RESEARCH ARTICLE

Customer experience management supported by artificial intelligence – al Salam bank Algeria- as a model

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Abstract
This study aims to demonstrate the role played by artificial intelligence in influencing consumer behavior and creating their experience through managing their activity and relationship with the institution. By relying on the descriptive analytical approach in controlling and analyzing concepts. By applying the study to the Algerian Salam Bank and studying the extent of its use of technology and artificial intelligence tools in its impact on the behavior of its consumers, it was concluded that artificial intelligence makes a difference in the banking sector. It contributes to creating more personalized customer experiences, supporting security and compliance issues, and improving operational efficiency. The use of artificial intelligence by the Algerian Salam Bank and its provision of various digital services has also allowed it to improve its banking operations and provide a better banking experience for customers.
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1. Introduction:

The banking sector is undergoing a radical transformation due to the rapid pace of digital development, with customers increasingly turning to electronic applications and smart solutions to conduct their banking transactions. In this context, artificial intelligence (AI) emerges as one of the most effective technologies that support customer experience management.

Given the significant role customer experience management plays in e-commerce in general and in digital marketing in particular, there is growing interest in understanding the success of AI in managing customer experience within the banking sector. Focusing on Al Salam Bank – Algeria, we pose the following research problem:

How does Al Salam Bank – Algeria deliver a seamless and consistent service experience to its customers using appropriate AI-supported ideas, methods, and innovations?

- **Sub-questions:**

- How does AI contribute to improving banking operations across different banks?

- To what extent has Al Salam Bank – Algeria adopted AI in its banking operations?
- How can integrating AI-supported services improve the customer experience?

- **Research Hypotheses**:

This research involves the following hypotheses:

- Artificial intelligence is capable of mimicking human intelligence in all economic fields.
- The use of AI applications in banking operations helps increase efficiency by facilitating risk management and enhancing electronic customer service.

- **Research Objectives**:

The study focuses on customer experience in the context of AI-supported services within the banking sector, by identifying key applications of e-banking and AI at Al Salam Bank – Algeria.

- **Research Methodology**:

In line with the nature of the research and in order to achieve its primary objectives and address the research problem, a descriptive exploratory method was adopted. This approach aims to determine an adequate amount of knowledge that sheds light on the issue and thoroughly studies it by collecting data from various primary and secondary sources, including the official website of Al Salam Bank – Algeria, its reports and journals, as well as its mobile application.

2. Concepts Related to Customer Experience Management and Artificial Intelligence

2.1 Customer Experience Management:

The term "Customer Experience" was first introduced by Gilmore and Pine in an article published in the Harvard Business Review in 1988. They believed that business success is influenced by individuals through their real experiences and that marketing policies evolve due to changes in customer culture and how they are influenced (Mujaad Farah Al-Mutairi, 2020, p. 448). They also argued that creating a distinctive customer experience can offer tremendous economic value to companies (Peter C, Katherine N, & all, 2009, p. 31). Some definitions of Customer Experience (CX) include:

- Schmidt (1999) defined experiences as the provision of sensory, emotional, cognitive, behavioral, and relational values that replace functional values. Gupta and Vajic (2000) offered a more comprehensive definition of customer experience, stating that experience occurs when the customer has any sense or knowledge acquisition resulting from a certain level of interaction with various elements of a context created by the service provider (Adrian, 2010, p. 197).

- Meyer and Schwayer (2007) defined customer experience as the internal and subjective response of customers to any direct or indirect contact with the institution. Direct contact typically occurs during purchasing and usage, while indirect contact usually arises from unplanned encounters with representatives of the institution's products or services or its brand, including word-of-mouth recommendations, criticism, advertising, news reports, and reviews (Meyer Christopher, 2007, p. 118). According to this definition, companies competing to achieve a satisfactory customer experience must coordinate all direct and indirect customer communications during service delivery (Jay, Tingting, & Zhang, 2017, p. 09).

- Klaus and Maklan (2012) defined customer experience as the cognitive and emotional evaluation by customers of all direct and indirect interactions with the organization related to their purchasing behavior (Klaus & Maklan, 2012, p. 10).

