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Providing a Decision-Making Model to Evaluate AI-Based Banking Services to Improve Customer Experience

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Abstract— Currently, artificial intelligence (AI) has penetrated all businesses, including the banking industry, and its use has been considered in order to increase productivity and reduce costs. To develop AI in the banking industry optimally, it is necessary to evaluate the customer's experience in dealing with services at first. For this purpose, based on previous studies, we first extracted bank customer satisfaction indicators in general and AI fields. Then, to obtain a model for decision-making, we ranked them by two groups of banking industry elites from Bank Pasargad and its customers. The obtained results show that the application of AI in authentication and risk management was, respectively, the most and least important for selection and prioritization.

Index Terms— *Artificial intelligence, customer experience, smart banking.*

I. INTRODUCTION

According to the definition of Britannica (2023), AI refers to the ability of computers or robots to perform tasks that normally require human intelligence and recognition. Today, AI is increasingly used in different domains, including banking and financial industries. In this paper, we discuss the priority of AI-based applications to invest in customer interactions and experiences.

Based on studies conducted in the field of customer interaction and engagement in the banking industry (Chung et al., 2020), (Biswas et al., 2020), (Joseph, 2020), and (Bhattacharya et al., 2022), the process of customer interaction and engagement in banking can be divided into four main stages: awareness, attention, decision, and post-purchase. Each stage brings different goals, challenges, and opportunities for a bank and its customers, according to the existing conditions. The role of AI is to improve the customer journey in the banking industry by providing personalized, integrated, fast, and secure solutions that meet or even exceed customer needs and expectations. In the following, these four stages have been described.

Awareness: In this stage, the customer becomes aware of his needs and the possible solutions that the bank can offer. The bank's goal at this stage is to attract the attention and interest of the customer by providing relevant and personalized information, offers, and incentives. AI can help the bank analyze customer data, preferences, and behavior to deliver appropriate messages and recommendations through various channels, such as online platforms, social media, email marketing, and so on.

Attention: According to this stage, the customer evaluates various options and alternatives introduced by the bank. The customer compares the features, benefits, costs, and risks of each option and requests additional information or advice from the bank or other resources. The bank's goal is to convince the customer that its offered solution is the best option for their needs and expectations. AI can help the bank provide more guidance to the customer by using various tools like chatbots, webinars, and so on.

Decision: Via this step, the customer makes the final choice and enters into a transaction with the bank. The customer registers, opens an account, gets a loan, card, or any other service that the bank offers. The bank's goal is to make this process as easy, fast, and safe as possible for the customer. AI can help the bank simplify the customer experience by using technologies like digital signatures, biometric recognition systems, blockchain systems, etc. AI can also help banks reduce errors and fraud by verifying customer identities and validating transaction details.

Post-Purchase: In this stage, the customer continues to interact with the bank after the purchase. The goal of the bank is to retain the customer and increase its loyalty and satisfaction by providing quality, performance, and optimal value in its services. AI can help the bank measure its own services through various methods like feedback surveys, and loyalty programs.

According to a study conducted in Business Insider (Fares et al., 2022), AI in the international banking market is expected to grow at a compound annual growth rate of 32.6% between 2021 and 2030. In 2019, North America accounted for 35.3% of the total global market for AI in banking (Fares et al., 2022). Additionally, according to a UBS Evidence Lab survey, 75% of banks with more than $100 billion in assets say they are currently implementing AI strategies, compared to 46% of banks with less than $100 billion in assets. (Statista, 2022).

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Based on these statistics and observed trends, AI can enrich the customer experience, improve operational efficiency, reduce costs, and, at the same time, reduce business risks. It seems that to succeed in the digital age, banks must take a strategic approach to adopting AI across their organizations.

II. Related Works

AI technologies are becoming increasingly integral to the world we live in, and banks must adopt these technologies on a large scale to survive in the banking industry. Success in this way requires a holistic transformation that includes several organizational layers (Makhija, 2021). It is noteworthy that the right choice of AI tools has a direct impact on the customer experience. Based on a study (Satheesh et al., 2021), the use of AI in banks has not had a favorable effect on the customer experience due to the lack of some technologies, such as chatbots, in bank applications and websites. Also, this study shows that the use of chatbots can have a positive effect on customer trust. In another study (Bhattacharya et al., 2022) quoted by (Gallego-Gomez et al, 2020) a theoretical study promotes the ability of AI to find new ways of communicating with customers, understanding their expectations, and adapting the services provided by companies to outperform competitors. It shows that AI can increase customer satisfaction by quickly answering customer questions. The study also shows that the right adoption of AI technology can redefine traditional banking practices. This research focuses on Mastercard Institute (USA), Royal Bank of Scotland, and Caixa Bank of Spain.

