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### Chatbot AI: A Pioneer of Change in the Indonesian Digital Banking Industry

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#### INFO ARTIKEL

#### Abstract

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*The development of AI (Artificial Intelligence) technology is currently growing rapidly and is widely applied in various fields, including digital banking. Facing the digital era, the banking industry is increasingly striving to provide more efficient and responsive services to its customers. Chatbot is a solution that is considered capable of achieving these goals. This research was conducted with the aim of describing the use of AI chatbots in digital banking services. This research uses descriptive analysis with a quantitative approach. Data was collected using documentation study techniques. The results of this study show that 12 of local banks in Indonesia have used AI Chatbot in improving their service quality. AI chatbots work more effectively and can respond to customers around the clock in a simple and independent way. In addition, implementing AI chatbots in the context of digital transformation is the right strategy to compete in this industry.*

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#### Introduction

Facing the challenges of new competition, changes in technology and their strategic position, traditional Indonesian banks have entered the digital banking sector, which is currently transforming. This transformation allows them to find their place in the new ecosystem. The digital banking transformation process varies depending on the initial state of each organization, although several stages can be identified depending on the bank's level of maturity (Indriasari, et al., 2019).

In an increasingly complex business environment, various efforts are being made to provide services digitally. Many innovations are now emerging, such as artificial intelligence, the Internet of Things (IoT), big data and other technologies, with the aim of providing simpler and more accurate services in line with growing economic developments (Sulistyowati, et al., 2023). Banks are encouraged to

develop digital banking systems or switch to digital without physical offices. To support this transition, the banking industry must be able to do more than provide online and mobile banking services.

As technology develops rapidly, the benefits of AI in finance bring many changes. Especially in recent years, AI has pushed the growth of the digital economy in a more advanced direction. Currently, we are witnessing developments that are causing a transformation where machines can replace certain jobs. AI (Artificial Intelligence) is a term used to describe the simulation of intelligent behaviour and critical thinking skills that are equivalent to humans through the use of computers and technology (Sari, 2023). Artificial intelligence is one of the oldest and broadest branches of computer science, which seeks to imitate human cognitive functions to solve problems by learning and thinking like humans (Sari, 2023).

In his latest research (Richad *et al.*, 2019) explored the factors of chatbot technology adoption in the Indonesian banking sector, especially among the younger generation, using the Technology Acceptance Model (TAM). Research shows that factors such as innovativeness, perceived usefulness, perceived ease of use, and attitudes towards using chatbots have a significant influence on users' behavioural intentions. These findings provide valuable insight into the acceptance and adoption of chatbot technology in the banking sector, especially in the context of the millennial generation in Indonesia. The Technology Acceptance Model (TAM) is a model used to predict user acceptance of new technology products. The TAM model itself was introduced by Davis *et al.*, (1989) and is widely used to produce good validity in research.

In the financial sector, technological innovation is basically not a new event because of the long-standing relationship between technology and the financial sector. Therefore, financial technology or FinTech is not a new development in the financial services sector. Even so, the level of attention and research on the relationship between the two has increased rapidly in recent years, especially due to the rapid development of FinTech (Sari, 2023). A simpler definition of *fintech* is an industry that includes organizations that use advanced financial technology to support or enable financial services (Schueffel, 2016). Fintech companies pose a challenge to conventional financial services. They offer a more innovative and customer-focused business model. These innovative organizations are gradually gaining greater market share and profits compared to traditional financial services, thereby prompting these organizations to reassess their business models and adjust their strategies. To increase competitiveness in the market (Nicoletti, 2019).

As a provider of a variety of complex products and services, the financial industry is increasingly interested in adopting the use of chatbots for customer support and sales. Implementing automation through the use of chatbots makes it possible to answer customer questions 24/7. For example, implementing chatbots in businesses that have historically relied heavily on human resources, such as call centres, can significantly improve operational efficiency (Okuda & Shoda, 2018). There is no doubt that data-driven AI is rapidly being embedded in various aspects of society, from voice and facial recognition systems to automated translation services, chatbots and virtual customer service assistants (World Bank, 2022). Typically, chatbots become active when a user asks a question or starts a new conversation. These software programs use Artificial Intelligence to understand user input and provide meaningful responses based on a predefined knowledge base (Kulkarni *et al.*, 2017).

