



## Managing customer service through artificial intelligence-driven chatbot systems in Islamic Banking institutions

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### Abstract

*This study examines the implementation of chatbots in Bank Syariah Indonesia (BSI) to enhance customer service in the Islamic banking sector. This study used a literature review in collecting and analyzing the secondary data in the form of papers downloaded from Google Scholar, Scispace, DOAJ, and Scopus websites. There were 26 papers gathered as samples of this study from 2015-2024. The data were analyzed through systematic data reduction, presentation, and conclusion-drawing. The findings show that deploying chatbots can significantly improve service delivery by reducing operational workloads through quick replies to repetitive customer inquiries. Chatbots serve as an innovative solution that handles routine questions swiftly, thereby increasing efficiency and allowing staff to focus on more complex tasks. Their continuous, round-the-clock availability further enhances customer engagement and experience by providing immediate assistance at any time, eliminating extended waiting times for information. Additionally, the chatbot's ability to interpret customer interactions provides valuable insights into customer behavior and preferences. Such insights enable BSI to better understand about customer needs and identify usage patterns of Sharia-compliant banking products. However, the implementation of chatbots in Islamic banking also requires careful consideration of Islamic ethics.*

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## Introduction

Recently, the global banking sector has experienced a profound digital transformation fueled by rapid advances in emerging technologies such as Artificial Intelligence (AI). Among the most impactful innovations is the AI-driven chatbot system, which is revolutionizing how banks interact with their customers. AI chatbots offer round-the-clock customer support, reduce operational costs, and enhance service consistency. Those factors that contribute significantly to customer satisfaction and loyalty (Jain et al., 2023). These benefits are especially relevant in Islamic banking, where the integration of cutting-edge technologies must align with Shariah principles while addressing customers' expectations for seamless and ethical digital experiences.

AI-powered chatbots utilize machine learning algorithms to simulate human-like interactions. However, AI could learn by itself without error, like humans, by processing global big data into a language learning model (LLM). AI becomes smarter the more data is processed into its system. AI could interpret customer queries, provide personalized responses, and perform tasks in real-time, making them an essential component of modern digital banking platforms (Khan & Rabbani, 2021). In the Indonesian banking landscape, AI chatbots have been adopted by several major institutions. For instance, Bank Syariah Indonesia (BSI) has launched "AISYAH," an intelligent virtual assistant designed to facilitate Sharia-compliant banking services efficiently and interactively (Hamadou et al., 2024). Such innovations are aligned with the growing digital demands of millennial customers, who place high importance on technological convenience and responsiveness in service delivery (Suhartanto et al., 2022).

Despite the clear advantages, the deployment of AI in Islamic financial institutions (IFIs) raises unique challenges. These include ensuring compliance with Islamic ethical standards, managing data privacy, and maintaining transparency in algorithmic decision-making (Triyanti et al., 2021). Moreover, a successful digital transformation requires the presence of adaptive digital infrastructure and a flexible core banking system capable of integrating AI solutions while adhering to regulatory and Shariah guidelines (Desky & Maulina, 2022).

Based on the statements above, it can be concluded that the current study seeks to explore the application of AI-driven chatbot systems to enhance customer service within Islamic banking institutions in Indonesia. As a result, this research examines the effectiveness, benefits, and challenges associated with integrating chatbot technologies and how these tools contribute to improved customer experience and institutional performance in the Shariah-compliant banking sector.

## Literature Review

AI-powered chatbot systems have emerged as a popular solution within the banking sector in Indonesia. Numerous banks and financial institutions have adopted this technology to enhance the quality, efficiency, and responsiveness of customer service. Through AI chatbots, customers can ask questions, report issues, or receive real-time assistance related to banking products and services—anytime and anywhere. The ability to provide timely and accessible information has become a key performance indicator in measuring service excellence. In the financial services industry, particularly in banking, customer loyalty is widely recognized.

According to Qian et al. (2023), several factors contribute significantly to customer satisfaction, such as perceived value, cognitive trust, affective trust, and satisfaction itself. Perceived value refers to the customer's evaluation of the benefits received in comparison to what is sacrificed (e.g., time, money, effort). This concept aligns with the definition by Schiffman and Wisenblit (2015), who describe perceived value as a trade-off between the perceived quality or utility of a product and the cost incurred to obtain it. Ganthika & Wahdiniwaty, (2020) further elaborate that perceived value is formed based on customers'

overall judgment regarding the utility of a product, following what they receive versus what they give a critical reflection of institutional success.