Also, in the same article (Bhattacharya et al., 2022) quoted by (Gallego-Gomez et al, 2020), during another study, banking processes using AI technology have been explained, and it has been determined that by using AI, banks can reduce credit risk and costs, increase payment security, automate compliance-related operations, and, as a result, strengthen business. The study discusses the capabilities of AI and shows that clarity, privacy, and proper documentation based on this technology increase customer satisfaction.

Over the decades, banks have continuously adopted the latest technological innovations to redefine the way customers interact with them (Satheesh et al., 2021). On the other hand, today's banks can no longer expect to serve as they used to, and customers expect personalized and customized interaction from all businesses they deal with, including banks. Customers also value efforts that focus on creating deeper insights that go beyond transaction facilitation (Devanarayanan, 2023). In a report by Deloitte, it was shown that customers now want the same level of sophistication, immediacy, and personalization in their interactions with banks as they do in other industries. They are even willing to share their data if they are assured of receiving personalized service. Despite the fact that personalization has been prevalent in the banking industry for some time, 94% of banks are unable to provide the desired types of personalization to customers (Devanarayanan, 2023). The use of AI to personalize services for a large number of customers will have more optimal performance, and banks that cannot put AI at the center of their strategy and operations are at risk of being removed by competitors or abandoned by customers. An increasing number of banking leaders are adopting a holistic approach to deploying advanced AI and embedding it throughout the entire lifecycle (Satheesh et al., 2021). Figure 1represents classes of AI applications at three different levels in the structure of banking processes (Bhattacharya et al., 2022):

- Applications that are effective in managing the customer experience are in the back office.
- Applications that are effective in creating a customer experience are placed in the middle office.
- Applications that directly affect the customer's front desk are members of the front office.

Different studies have been published on the use of AI in the field of customer experience in the banking industry. Table I shows a summary of some of the research conducted in the last three years.

Figure 1. Classification of AI applications (Bhattacharya et al., 2022)

III. Research Metho

The main goal of this research is to value banking services based on artificial intelligence. To achieve this purpose, the applications of artificial intelligence among the studies conducted in the banking industry, collected and based on Figure 1 (Bhattacharya et al., 2022), were divided into three main categories (Table 2).

In the following, to adapt the research results to the banking industry in Iran, based on Table 3, customer satisfaction indicators were studied from seven related studies in Iran, and nine common and main indicators were extracted according to Table 4. In order to evaluate customer satisfaction indicators, 140 questionnaires were distributed among customers of Bank Pasargad without considering other factors such as gender, age, and education, and they were asked to rate each of the 9 indicators according to their importance and assign a score between zero (the least important) and five (the most important).

Table1: Summary of Researches

Title	Author(s)	Code	year	Research Purpose(s)	Research Method(s)	Research Findings
Does artificial intelligence (AI) boost digital banking user satisfaction? Integration of expectation confirmation model and antecedents of artificial intelligence enabled digital banking	Alnaser, FM, Rahi, S., Alghizzawi, M., & Ngah, AH	A1	2023	It examines the satisfaction and acceptance of customers when they are served by AI-Based Banks	Survey (the statistical population of this research is digital banking users from all commercial and Islamic banks based in Pakistan)	This research has suggested that policymakers should pay attention to users' expectations, visual appeal, communication quality, and company reputation, which in turn will increase the satisfaction and trust of digital banking users to adopt AI-enabled digital banking. to give
An exploratory study on the effect of artificial intelligence-enabled technology on customer experiences in the banking sector	El-Gohary, H., Thayaseelan, A., Babatunde, S., & El-Gohary, S.	A2	2021	How has AI technology in the banking sector affected the overall customer experience? How the personal digital transformation of the customer has affected the development of digital banking and how this affects customer expectations and experience.	survey was sent to people who live mainly in London and are over 16 years old. Then, the sample was randomly selected from the community. The aim of the sample was to reach about 100 to 150 respondents during four weeks.	The first key finding of this study includes all demographic clusters, and all are on a digital transformation journey. This has caused customers to have similar expectations. These expectations have caused banks to continuously develop their programs to provide such a positive banking experience. Second, it was revealed that AI-based technology in banks did not have a favorable impact on customer experience as expected from other studies due to the lack of use of technologies such as chatbots in bank apps and websites. Finally, an important finding that is obtained from this study that customers are not aware of the available information about the scope and capabilities of neo banks.