Jang, et al. (2021) Also stated that to be a good part of customer service, it is generally important for chatbots to respond quickly and accurately in the most natural way possible. As AI technology applied to chatbots evolves to the point where responses to new questions are accurate and natural language processing (NLP) is possible, researchers have tried to develop more efficient and accurate algorithms for chatbot learning.

Sari (2023) believes that in terms of talent, Indonesia is still relatively rare in the field of AI because AI is a relatively new skill, practice and mindset. Therefore, efforts to develop AI talent need to continue, even though the numbers are limited. Educational institutions must proactively train talent in data and AI to meet today's needs.

Improvements and developments in the AI industry certainly have the potential to increase bank productivity at a more cost-effective rate. The shift towards digitalization is rapidly changing the traditional banking framework. However, this transition also makes banks more vulnerable to increasing cyber threats and vulnerabilities. Banks need to ensure that their employees are always well-informed about new technologies and processes related to the use of AI in various aspects of banking operations (Subudhi, 2019). Therefore, reflecting on the arguments above, it can be understood that the author is interested in studying "Chatbot AI: A Pioneer of Change in the Indonesian Digital Banking Industry".

## **Digital Banking**

Digitalization is changing the financial services industry. The main driver of this process is the huge development of IT and the convergence of these technologies, such as smartphones and tablets, with new electronic services. As the time to market for digital banking products continues to decrease, thousands of financial technology (FinTech) startups and non-banks are actively participating in this opportunity. They do this by creating new products, services and business models across the banking sector, including payments, investments and financing across the value chain. These innovations include everything from customer-facing initiatives to back-office operations driven by rapid customer adoption of these new services (Gasser *et al.*, 2018).

Following global trends, the Indonesian banking industry is responding to changes in customer behaviour gradually to offer sophisticated digital banking products and services (Indriasari, et al., 2019). The banking industry plays a central role in every economy, both developed economies and those still in the development stage. This sector designs and implements economic reforms, and any changes made in this sector through the use of technology will have a significant impact on economic growth. Today, financial institutions provide differentiated services to meet the diverse needs of corporate and individual customers. These two groups of customers do not have to wait long to get calls regarding banking services (Revathi, 2019).

Investing in digital banking offers exciting opportunities and necessary strategic development as traditional banks are no longer able to meet customer needs effectively in the digital era (Lipton, et al., 2016). Additionally, a recent study conducted by the Kuwait Banking Research Institute found that nearly 20% of customers are willing to switch financial institutions if their current bank does not offer online banking services. This highlights the fact that traditional banks must recognize the importance of online banking, especially as computer literacy and

awareness of the Internet increase globally. This, coupled with the benefits of lower operational costs, wider global market access for banks and increased convenience for customers, will transform digital banking from a mere novelty to a necessity if these banks are to compete effectively in the global marketplace.

Artificial intelligence is currently expanding its presence in the market. This is applied in various fields, including the banking sector. In the banking sector, AI is being used in very innovative ways, helping to save a lot of time and money. Banks use algorithms to produce accurate results, thereby helping improve customer service and increase business efficiency to generate profits. AI includes machine learning and deep learning, helping to minimize errors caused by emotional and psychological factors. One of the most important tasks that AI performs is extracting important information from various data sets and drawing conclusions (Kaur *et al.*, 2020).

### **Artificial Intelligence (AI)**

Artificial intelligence (AI) or artificial intelligence is a branch of computer science that studies how to provide human-like abilities or intelligence to computers. Generally, artificial intelligence is incorporated into computers so that they can help them function like humans (Paliwahet, et al., 2017). Artificial intelligence (AI) can do things that humans do, such as analyzing reasoning to reach conclusions or decisions or translating from one language to another. Artificial intelligence can learn from experience and collect data to communicate and pronounce every word.