Based on the above definitions and according to Schmidt, customer experience can be classified into five categories (Zhaohao & Kim Lau, 2007, p. 376):

- ✓ **Sensory Experience**: Appeals to the five senses, creating value through sight, sound, touch, taste, and smell.
- ✓ **Emotional Experience:** Appeals to customers' inner feelings and emotions, creating value ranging from mildly positive moods associated with the brand to strong feelings of joy and pride.

- ✓ **Cognitive Experience**: Appeals to the intellect, engaging customers creatively to generate value.
- ✓ **Physical/Behavioral/Lifestyle Experience**: Appeals to behaviors and lifestyles, creating value by showcasing alternative lifestyles or business practices.
- ✓ **Social Identity Experience**: Creates value by providing social identity and a sense of belonging.

Customer experience refers to the impression formed by a customer through their interactions with the institution across different touchpoints. A good customer experience means the interaction met the customer's expectations. Thus, institutions aim to manage customer experience by designing these interactions to meet expectations, resulting in higher satisfaction and loyalty.

Verhoef and Schmitt agreed that Customer Experience Management (CEM) is a model of a new marketing strategy that defines how to handle customers across all touchpoints. Bauer and Gopalan described it as an institutional need to plan and express their interaction behavior with customers to offer a consistent and satisfying experience across all communication channels, as well as coordinating and delivering experience through their functional units (M.M. Kamal Alwan, 2018, p. 208).

Georgescu and Popa pointed out that CEM is a strategic approach that can be classified as a continuous process aimed at creating a sustainable competitive advantage by integrating emotional and rational experiences and managing the organization's touchpoints effectively (Tawfik Atiya, 2018, p. 33).

Therefore, managing the customer experience involves creating a positive experience through managing the interaction between the organization and its customers in terms of the customer journey, brand touchpoints, and the environments they pass through—including digital environments—in order to gain their trust, satisfaction, and loyalty, ultimately enhancing the institution's competitive advantage.

The main outcome—and the reason for taking CEM seriously—is increased customer satisfaction, loyalty, retention, and stronger emotional connections between the customer and the brand (Havíř, 2019, p. 29). Successful application of CEM yields both short- and long-term benefits, which can be identified as follows (M.M. Kamal Alwan, 2018, p. 209):

- ✓ Effective use of customer support resources, potentially reducing support costs.
- ✓ Problem resolution through customer contact, increasing satisfaction and reducing loss.
- ✓ Enabling sales staff to achieve additional sales of company products.
- ✓ Enhancing adaptability to changing market conditions.
- ✓ Differentiating the organization's customer service, leading to more satisfied and loyal customers who help spread a positive reputation in the market

2.2 Artificial Intelligence:

The origins of artificial intelligence (AI) date back to the mid-20th century. In fact, the invention of the analog computer by the U.S. Navy in 1938, followed by the digital computer by Konrad Zuse in 1939, were crucial milestones in the history of AI. The term "artificial intelligence" was first used as the title of a workshop organized by Marvin Minsky and John McCarthy for a summer research project at Dartmouth College in 1956. (Ashta & Herrmann, 2021, p. 211).

The Financial Stability Board (FSB) defines AI as a set of theories and algorithms that allow computer systems to perform tasks typically requiring human intelligence (such as visual perception, speech recognition, or text interpretation within its context) and, in some cases, to enhance those abilities. (Ana, 2019, p. 01)

The consultancy firm Accenture defines AI as: a computer system capable of sensing, understanding, acting, and learning. In other words, it is a system that can perceive the world around it, analyze and understand incoming information, take action based on that understanding, and improve its performance by learning from past experiences. (Indriasar, Lumban Gao, & Matsu, 2019, p. 864)

AI can perform many cognitive functions that humans usually carry out, such as learning, problem-solving, and decision-making. The AI ecosystem consists of three elements (data collection and storage devices, statistical and

computational techniques, and output systems). It uses algorithms that allow machines to understand and produce natural language, learn from experience, and recognize emotions. (Hoyer & all, 2020, p. 59)

