from business and 40% from service category. 40% are in the salary bracket of 6–9 lacs and 20% are in 9–12 lac salary bracket. Most of the respondents are from, SBI, HDFC, ICICI, Axis, BOI, PNB, Yes Bank, Kotak Mahindra, Indusind and Union bank. 80% of the customers stated yes that bank is catering their all requirements.

Respondents are asked to select the multiple options and give opinion for the variety of banks products are services that they are using. Below is the mentioned.

It can be stated from the below (**Table 4**) the respondents' customers believe that AI usage in banking assist in financial advice and virtual financial assistance and better customer service with AI assistance. For most of the other parameters 60% of the respondents selected that they are either of using these banking products and services.

Table 4. Customer usage for various banking products and services.

Variables/parameters	Frequency	Percentage
Financial education/literacy	281	65.349
Financial advice and virtual financial assistance	370	86.047
Prevention of fraud and risk management	264	61.396
Usage of mobile apps by the customers	264	61.396
Chatbots and VoiceBot	263	61.162

Affordable loans and loan appraisal	220	51.163
Credit scoring	265	61.628
Better customer service with AI assistance	320	74.4186

8.2 Frequency tables for the variables

Frequency tables are also generated from level of 'strongly disagree to strongly agree' from 1–5 scale. To understand the level of usage for the various banking products and services, statements related to that was asked in form of 5 point Likert scale.

It can be stated from the below mentioned (**Table 5**) that 52.8% respondents strongly agree, 12.6% respondents agree and 12.3% are neutral that AI tools used by banking are assisting in financial education/literacy.

Table 5. Financial education/literacy.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1.00	44	10.2	10.2	10.2
	2.00	52	12.1	12.1	22.3
	3.00	53	12.3	12.3	34.7
	4.00	54	12.6	12.6	47.2
	5.00	227	52.8	52.8	100.0
	Total	430	100.0	100.0	-

It can be stated from the below mentioned (**Table 6**) that 26.7% respondents strongly agree, 59.3% respondents agree and 4.2% are neutral that AI tools used by banking are assisting in Financial Advice and virtual financial assistance.

Table 6. Financial Advice and virtual financial assistance.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1.00	1	0.2	0.2	0.2
	2.00	41	9.5	9.5	9.8
	3.00	18	4.2	4.2	14.0
	4.00	255	59.3	59.3	73.3
	5.00	115	26.7	26.7	100.0
	Total	430	100.0	100.0	-

It can be observed from the below mentioned (**Table 7**) that 24.7% respondents strongly agree, 36.7% respondents agree and 34.4% are neutral that AI tools used by banking are assisting in prevention of fraud and risk management.

Table 7. Prevention of fraud and risk management.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1.00	15	3.5	3.5	3.5
	2.00	3	0.7	0.7	4.2
	3.00	148	34.4	34.4	38.6
	4.00	158	36.7	36.7	75.3

	Frequency	Percent	Valid percent	Cumulative percent
5.00	106	24.7	24.7	100.0
Total	430	100.0	100.0	-

It can be observed from the below mentioned (**Table 8**) that 51.4% respondents strongly agree, 10% respondents agree and 14% are neutral that AI tools used by banking are using the mobile applications of banking for banking products and services.

Table 8. Usage of mobile apps by the customers.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1.00	57	13.3	13.3	13.3
	2.00	49	11.4	11.4	24.7
	3.00	60	14.0	14.0	38.6
	4.00	43	10.0	10.0	48.6
	5.00	221	51.4	51.4	100.0
	Total	430	100.0	100.0	-

It can be stated from the below mentioned (**Table 9**) that 48.6% respondents strongly agree, 12.6% respondents agree and 12.6% are neutral that AI tools used by banking products like ChatBots and VoiceBot are assisting in better customer service.

Table 9. ChatBots and VoiceBot.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1.00	113	26.3	26.3	26.3
	3.00	54	12.6	12.6	38.8
	4.00	54	12.6	12.6	51.4
	5.00	209	48.6	48.6	100.0
	Total	430	100.0	100.0	-

It can be stated from the below mentioned (**Table 10**) that 25.6% respondents strongly agree, 25.6% respondents agree and 10.5 % are neutral that AI tools assist in affordable loans and loan appraisal.

Table 10. Affordable loans and loan appraisal.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1.00	55	12.8	12.8	12.8
	2.00	110	25.6	25.6	38.4
	3.00	45	10.5	10.5	48.8
	4.00	110	25.6	25.6	74.4
	5.00	110	25.6	25.6	100.0
	Total	430	100.0	100.0	-

It can be observed from the below mentioned (**Table 11**) that 25.6% respondents strongly agree, 36% respondents agree and 12.8% are neutral that AI tools used by help to get the credit score.

Table 11. Credit scoring.

	Frequency	Percent	Valid percent	Cumulative percent

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Valid	2.00	110	25.6	25.6	25.6
	3.00	55	12.8	12.8	38.4
	4.00	155	36.0	36.0	74.4
	5.00	110	25.6	25.6	100.0
	Total	430	100.0	100.0	-

It can be witnessed from the below mentioned (**Table 12**) that 23.3% respondents strongly agree, 51.2% respondents agree and 25.6% are neutral that AI tools used by help to get the credit score. It is interesting to state that banking customers either strongly agreed, agreed or neutral that AI is helping to improve the banking and customer service and experience.