Applications of artificial intelligence on customer experience and service quality of the banking sector	Satheesh, MK, & Nagaraj, S.	A3	2021	Investigating what and how AI is and its applications to improve the quality of customer experience in the banking industry	Systematic study of the subject literature	AI facilitates various processes to reduce employee workload by providing credit score checks, system failure prediction, emergency alert systems, fraud detection, phishing website detection, liquidity risk assessment, customer loyalty assessment and information systems. On the other hand, customer experience is enhanced through various applications, namely mobile banking, chatbots and augmented reality.
A study of the scope of Artificial Intelligence customer experience in banking sector in India	Ankur Aggarwal Shubhra Garg	A4	2022	The current research has tried to clarify the use of AI in improving the experience of the banking industry in terms of speed and security.	using SPSS software to test the hypothesis.	Cybercrime is one of the costliest risks to customers and the banking industry, costing 600 billion USD in the United States. Machine learning is being used as an answer to detect fraud through transactions before it occurs. Artificial intelligence can combat and eliminate fraud. It helps to remove incorrect presentation of programs.
The Role of Artificial Intelligence in Banking for Leveraging Customer Experience	Bhattacharya, C., & Sinha, M.	A5	2022	The purpose of this article is to analyze the effectiveness of banking practices in implementing AI to increase customers' interactions and improve their satisfaction.	Data was collected through interviews with senior officials. Regarding user experience through AI-Banking, data was collected through a survey on the use of chatbots in online banking platforms.	This research paper shows the features of seamless AI-banking. Chatbot use cases in the banking platform are ranked based on customer experience.
An exploratory study on the effect of artificial intelligence-enabled technology on customer experiences in the banking sector	El-Gohary, H., Thayaseelan, A., Babatunde, S., & El-Gohary, S.	A6	2021	This paper assesses how banks are using intelligent virtual agents such as conversational chatbots to change the way of customers to use banking facilities.	First step is to find the relevant data, Next step is to collect the data and finally, analyzing the data	Taking into account the key findings, it became clear that: • customers are digitally transformed. • Artificial intelligence-based technology is not widely adopted. • There are knowledge and information gaps about neo-banks.

The Banks in the Age of Digital Transformation: Considerations for Enterprise Architecture	Shiri, F., ShamiZanjani, M., Abooyee Ardakan, M., & Shams Aliee, F	A7	2023	Identifying the distinguishing features of the digital banks from traditional ones in order to review the organizational architecture with a transformation approach.	The qualitative method used to conduct this research is the structured approach of systematic review of theoretical foundations.	The six distinguishing macro characteristics of the digital bank are: customer-oriented experience, ecosystem-based, service-oriented, platform-based, adaptation to digital technologies, and digital transformation strategy. These macro features were categorized into 18 micro features. After obtaining the macro and micro characteristics of the digital bank, the approach of the organizational architecture framework of the digital bank and the school of thought corresponding to these characteristics were examined.
Designing a Framework to Enhance Digital Customer Experience in Internet Banking	Karimi , E., Shami Zanjani, M., Kimasi, M., Hasanzadeh, A.	A8	2020	How can the customer's digital experience be improved in online banking and at customer contact points?	The methods of observation, interview and document review have been used to collect information.	By analyzing the opinions of customers, their pleasant and unpleasant experiences have been identified based on the two lenses of perception and feeling at first. Then, they were separated by contact points, and finally, the framework for improving the customer experience has been presented based on the four characteristics of accessibility, ease of use, reliability and efficiency.