Based on the previous definitions, the characteristics of AI can be summarized as follows: (Alaq & Duraid, 2022, pp. 710-711)

- AI algorithms use real-time data and collect various information from different sources, enabling them to perform complex and fast analysis and make better decisions
- Machine learning and big data analytics support many AI solutions, allowing AI to gather data and detect potential rules and patterns
- AI operates in an adaptive manner, meaning it can learn and assist in decision-making.
- The increasing use of AI technologies, such as chatbots, by retailers, academics, and practitioners has led to recognizing their impact on customer experience. Some AI applications that enhance customer experience include: (Suman, Ruchi, & Varsha, 2018, p. 759)
- **Product Recommendation Tools:** These applications predict customer shopping behavior, helping companies suggest products of interest. They are widely used by Amazon, Netflix, and Uber.
- **Engagement Bots**: Also called web robots or interactive agents, they use advanced natural language processing (NLP) systems, learn independently, process trillions of data points in seconds, and make suggestions—examples include Google Assistant, Amazon's Alexa, and Apple's Siri.
- **Speech Recognition Tools**: These convert speech to text using AI technologies. One of the latest is IBM Watson, which processes customer speech and provides output in textual or graphic format. Chatbots widely use this technology. Francesco Corea stated that Bot-to-Bot business models, where bots interact with each other to filter and resolve queries, are coming soon.
- **Visual Perception**: The latest AI development includes visual perception tools, allowing computers to now recognize and identify images and videos. Companies such as clarifai.com, thehive.ai, Google, and Facebook offer these tools for image search.
- **Text and Email Analysis**: Also known as text mining, this is one of the most important recent concepts after big data. It is a subfield of NLP, a branch of AI.

AI helps accelerate a deep understanding of customers, including their preferences and past experiences, through:

- **Personalization**: Refers to the degree to which information is tailored to the needs of a single user, thus playing a critical role in positive customer experiences (Bilgihan, Kandampully, & Zhang, 2016, p. 110).
- Enhancing companies' knowledge of customer preferences and shopping patterns. Strategically deploying AI technologies across key customer touchpoints may bring significant benefits to companies and potentially increase customer satisfaction (Ameen, Tarhini, Reppel, & Anand, 2021, p. 01).
- Customers also enjoy chatting with chatbots. Enjoyment is critical to the customer experience as it increases perceived value and the intention to adopt digital tools. Providing customers with specific, clear, and easy-to-read information along with comprehensive discussions increases their sense of value and comfort (Go & Shyam, 2019, p. 306).
- AI and machine learning solutions also assist in customer service operations, such as transcribing incoming customer calls, identifying patterns like common reasons for contact or recurring complaints, and analyzing this data to improve service quality.

The Customer Experience Professionals Association (CXPA, 2018) confirmed in its white paper that incorporating AI into the customer journey provides numerous benefits to organizations (Mohannad & Ahmad, 2019, p. 23):

- **In the awareness stage**: Predictive analytics (a subfield of AI) identify aspects of interest to the customer and suggest product or service recommendations.
- **In the consideration stage**: AI helps websites integrate vast amounts of data, allowing customers to gain knowledge and compare relevant products.
- **In the purchasing stage**: AI identifies the customer's unique buying pattern by studying data trends and offering tailored recommendations.

- **In the support stage**: AI can also study customer behavior and track signs of dissatisfaction to take appropriate action for a particular client. Such strategies offer highly personalized customer service.