Many people believe that machine learning is based on the principle that machines can learn in certain ways. Historically, the main principles of machine learning and artificial intelligence show that both have been around for more than half a century now (Lin and Chou, 2022). Artificial intelligence (robots) are now able to imitate human intelligence, participating in a variety of different activities that require thinking, learning, problem-solving, and making various decisions (Shabbir and Anwer, 2018).

Humans are physically different from AI machines because humans often exhibit similar physical characteristics while machines have different shapes and forms. Analysis of transhuman vision shows that we believe that the brain is essentially a computer. Report AI is a silicon-based, algorithm-driven engine that powers the entire Internet of business (Shabbir and Anwer, 2018).

### **Chatbots**

As a provider of a variety of complex products and services, the financial industry is increasingly turning to chatbots for customer support and sales. The word "bot" in "chatbot" comes from the word "robot"; the meaning of chatbot is a program that automatically communicates with humans, not with humans or with the entire system where the program is located (Okuda and Shoda, 2018).

To understand natural human language, chatbots use NLP or natural language processing methods to learn and process every word spoken by humans as text messages. Chatbots are programmed to operate independently and can answer questions built on a combination of pre-defined scripts using natural language and responding like real humans (Hikmah, et al., 2023).

Chatbot development will provide intelligent solutions to resolve these questions, provide information when needed, improve service and increase the number of customers. It eliminates the human factor in the organization and can be operated 24 hours a day to increase productivity. Customers can access chatbots via the web and on any mobile device. Customers can state their questions in natural language, and chatbots can reply with correct answers. The proposed chatbot application is easily accessible to customers, thereby resolving redundant queries anywhere and anytime. Since it will respond quickly to requests, it will save both banks and customers time. The proposed system will be a stepping stone towards the implementation of intelligent request processing programs, which in the later stages will not only converge but also self-learn to improve them, thereby not only improving the quality of customer service but also reducing the burden on customers. Increased productivity and, of course, an increase in the number of satisfied customers (Kulkarni *et al.*, 2017). Chatbots can manage interactions with customers, improve the way they interact with customers, and provide more interesting experiences for customers (Shweta, 2022).

## RESEARCH METHODS

The research method used in this article aims to investigate and analyze the use of chatbots in the banking sector in Indonesia. The type of research applied is analytical descriptive research with a quantitative approach. The research design adopted is descriptive, which allows researchers to describe the observed phenomena. The research population includes all 47 banks listed on the Indonesia Stock Exchange (BEI). In this context, samples were taken from 25 local Indonesian banks, which were selected based on certain criteria such as the type of service provided. Data collection was carried out through analysis of financial reports from 2018 to 2023. Financial reports are considered a data source that is rich in information related to the implementation and development of chatbots in banking services. Thus, this research method is designed to provide an in-depth understanding of the application of chatbots in the Indonesian banking sector through a careful and detailed approach.

## RESULT

In order to describe the evolution of innovative banking services, this research takes an approach that involves an in-depth analysis of Indonesian banking annual reports. Through a careful review, a remarkable development in the adoption of chatbot technology by the banking sector can be depicted. An interesting journey reveals the steps taken by these institutions over time, exposing the transformation from the conceptual stage to the practical implementation of Chatbots-based services.

The image below shows that 12 banks have adopted Chatbots in Indonesia. Of the 47 banks listed on the Indonesian Stock Exchange for the period 2018 to 2023, the population used is only local private banks, both conventional and syariah, as well as Indonesian digital banks. This is because it is to see how far the development of Indonesian banks has carried out transformation, especially in digital services. In 2018, Indonesian banks have widely used chatbots because they are considered more efficient, and customers can experience interesting experiences.