Table 2. References and applications of artificial intelligence

Application from the Bank's View Point	Application from the customer's View Point	Application Name
Back Office	Customer Experience Management	Fraud Detection
		Risk Management
		Marketing and Market Segmentation
Middle Office	Customer Process Management	Authentication and KYC Processes
		Scrutiny and Digitization of Documents
		Validation and Lending
Front Office	Customer Experience Creation/ Contact Points	Self-Service and Customer-Oriented Services
		Analysis of Financial Behavior
		Sentiment Analysis
		Personal Financial/Wealth/Property Management
		Chat Bot
		Smart Financial Assistant
		Customer Relations Management

Table 3. References and indicators of customer satisfaction

Writer(s)	Year of Publication	Research findings (indicators of customer experience in the banking industry)
Ameneh Gerami, Maryam Sharifi	2021	1. Content Services 2. Correctness and Accuracy 3. Ease of Use 4. Form and Format of Services 5. Time Saving Using Electronic Banking Services
Mahmoud Mohammadian, Vahid Nasehi Far, Mohammad Taghi Taghavi Fard, Alireza Salek Moghadam	2021	In this research, a customer experience model was presented, the dimensions of this model are: Service delivery tools, service marketing factors, technical infrastructure factors, service structure factors, industry and market service factors, macro environment factors, customer experience, management strategy
Samaneh Kholousi Adab, Siamak Baradaran, Masoumeh Habibi	2015	Prioritizing the factors affecting customer experience: 1. Fast access to technology 2. Reduction of operational cost 3. Responsiveness to customers 4. Ease of using technology 5. The speed of banking operations 6. Security of banking operations
Seyed Kamran Noorbakhsh, Nafiseh Rostami	2014	1. Tangible aspects: including physical devices, equipment, appearance of employees and communication devices in terms of appearance. 2. Reliability: the ability to perform the committed services with complete accuracy and reliability. 3. Responsiveness: including the desire to help the customer and provide services immediately. 4. Guarantee: including the knowledge and politeness of the employees and their ability to instill confidence in the correctness of the services provided. 5 .Empathy: includes the special attention that the company provides for its special customers. 6. Improvement: includes the organization's ability to solve unexpected problems
Aliyar Esmaili, Rudabeh Torabian , Mohammad Sadegh Horri	2013	The overall expression of service quality by the provided information, the necessary tools to compare services with the services of competitors, the ability of the website to respond to customer needs, the usability of the website in terms of capabilities, the prestige of customer expectations ,having the necessary tools to search for services, matching between needs Customer with the provided services, ease of use to search for imagined services, adding credit to your user, innovation in the provided services. The reliability of the website to provide information, the customer's feeling towards the uniqueness of the service, the coordination between the website's advertisements and the customer's needs, the sense of fun from using the service. Customer satisfaction: Satisfaction with the decision to use the service, satisfaction with the rationality of using the service, satisfaction with the fulfillment of expectations. Customer loyalty: Being the first choice of the website to use the services, recommending this website to others, choosing the website as the best website compared to competitors, believing in using the services
Tahmoures Hasangholipour, Fereshteh Amin, Gholamreza Kateb, Ali Ramezani	2011	Respectively, among the four general factors, competitive factors and human factors have been more effective than the rest of the factors. In the human factors section, the most important indicators affecting customer satisfaction are, in order, the appropriate behavior indicators of employees, how to respond to customers, and the well-groomed appearance of employees, and in the factors section , Professionalism, indicators of the correctness of doing banking affairs ,speed in doing banking affairs and the quality of providing banking services, and among the environmental factors of the branch, respect for the novelty of customers and the proximity of the branch, and among the competitive factors, higher interest rates, higher maximum facility, and lower costs and fees are the most they have weight and importance from the view point of customers.
Iraj Nouri, Komeil Fatahi	2010	1. Availability during bank working hours 2. Eagerness to know and guide to solve problems and provide reasonable and needed information 3. Variety of facilities and services 4. Transparency and ease in providing services and procedures for granting facilities (no unnecessary bureaucracy) 5. Quick and logical response to complaints ,criticisms, suggestions, etc. 6. The ability to meet future needs 7. Ability to follow up requests (facilities, services and so on) 8. Suitability of branch locations (close to commercial and administrative places) 9. Appearance decoration 10. Proportion (adequacy) of facilities with the client's executive program

Table 4. Finalized indicators of customer satisfaction

No.	Indicator
1	Ease of Access and Use of Technology
2	Security of Banking Operations
3	Cost Reduction
4	Matching Customer Needs with Provided Services
5	Speed of Response
6	Transparency and Reliability
7	Variety of facilities and Innovation in Services
8	Appearance in Physical and Digital Factors
9	Notification of Services

Next, a decision matrix was formed from the intersection of AI-based services as matrix rows and customer experience indicators as matrix columns. To evaluate the segmented services, the opinions of seven experts active in the banking industry at Pasargad Bank have been used (Table 5). Experts were asked to examine this matrix as a person who uses banking services and assign a score between zero (the least important) and five (the most important) to each cell. The average score of the customer questionnaire for each indicator was used as a weight. Finally, using the TOPSIS method, the effectiveness of each service in improving the indicators was measured.