The integration of AI into banking and financial services has helped enhance customer experience and increase user convenience. Examples of AI applications in the financial sector include: (Ana, 2019, pp. 3–4)

- **Chatbots and Virtual Assistants**: Enable users to resolve common doubts and, in some cases, obtain product recommendations or conduct certain transactions (e.g., transfers, account opening). These AI-powered communication channels are available 24/7, and user interaction data is automatically collected.
- **Personalized Product and Service Offerings**: Based on information obtained from customers, financial institutions can offer personalized user experiences—possibly beyond traditional banking (e.g., sending balance alerts when geolocation services detect shopping activity).
- **Anti-Money Laundering (AML) and Fraud Prevention**: AI's ability to analyze larger volumes of data and integrate it with new sources helps detect anomalies or patterns that might otherwise go unnoticed, enabling faster and more accurate fraud detection and AML monitoring.
- **Credit Scoring**: Enhanced analytical capabilities improve credit assessment and speed up the loan origination process.
- **Regulatory Auditing**: Greater analytical capacity through AI tools helps in complying with regulatory requirements (e.g., risk management and reporting obligations) and in monitoring regulatory changes.

3. Artificial Intelligence at Al Salam Bank – Algeria

The adoption of artificial intelligence among Islamic banks is generally lower compared to conventional banks, especially the larger ones which have made significant progress in this area. However, AI has begun to establish a presence, particularly in countries advanced in Islamic banking such as Malaysia, the UAE, and Bahrain. Moreover, it is becoming a new research field for scholars across various branches of Islamic finance.

3.1 Overview of Al Salam Bank – Algeria:

The establishment of Al Salam Bank – Algeria was officially announced on June 8, 2006. It is a commercial bank founded under Algerian law with an initial capital of 7.2 billion Algerian dinars, which was raised in 2009 to 10 billion dinars, and further increased to 15 billion dinars in 2020 in compliance with the Bank of Algeria's Regulation No. 18-03 dated November 4, 2018, concerning the minimum capital requirement for banks and financial institutions operating in Algeria (Al Salam Bank, 2020, p. 38).

Al Salam Bank – Algeria is a multi-service bank operating in accordance with Algerian law and the principles of Islamic Shariah in all its transactions. The bank was accredited by the Bank of Algeria in September 2008 and began its operations with the goal of offering innovative banking services. It follows a clear strategy aligned with the needs of Algeria's economic development across key sectors by providing modern banking services rooted in the traditional values and principles of the Algerian people. A Shariah Board composed of senior scholars in Shariah and economics oversees its operations. The bank currently has 20 branches across the country, with plans to open more branches in line with its vision to bring its diverse banking services closer to clients with the highest quality.

Al Salam Bank – Algeria provides clients with services that meet modern banking standards and innovative global technologies (Ben Zekoura, 2020, p. 69):

✓ The bank finances investment projects and various operational needs according to Islamic financing modes (musharakah, mudarabah, ijarah, murabaha, istisna', installment sale, deferred payment sale, etc.).
✓ It conducts international trade operations using international payment methods, documentary credits, guarantees, and letters of credit. In terms of investment and savings, it offers secure and attractive solutions through:
- Investment bond subscriptions.
- "Omnity" savings accounts Omnity savings cards, investment accounts, etc.
✓ In the field of banking services, the bank offers a range of innovative services, including:
- Money transfers via electronic payment tools.

- Remote banking services (Al Salam Direct).
- Mobile banking, Swift Mobile service.
- Electronic payment cards (Amina), Al Salam Visa International card.
- Online payment service "E-Amina", safety deposit boxes (Aman).
- POS machines, ATMs.

3.2 AI Applications Supporting Customer Experience Management at Al Salam Bank – Algeria:

Banks have shifted from offering traditional services to exploring multiple areas in banking operations to align their products with market demands. They leverage advanced technologies that help attract more customers and partners while reducing risk exposure. This has improved banking performance and enabled adaptation to modern changes. Below are key AI applications at Al Salam Bank – Algeria and how this technology is redefining customer experience with its exceptional features:

- **Operational Risk Management:** Based on the general policy for operational risk management, which enables the identification and assessment of risks the bank might face due to failures in internal procedures, IT systems, or human resources, a risk map was developed. Measures were taken to mitigate future risks through the establishment of an emergency incident database, reviews of all audit reports, and the implementation of a comprehensive and detailed Risk & Controls Self-Assessments (RCSA) system. The aim is to evaluate the necessary operations for each banking activity in order to identify all operational risks, including those arising from such activities, and to develop strategies to eliminate, mitigate, transfer, or manage these risks. The RCSA practice classifies operational risks in order and assigns responsibility for managing them. A self-assessment map was created along with proactive and reactive action plans, which enabled the bank to formulate strategies to eliminate or reduce these risks (Al Salam Bank, 2019, pp. 24–25).
- **Electronic Customer Support Services:** Al Salam Bank plans to develop the Wimpay service, which allows bill and dues payments via mobile phones, and also enhance the SMS banking service to enable account holders to receive notifications via text messages. The bank is also set to launch a digital platform with its partner Savitam, expected to be the largest online consumer financing platform. In addition, the bank has launched a chatbot service using artificial intelligence to respond to customer inquiries via Facebook messages and the bank's official website (Al Salam Bank, 2020, pp. 16–17).

Furthermore, the bank has developed a technical platform to connect with external providers, Dyar Dzair and Savitam, to provide installment financing services to individuals over the internet without requiring customers to visit the bank physically. It has also activated the workflow application for collection bills and provided the necessary support to branches and the central administration to control it. Additionally, workflows have been developed for letters of credit, free transfers, and currency purchases, thereby integrating all foreign trade import operations into the workflow system. The bank has also automated the distribution of term deposit profits, directly depositing them into the customer's account (Al Salam Bank, 2020, pp. 19–20).

- **Human Resource Management:** To better organize work, the bank has acquired a new HR information system operating through compatible modules. It has activated the payroll management module and linked it to the bank's information system. It plans to activate modules for career path management and skills development by creating an HR interface connected to the automated management platform (Workflow) (Al Salam Bank, 2020, p. 21). Internally, the bank has transitioned its telephone system from the traditional model to IP telephony using four-digit extensions to improve video communication between branch and central office employees (Al Salam Bank, 2019, p. 42).
- **Banking Information Security and Monitoring:** Al Salam Bank – Algeria has set up a central system for monitoring sensitive servers by installing a global system to monitor critical bank servers (T24 servers, CPI servers). This system tracks several server components (Hard Disk, Memory Utilization, and CPU) via a dashboard (Al Salam Bank, 2019, p. 42). The bank also implemented automated restriction of unearned profit operations, a key recommendation emphasized by financial control and audit departments. Moreover, it activated automatic restriction of financial control operations based on XLS files, and integrated the National Trade Register database

into its information system, which enabled the correction of all commercial registration numbers and related data such as partner and shareholder names.

In terms of cash management, the bank made several improvements to its management systems for local and Visa payment cards, including switching to an 8-digit BIN instead of 6, and enabling 3D Secure with the Algerian monetary company SATIM. For infrastructure, the bank has completely upgraded its IT infrastructure by renovating the main data center. As part of its continued development of electronic channels and enhancement of card services, it launched the 3D Secure feature, enabling cardholders to shop online with greater confidence and security. As a result, online payments have increased, and usage of both local and international cards continues to expand. The number of local cards reached 14,730 in 2020, up from 10,336 in 2019, a 42% increase, while international cards increased from 1,154 in 2019 to 1,677 in 2020, a 45% rise (Al Salam Bank, 2020, p. 20).

- **Virtual Banking Assistant and Automated Financial Analyst**: The bank uses virtual machines (VMware) to meet both planned and unexpected technical needs dynamically. These virtual machines can be expanded, modified, or enhanced on demand. Regarding digitization, the bank has strengthened internet banking, mobile banking, ATMs, and POS terminals, and initiated the automation of manual operations through process automation tools and straight-through processing (Al Salam Bank, 2020, p. 20). Al Salam Bank – Algeria aims to launch more innovative initiatives to enrich its customer experience through authentic and modern banking services, offering various tools, technologies, and systems in delivering services like ATMs, internet banking, and mobile banking.
- **ATM Banking**: Al Salam Bank – Algeria has expanded its ATM network by adding 5 new machines, bringing the total to 21 ATMs in 2020. It also installed 29 new POS terminals, bringing the total to 63 devices (Al Salam Bank, 2020, p. 20). Customers can withdraw their savings from any ATM using the "Oumnyati" savings card or the E-Amina payment card, available 24/7 across Algeria, including in areas where no branches exist. Customers can also make purchases at any CIB-enabled POS terminal, and withdraw cash using any CIB-compatible ATM with a four-digit PIN issued by the bank.