Trust also plays a central role in shaping customer loyalty. A study conducted by Pratiwi & Hutasuhut, (2019) stated that customers' trust of a brand significantly and positively influences them to buy products repeatedly. Consumers who trust a particular brand are more likely to continue engaging with the brand, leading to long-term loyalty. On the contrary, a lack of trust diminishes the likelihood of ongoing transactions. Therefore, consumers' trust acts as a long-term mediator, reinforcing customers' emotional and rational attachment to a brand and enhancing their loyalty over time.

Customer satisfaction itself yields numerous strategic benefits for organizations. It contributes to long-term profitability, enhances customer retention, and strengthens corporate reputation. When businesses succeed in meeting or exceeding customer expectations, they are perceived as providers of high-value service. Consequently, financial institutions must deliver service offerings that are aligned with customer needs and desires. In this context, the quality of AI chatbot services has been found to positively influence perceived value, trust, and satisfaction (Qian et al., 2023).

As emphasized by Tjiptono (2016), service quality plays a pivotal role in fulfilling customer expectations and shaping their perceived service experience. High service quality not only satisfies immediate customer demands but also influences the perceived versus expected service gap. Tjiptono Therefore, continuous innovation in the service quality of AI chatbots can support banks in meeting evolving customer needs, ensuring satisfaction, and ultimately fostering customer loyalty in the digital era.

## Methodology

This study adopts a qualitative research design employing a library-based (literature) approach. The library research method is an established qualitative technique that involves systematic examination and interpretation of existing literature, scholarly publications, reports, and documented evidence related to the research problem. This approach is particularly suitable for conceptual and exploratory studies, where the objective is to synthesize theoretical perspectives and empirical findings from prior research (Creswell & Poth, 2016; George & Bennett, 2005).

The data sources in this study were obtained from various reputable scientific databases such as Google Scholar, Scispace, DOAJ (Directory of Open Access Journals), and Scopus using keywords such as "Artificial Intelligence in Islamic Finance," "Business Information Technology," "Islamic banking chatbot," and "AI in customer service." The selected articles were derived from national and international journals that discuss topics related to Islamic finance, the application of AI in Islamic finance, and chatbot technology. The inclusion criteria for this study consisted of journal articles that: (1) were published between 2015 and 2024, (2) are available in English or Indonesian, (3) discuss the technical, regulatory, or practical aspects of chatbot implementation in the context of Islamic finance, and (4) are peer-reviewed. On the other hand, the exclusion criteria included articles that: (1) are not relevant to the main theme, (2) are non-academic publications such as opinion pieces or editorials, and (3) are not fully accessible (i.e., full-text not available). Based on these criteria, a total of 26 articles were reviewed, consisting of 8 articles on the use of information technology in general business development and organizational efficiency, 8 articles on the use of AI and chatbots in services, banking, and risk management, 4 articles on the role of AI in supporting Islamic finance, Sharia compliance, and Islamic banking services, 3 articles on loyalty, e-satisfaction, customer value, and consumer behavior in the digital context, and 3 books on marketing theory and research methodology.

The analysis was conducted through a qualitative content analysis, which involves identifying, interpreting, and categorizing patterns and themes related to AI-driven chatbot

systems and their impact on customer service in Islamic banking institutions. This method enables the researcher to build a comprehensive understanding of theoretical concepts and real-world applications while identifying gaps in the existing literature.

## **Result and Discussion**

### *Technological utilization in business development*

The acceleration of internet-based technologies has created numerous opportunities for business innovation, particularly in marketing, sales, and customer service. Digitalization disseminated information rapidly and quickly transcended boundaries of time and place globally. To attract more customers, business needs to create user-friendly apps or websites to support centralized databases and universal navigation systems accessible to users globally (Fidiyanti et al., 2023). Digital marketing transcends geographical and regulatory boundaries, allowing businesses to reach a broader audience without the constraints that traditional markets cannot provide digital payment and digital transactions.

Information and Communication Technology (ICT) consists of two interconnected domains: information technology and communication technology. Information technology encompasses all tools and processes related to the management, manipulation, and analysis of information. On the other hand, communication technology encompasses devices and systems used to transmit and share information across platforms (Aziz, 2015). Together, ICT represents a holistic framework for data processing, exchange, and storage, which are critical for modern businesses.

Technology has become a pivotal driver of business growth by improving operational efficiency, enhancing productivity, and strengthening competitive advantage. Organizations leverage technology to streamline business processes, enhance data analysis, and manage operations with higher precision. Furthermore, technological tools contribute to improving the quality of products and services delivered to customers, thereby increasing overall customer satisfaction and organizational performance (Anggraeni & Elan Maulani, 2023).

As noted by Fidiyanti et al. (2023), the role of ICT in digital business development includes:

- a. Facilitating the widespread dissemination of information, enabling digital businesses such as e-commerce to operate globally.
- b. Empowering business transformation through the availability of skilled IT professionals, which enhances digital infrastructure and data security; and
- c. Promoting business flexibility, where sellers can operate without physical storefronts and buyers can conveniently make purchases online. This model reduces operational overhead and increases accessibility, contributing to customer convenience and satisfaction.