IV. Results and Discussions

First, the results of a survey of Bank Pasargad customers were examined. The information obtained according to the diagram in Figure 2 shows that the indicator of ease of use of technology, with more than 94%, is the most important indicator, and the indicator of cost reduction, with about 66%, was the least important one among the customers of Bank Pasargad.

Next, according to Table 6, the relative weight of each customer satisfaction indicator was calculated based on the average score of customers for each indicator. Table 7 contains the average score of experts in each cell of the decision matrix, and Table 8 is obtained by using equation 1 to normalize Table 7.

$$n_{ij} = \frac{x_{ij}}{\sqrt{\sum_1^m x_{ij}^2}} \quad (1)$$

At this stage, by applying the relative coefficient of importance obtained in Table 6, Table 8 changed to Table 9. Based on Table 9, the best ideal value and the worst ideal value for the indicators were determined and placed in Table 10. To obtain the distances from the best and worst ideal values as well as the similarity index, equations (2), (3), and (4) were used. The distance from the best ideal value to the worst ideal value and the similarity index are shown in Table 11.

$$d_i^+ = \sqrt{\sum_{j=0}^n \left(V_{ij} + V_j^+\right)^2} \quad \text{from the best ideal value} \quad (2)$$

$$d_i^- = \sqrt{\sum_{j=0}^n \left(V_{ij} - V_j^-\right)^2} \quad \text{from the worst ideal value} \quad (3)$$

$$CL_i^* = \frac{d_i^-}{d_i^- + d_i^+} \quad \text{similarity index} \quad (4)$$

Table 5. Information of experts

No.	Level of Education	Position
1	PhD in Artificial Intelligence	Head of a Bank's information technology management department
2	PhD in Artificial Intelligence	AI group manager of a bank related software company
3	PhD in Artificial Intelligence	AI group manager of a bank related software company
4	MBA	PM of a bank related software company
5	Master of Entrepreneurship Management	CEO of a bank related software company

6	PhD in Banking Policy	Business manager of the banking infrastructure company
7	PhD in Electrical Engineering /AI Researcher	CEO of a fintech software company

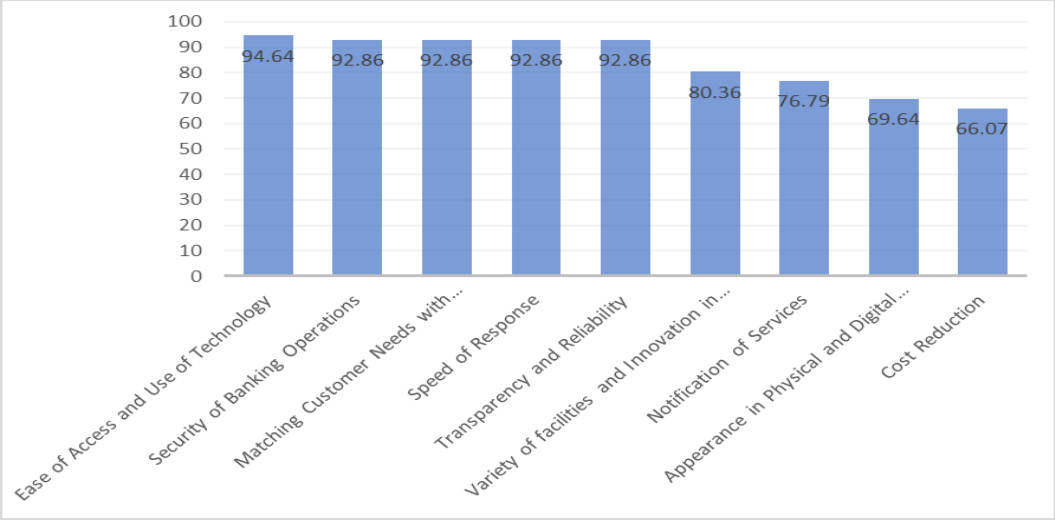

Figure2 The importance of Indicators according to customers' view point

Table 6. customer satisfaction indicators as relative coefficients of importance

Indicator	Ease of Access and Use of Technology	Security of Banking Operations	Cost Reduction	Matching Customer Needs with Provided Services	Variety of facilities and Innovation in Services	Speed of Response	Transparency and Reliability	Appearance in Physical and Digital Factors	Service notification
Weight	0.1172	0.1204	0.1013	0.1118	0.1054	0.1177	0.1177	0.1013	0.1072