Additionally, Al Salam Visa cards (Prepaid, Classic, Gold, and Platinum) allow customers to perform various banking operations, including cash withdrawals from Visa ATMs locally and internationally. They can also pay for purchases at stores worldwide using Visa POS terminals.

- **Mobile Banking**: The updated My Salam mobile app allows automated transfers, significantly reducing the time needed for these operations and providing real-time updates on the platform and smartphone app (Al Salam Bank, 2020, p. 20). The Al Salam Visa cards are equipped with a smart chip and PIN, enabling holders to receive SMS alerts after every transaction for verification and protection against theft and fraud.
- **Internet Banking**: Al Salam Bank – Algeria has developed a direct connection (web service) method, awaiting the supplier's platform update for real-time transaction access. It also enhanced the security of the Al Salam Direct internet banking platform (Al Salam Bank, 2020, p. 20). Customers can track withdrawals and profits earned every three months from home, work, or even while on vacation, thanks to the free remote banking service offered with the "Oumnyati" savings card.

The Oumnyati savings card and E-Amina card allow customers to pay for purchases or settle bills online, and Visa cardholders can make e-commerce purchases using the CVV2 code and OTP sent via SMS.

4. Conclusion:

Artificial intelligence (AI) has been defined since its inception as the intelligence exhibited by machines and software in a way that mimics human cognitive abilities and behavioral patterns—such as learning, reasoning, and responsiveness. In essence, it refers to computer systems and devices designed to function in ways considered intelligent, simulating human performance by learning, drawing conclusions, understanding complex content, engaging in human dialogue, and enhancing human cognitive functions.

AI has grown rapidly in the banking sector, where many banks around the world have adopted AI-based systems for customer support, fault detection, and credit card fraud prevention. This has enabled banks to gain accurate

insights into their data with reduced error rates, improved quality, and more efficient data analysis to ensure a better understanding of customer needs and deliver an equitable customer experience.

This study has reached several key findings, most notably:

- AI helps banks gain a clear understanding of customer needs and is used to identify the most suitable set of channels to engage more clients.
- The faster response time provided by AI positively impacts customer satisfaction.
- The adoption of AI contributes to an increase in the number of customers benefiting from financial services by making them more accessible.
- Banque Al Salam–Algeria employs AI in various areas such as operational risk management, digital customer support services, human resource management, and the security and monitoring of banking information.
- Banque Al Salam–Algeria provides various tools, technologies, and modern systems in delivering banking services such as ATMs, internet banking, and mobile banking, and looks forward to launching more innovative initiatives to enrich customer experiences with original banking services.
- The integration of AI into banking applications and services has made the sector more customer-focused and technologically relevant.
- AI helps banks enhance the security of online financing, track system vulnerabilities, and reduce risks and fraud.

5. Recommendations:

The following are several proposed recommendations to effectively leverage AI innovations in shaping the future of banking services and enhancing customer experience:

- Encourage Algerian banks to capitalize on fintech and AI innovations to develop the future of banking services.
- Stress the need for all stakeholders in the Algerian banking and financial sector to train their employees in fintech and AI technologies due to their role in diversifying economic activity and evolving banking operations to better meet the changing and diverse needs of a wide range of clients.
- Increase investment in AI to improve banking services offered to customers, particularly through apps and digital technologies.
- Introduce more academic specializations in AI at universities, graduate schools, and vocational training centers, in addition to offering more specialized training courses in this field.
- Work on developing strong and effective regulatory mechanisms to provide protection against cyberattacks and enhance information security.
- Learn from global experiences in the use and integration of AI, and conduct field research and studies to identify the weaknesses within Algerian banks.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.