### *The strategic role of artificial intelligence in business growth*

Artificial Intelligence (AI) plays a strategic role in driving business development through mechanisms such as geographic expansion, product diversification, market penetration, and strategic alliances (Fidiyanti et al., 2023). AI systems are increasingly adopted to analyze complex datasets, detect patterns and trends, forecast future behaviors, and generate intelligent recommendations. These capabilities develop AI into more human-like decision-making processes. Once the system is trained with sufficient data, it can autonomously provide insights to support strategic and operational decision-making.

In the context of digital transformation, AI makes a big contribution to improving the agility and responsiveness of businesses. The integration of AI tools supports smarter decision-making, minimizes errors, reduces dependency on human resources, and optimizes cost

structures. These attributes make AI an essential element in enhancing customer satisfaction, operational performance, and long-term business sustainability.

#### *Chatbot implementation in the banking industry*

Artificial Intelligence has been widely acknowledged for its potential to generate efficiencies in the banking industry ([Mikalef & Gupta, 2021](#)). The financial sector, particularly banking, faces intense competition, pushing institutions to adopt AI technologies to improve performance, optimize operations, and gain a competitive edge ([Jakšić. & M Marinč, 2019](#)). AI adoption in banking enables improvements in customer targeting, loan risk reduction, fraud detection, payment processing, and compliance automation ([Garg et al., 2021](#)). [Leo, M., Sharma, S., & Maddulety \(2019\)](#) emphasized that AI-driven business applications in banking have shifted from experimental to mainstream, with systems designed to reduce operational costs and enhance strategic capabilities. AI-based models also support customer retention by personalizing experiences and fostering long-term loyalty.

In Islamic banking, AI technologies such as chatbots have become an essential tool in enhancing customer service. A chatbot is an AI-powered software application designed to simulate real-time interaction with users via text or voice communication. It functions as a digital assistant, responding to queries, providing guidance, or facilitating transactions based on customer intent ([Kamal, 2022](#)). An advanced chatbot should be supported by machine learning, deep learning, and natural language processing (NLP) to understand user inputs, interpret emotions, and deliver accurate responses in real time.

The integration of chatbots into Sharia-compliant banking systems allows for continuous service delivery, reduces wait times, and minimizes employees' workload. For instance, Bank Syariah Indonesia (BSI) has implemented AISYAH, a virtual assistant designed to meet the specific needs of Islamic banking customers by offering seamless support across multiple communication channels.

The benefits of chatbot implementation in banking institutions include:

- a. Operational efficiency: Chatbots handle repetitive queries instantly, allowing human agents to focus on more complex tasks.
- b. Enhanced customer engagement: Chatbots are accessible 24/7, significantly improving customer experience and responsiveness.
- c. Cost-effectiveness: A single chatbot can integrate with various messaging platforms, reducing labor costs and optimizing customer service operations.
- d. Customer insights: By analyzing user conversations, chatbots generate valuable data on customer behavior and preferences, which can inform strategic decision-making and service improvements ([Hidayati et al., 2020](#)).

The strategic deployment of chatbot technology in Islamic banking not only enhances service delivery but also supports business intelligence, customer relationship management, and digital transformation objectives. As AI-driven tools continue to evolve, their role in shaping the future of Islamic financial services will become increasingly critical.

#### *The ethical dimensions of islam in the implementation of chatbots in islamic banking*

The ethical dimensions of Islam in the implementation of artificial intelligence (AI) in Islamic banking require an in-depth analysis of the compatibility of this advanced technology with the fundamental principles of Shariah. Unlike conventional AI ethics frameworks, which generally focus on fairness, accountability, transparency, and beneficence, the Islamic perspective introduces additional foundational considerations—tauhid (the oneness of God), khalifah (stewardship as God's vicegerent on Earth), and maslahah (public welfare).

AI technology implemented in Islamic banking must not only meet technical and economic standards but also reflect these core values. [Malik et al. \(2024\)](#) identify that AI

algorithms for credit scoring should not be designed solely for-profit optimization but must also incorporate social justice ('adl) and equitable wealth distribution, as emphasized in Islamic economics. The analysis of AI compatibility with Shariah principles reveals several areas of convergence and divergence. AI offers potential to enhance Shariah compliance through the automation of transaction verification and portfolio monitoring to ensure investments are limited to halal activities. However, the probabilistic and statistical nature of many machine learning and deep learning algorithms may conflict with the Islamic legal prohibition of *gharar* (excessive uncertainty) in financial transactions. A study conducted by [Shalhoob \(2025\)](#) argues that AI algorithms used in Shariah stock screening, for example, can be considered compliant as long as they are based on clear, explainable parameters and criteria, not merely "black box" systems that cannot be validated against Islamic principles.