Table 7. Average score of experts

Application from the Bank's View Point	**Application from the customer's View Point**	**Application name**	Ease of Access and Use of Technology	Security of Banking Operations	Cost Reduction	Matching Customer Needs with Provided Services	Variety of facilities and Innovation in Services	Speed of Response	Transparency and Reliability	Appearance in Physical and Digital Factors	Service notification
Back Office	**Customer Experience Management**	Fraud Detection	2	4.167	2.333	2.667	3.167	3.833	3.167	1.167	2.333
		Risk Management	2.5	2.667	3.167	2.5	2.5	2.667	2.667	1.167	1.167
		Marketing and Market Segmentation	2.667	2.333	2.833	3	3	2.333	3.167	2.333	2.667
Middle Office	**Management processes**	Authentication and KYC Processes	3.667	4	3.5	3.833	3.667	4	4	3.5	3.167
		Scrutiny and Digitization of Documents	3.667	3.167	3.5	3.833	3.833	3.833	3.333	2.667	2.167
		Validation and Lending	2.833	3	3.167	3.167	3.4	2.667	3.167	2	3
Front Office	**Customer experience and touchpoints**	Self-Service and Customer-Oriented services	3.833	3.333	3.667	3.667	3.5	3.5	3.667	3.167	3
		Analysis of Financial Behavior	3.667	3.333	3.333	3.333	3.333	2.833	3.167	1.833	2.333

		Sentiment Analysis	2.833	3	2.167	3.167	3	2.833	3	2.167	2
		Personal Financial / Wealth / Property Management	3.5	3.167	3.5	3.5	2.667	3.5	3.5	3	3
		Chat Bot	4	2.833	2.833	3.5	3.667	3.667	3.333	3.167	2.833
		Smart Financial Assistant	3.4	3	3	3.667	3.667	3.167	3.833	3	2.333
		Customer Relations Management	3.5	3.167	2.833	3.5	4	3.5	3.333	2.833	2.5

Table 8. Normal decision matrix values

Application from the Bank's View Point	**Application from the customer's View Point**	**Application name**	Ease of Access and Use of Technology	Security of Banking Operations	Cost Reduction	Matching Customer Needs with Provided Services	Variety of facilities and Innovation in Services	Speed of Response	Transparency and Reliability	Appearance in Physical and Digital Factors	Service notification
Back Office	**Customer Experience Management**	Fraud Detection	0.337	1.504	0.488	0.587	0.826	1.236	0.83	0.147	0.591
		Risk Management	0.527	0.616	0.898	0.516	0.515	0.598	0.589	0.147	0.148
		Marketing and Market Segmentation	0.6	0.472	0.719	0.743	0.741	0.458	0.83	0.588	0.772
Middle Office	**Management processes**	Authentication and KYC Processes	1.134	1.386	1.098	1.214	1.108	1.346	1.324	1.324	1.089
		Scrutiny and Digitization of Documents	1.134	0.869	1.098	1.214	1.211	1.236	0.92	0.768	0.51
		Validation and Lending	0.677	0.78	0.898	0.828	0.952	0.598	0.83	0.432	0.977
Front Office	**Customer experience and touchpoints**	Self-Service and Customer-Oriented services	1.24	0.963	1.205	1.111	1.009	1.03	1.113	1.083	0.977
		Analysis of Financial Behavior	1.134	0.963	0.995	0.918	0.915	0.675	0.83	0.363	0.591
		Sentiment Analysis	0.677	0.78	0.421	0.828	0.741	0.675	0.745	0.507	0.434
		Personal Financial / Wealth / Property Managem	1.033	0.869	1.098	1.012	0.586	1.03	1.014	0.972	0.977

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		Chat Bot	1.35	0.695	0.719	1.012	1.108	1.131	0.92	1.083	0.872
		Smart Financial Assistant	0.975	0.78	0.806	1.111	1.108	0.843	1.216	0.972	0.591
		Customer Relations Management	1.033	0.869	0.719	1.012	1.318	1.030	0.920	0.867	0.679