Table 12. Better customer service with AI assistance.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	3.00	110	25.6	25.6	25.6
	4.00	220	51.2	51.2	76.7
	5.00	100	23.3	23.3	100.0
	Total	430	100.0	100.0	-

Customers are specifically asked the questions related to their level of satisfaction with the usage of AI powered tools and techniques. The data calculated is shown in (**Table 13**).It depicts that 48.6% customers are satisfied and 25.8% customers are highly satisfied with the AI based tools and techniques used by the banks.13.7% customers are neutral for this.

Table 13. Level of satisfaction for usage of updated AI powered technology/tools used by your bank.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1.00	2	0.5	0.5	0.5
	2.00	49	11.4	11.4	11.9
	3.00	59	13.7	13.7	25.6
	4.00	209	48.6	48.6	74.2
	5.00	111	25.8	25.8	100.0
	Total	430	100.0	100.0	-

9. Research Findings

9.1 Major observations from primary data:

- Financial advice and virtual financial assistance and better customer service with AI assistance are the major variables that customers have considered for AI powered banks.
- It depicts that 74.4% customers are highly satisfied and satisfied with the AI based sustainable tools and techniques used by the banks in India.
- 61.4% respondents agreed that AI tools used by Indian banks are assisting in prevention of fraud and risk management.
- AI tools used by Indian Banks help to get the credit score that is responded by 61.6% of the respondents' customers.
- AI tools used by banking products like ChatBots and VoiceBot are assisting in better customer service as responded by 61.2% respondents.

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- Respondents with 60 and above age group are not mostly comfortable and adoptive for AI powered banking products and tools.

9.2 Major inferences from secondary data:

- Conversational software agents i.e., chatbots based on AI to communicate with customers many times cannot fulfil expectations of customers. Due to which customers do not comply with suggestions given by chatbots which cannot fulfil the purpose.
- The response of customers depends upon user friendly chat i.e., hello, welcome and further conversation as per customers' demand.
- If the chatbot is developed gender neutral and showcasing empathy, its impact is observed higher in conversation with customers.
- All the Banks are using the mobile apps like YONO, Mera iMobile, and others for given better customer experience and assistance.
- Banks are using AI to improve the digital banking services and educating the customers about their products and services. As per directives given by RBI, all banks are displaying posters and other contents to improve awareness among customers to prevent frauds.
- It is observed that Banks are using AI based tools for risk management and fraud prevention. PNB is applying AI Audit system to prevent frauds.
- For credit scoring and loan appraisal also banks are utilizing the AI based technology. Axis bank is using robotic process automation solution from credit assessment to payment to which helps in preventing frauds.
- If certain queries asked by the customers are beyond the limit of chatbot, it should direct the customer to an authorized persons.
- Chatbot miss personal touch which is more required to senior citizens.
- There can be unsatisfied encounter with chatbots. Thus, reluctance is found in use of chatbots.
- There is a fear of losing personal privacy while using chatbots which is one of the reasons of avoiding use of AI based services developed by banks.

10. Suggestions and recommendation:

- Banks should make aware their customers how virtual assistance and AI powered tools can help to access the affordable loans and loan Appraisal that will help to expand the customer base also. Even loan processing using the technology should be done at fast pace.
- Banks should educate customers how AI based tools assist in improving in credit scores for them that assist bank also to reduce paper work and help in virtual services.
- Chatbots and voice bots should not be gender bias as most of the banks used the word as Alexa assistance. Even it should be customized little bit for more personal experiences. If human element is blended with this individual may feel more attached. Queries addressed through chatbot and VoiceBot should be assisted in specific time period to make it popular and customer friendly.
- Age group of 60 and above are the major respondents for disagree and strongly disagree as they are reluctant for the adoption and usage of updated technology. Banks may have special programs or apps that are friendly to their age groups to give them confidence against fraud and cybercrime.
The following Points should be considered to meet customers' expectations in today's era.

11. The main challenge the finance industry facing today is customer retention. While framing the strategies of customer retention the following are the features gen Z should be considered:

- Highly educated.

- Highly technology savvy.
- Highly exposed to social media.
- Innovation focused.
- Insisting on convenience.
- Internet connected and constantly on mobile.
- Lacking in brand loyalty.
- Multitasking.
- Interested in snack size information about financial service.
- Interested in personalized experience.

12. Conclusion

Researchers in present study focused on major banking initiatives by use of technology more specifically artificial intelligence and what are the major benefits of the utilizing the artificial intelligence in enhancing customers' experience of financial services. It is inferred from the data analysis that overall customers are using and satisfied with AI enabled sustainable banking products services. The user friendly chatbots are very popular and helpful for customers to know about banking products and services. AI enabled tools are highly useful to the banks and customers for fraud detection, risk management and identifying credit scoring. Thus, as digital customers' needs are different and changing drastically, the Banks, Financial Institutions and Fintech should go on improvising it after understanding customers' concerns to retain the target customers.

13. Future scope of research work

In the present research paper, the authors have studied customers' adoption and perception about AI enabled sustainable tools used by the customers. The research work can be extended to study the cost benefit analysis of AI enabled tools applied by the banking sector. That is the direct impact on the increase in revenue, market base and profitability of the banks because of use of AI.

Author contributions

Conceptualization, SD and RK; methodology, SD and RK; software, RK; validation, SD, RK and SK; formal analysis, RK and SD; investigation, RK and SD; resources, RK and SD; data curation, RK and SD; writing—original draft preparation, SD, RK and SK; writing—review and editing, SD, RK and SK; visualization, SD, RK and SK; ll authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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