Ethical challenges surrounding AI in Shariah-compliant financial products become even more complex when applied to specific contracts such as *mudarabah* (profit-sharing partnerships) and *musyarakah* (joint ventures). In these participatory contracts, the use of AI for determining profit-sharing ratios or asset valuations raises concerns about *rida* (mutual consent), a fundamental requirement for the validity of Islamic contracts. If AI algorithms autonomously determine contract parameters without full transparency to the customer, the legitimacy of the consent provided is questionable. Moreover, using AI in the restructuring of distressed financing must be sensitive to principles such as *ihsan* (benevolence) and *ta'awun* (mutual assistance), which are not easily quantifiable in algorithmic models.

A case study by [Fitria \(2025\)](#) involving three Islamic banks implementing AI-based customer service chatbots revealed that 65% of automated responses prioritized efficiency over ethical benevolence, potentially conflicting with Islamic service ethics. Incorporating *maqasid al-shariah* into AI algorithm development is essential for the basis to align technology with Shariah objectives. The traditional *maqasid* include the protection of religion (*din*), life (*nafs*), intellect ('*aql*), lineage (*nasl*), and wealth (*mal*). In the context of financial technology, however, a contemporary interpretation by [Shalhoob \(2025\)](#) adds data protection (*hifz al-bayanat*) as a critical component. AI algorithms that process large volumes of customer data must consider not only technical security but also ethical implications regarding privacy, as recognized in Islamic tradition.

An AI development model based on *maqasid* requires a multidimensional evaluation framework, one that assesses not just the algorithm's output but also the decision-making process and the long-term socio-economic implications. Addressing the tension between technological efficiency and Islamic values requires a balanced approach. On one hand, a total rejection of AI due to excessive precaution may cause Islamic financial institutions to fall behind in a competitive landscape. On the other hand, unfiltered adoption of AI that prioritizes efficiency over ethical values risks eroding the distinctive identity of Islamic banking. On the other hand, studies conducted by [Shalhoob, \(2025\)](#) advise a more compromised solution called *AI Shariah Compliance by Design*. It was a methodology where Shariah considerations are integrated from the conceptual stage of AI development, rather than as post-implementation evaluations. This includes involving Shariah scholars in AI development teams, documenting ethical considerations at every development phase, and conducting comprehensive testing to validate not only technical accuracy but also conformity with Islamic values.

## Conclusion

The integration of Artificial Intelligence (AI) into business development strategies offers substantial benefits, particularly in the area of advanced data analytics. AI empowers organizations to process and analyze vast volumes of data, detect patterns, identify emerging trends, and extract actionable insights to support informed decision-making. One of the most

valuable contributions of AI lies in its ability to enable hyper-personalization. By leveraging customer data and sophisticated algorithms, businesses can tailor products, services, and communication to match individual customer preferences and behaviors, thereby enhancing customer satisfaction, engagement, and long-term loyalty.

In the context of Islamic banking, the adoption of AI-driven chatbots represents a critical advancement in customer service delivery. Chatbots effectively reduce the operational workload by automating responses to frequently asked questions, which significantly enhances service efficiency. Furthermore, these virtual assistants are available 24/7, offering immediate support to customers and eliminating long wait times, thus contributing to a superior customer experience.

Beyond operational efficiency, chatbots serve as a valuable tool for understanding customer behavior. By analyzing the pattern behavior of customers' chat, they can provide meaningful insights into customer preferences, expectations, and engagement with Sharia-compliant banking products. This information can be strategically utilized to refine service offerings, improve customer interaction, and support product development aligned with the principles and demands of Islamic finance.

However, the implementation of chatbots in Islamic banking also requires careful consideration of Islamic ethics. The development of AI must integrate *Maqasid Al-Sharia* values such as justice, transparency, and data protection to ensure alignment between technological efficiency and Shariah principles. Therefore, ethical and Shariah-compliant AI design should involve Islamic scholars from the early stages of technological development. Overall, the implementation of AI and chatbot technologies in Islamic banking institutions not only facilitates digital transformation but also reinforces competitive advantage through improved service quality, customer-centric innovation, and data-driven strategic planning.

### **Author Contribution**

Eka Sri Wahyuni: reviewing the draft, literature review, result, and discussion; writing paper; translation.

Ayu Yuningsih: creating and designing analyses; writing paper; review of the draft, literature review; result and discussion.

Yosy Arisandy: review of the draft, literature review; result and discussion.

### **Declaration of Competing Interest**

All these authors have no competing interests.

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