Table 9 . The matrix resulting from the application of the weights of indicators

Application from the Bank's View Point	Application from the customer's View Point	Application name	Ease of Access and Use of Technology	Security of Banking Operations	Cost Reduction	Matching Customer Needs with Provided Services	Variety of facilities and Innovation in Services	Speed of Response	Transparency and Reliability	Appearance in Physical and Digital Factors	Service notification
Back Office	Customer Experience Management	Fraud Detection	0.04	0.181	0.049	0.066	0.087	0.145	0.098	0.015	0.063
		Risk Management	0.062	0.074	0.091	0.058	0.054	0.07	0.069	0.015	0.016
		Marketing and Market Segmentation	0.07	0.057	0.073	0.083	0.078	0.054	0.098	0.06	0.083
Middle Office	Management processes	Authentication and KYC Processes	0.133	0.167	0.111	0.136	0.117	0.158	0.156	0.134	0.117
		Scrutiny and Digitization of Documents	0.133	0.105	0.111	0.136	0.128	0.145	0.108	0.078	0.055
		Validation and Lending	0.079	0.094	0.091	0.093	0.1	0.07	0.098	0.044	0.105
Front Office	Customer experience and touchpoints	Self-Service and Customer-Oriented services	0.145	0.116	0.122	0.124	0.106	0.121	0.131	0.11	0.105
		Analysis of Financial Behavior	0.133	0.116	0.101	0.103	0.096	0.079	0.098	0.037	0.063
		Sentiment Analysis	0.079	0.094	0.043	0.093	0.078	0.079	0.088	0.051	0.047
		Personal Financial / Wealth / Property Management	0.121	0.105	0.111	0.113	0.062	0.121	0.119	0.099	0.105
		Chat Bot	0.158	0.084	0.073	0.113	0.117	0.133	0.108	0.11	0.093

		Smart Financial Assistant	0.114	0.094	0.082	0.124	0.117	0.099	0.143	0.099	0.063
		Customer Relations Management	0.121	0.105	0.073	0.113	0.139	0.121	0.108	0.088	0.073

Table 10. Best ideal value and worst ideal value

Value	Vij	Ease of Access and Use of Technology	Security of Banking Operations	Cost Reduction	Matching Customer Needs with Provided Services	Variety of facilities and Innovation in Services	Speed of Response	Transparency and Reliability	Appearance in Physical and Digital Factors	Service notification
The Worst Ideal Value	V_{J-}	0.04	0.057	0.043	0.058	0.054	0.054	0.069	0.015	0.016
The Best Ideal Value	V_{J+}	0.158	0.181	0.122	0.136	0.139	0.158	0.156	0.134	0.117

The closer the similarity index of an option is to 1, the more similar the option is to the ideal. The distance from the best and worst ideal values as well as the similarity index were calculated for each of the services, and according to Table 11, the services based on artificial intelligence in the banking industry were sorted based on the obtained similarity index.

Table 11. Prioritizing services based on artificial intelligence in banking

Service Name	Distance from the Worst Ideal Value	Distance from the Best Ideal Value	Similarity Index
Fraud Detection	0.168	0.218	0.435
Risk Management	0.058	0.273	0.176
Marketing and Market Segmentation	0.102	0.23	0.306
Authentication and KYC Processes	0.28	0.038	0.88
Scrutiny and Digitization of Documents	0.206	0.127	0.618
Validation and Lending	0.136	0.194	0.412
Self-Service and Customer-Oriented services	0.231	0.091	0.717
Analysis of Financial Behavior	0.154	0.174	0.469
Sentiment Analysis	0.09	0.22	0.289
Personal Financial/Wealth/Property Management	0.197	0.134	0.595
Chat Bot	0.213	0.13	0.621
Smart Financial Assistant	0.183	0.14	0.567
Customer Relations Management	0.186	0.134	0.582

Conclusion

The results of this research show that in order to improve the customer experience in the banking industry with the help of artificial intelligence, the use of artificial intelligence applications in authentication, KYC processes, self-service banking, customer-oriented services, and chatbot service are the top priorities. Also, risk management, sentiment management, and market segmentation are the least important among the applications of artificial intelligence in the banking field. This research was done to give priority to services based on artificial intelligence at Bank Pasargad and its customers. To generalize the results of this research, it is necessary to expand the scope of this research to other banks and definitely their customers. Finally, it can be said that this research introduces an efficient method to senior bank managers for more optimal and efficient investment in the development of AI-based services.

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