Picture 1. Banks with Chatbot in Indonesia

Source: Research Result

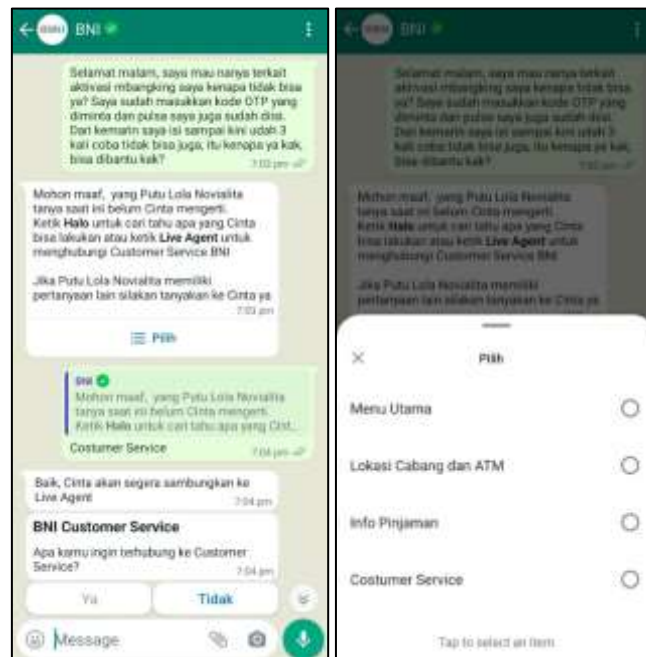
In the Bank Service Excellence Monitor (BSEM) 2020, MRI also evaluated chatbot services as one of the touchpoints where customers can interact with their bank. A *superior chatbot* is a user-friendly chatbot that can understand customer conversations well and is able to provide appropriate solutions and information to customer requests and problems. Not only that, this measurement also looks at how bots can interact like humans in detecting and showing emotions or empathy. The best chatbot category in the 2020 BSEM evaluation was won by Mita (Mandiri Intelligent Assistant) from Bank Mandiri (81.58%), followed by Vira (Virtual Assistant Chat Banking) from BCA (81.25%) and Aisyah (Mandiri Syariah Interactive Assistant) from Bank Syariah Mandiri (80.89%).



Picture 2. Sabrina Chatbot Workflow

Source: Prosiding Use Cases AI Indonesia (2023)

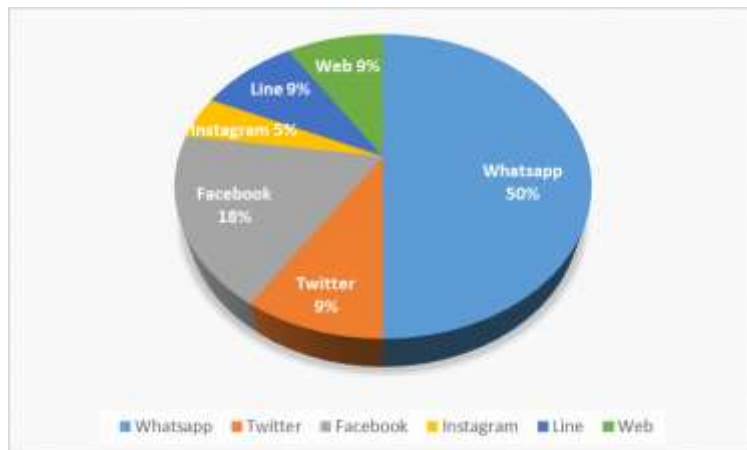
Sabrina is one of the chatbots released by BRI bank to serve customers via text messages containing information related to products, services about BRI or other complaints that will help customers overcome their problems. Sabrina was developed using a branch of Artificial Intelligence that can communicate naturally, like a conversation with humans. The advantage of Sabrina is not only that it can work 24 hours, but this platform is able to answer customer questions at the same time and consistently according to the customer's character. In addition, Sabrina can provide services equivalent to 25 human operators (Ghifary, et al 2023).



Picture 3. Chatbots Conversation Display  
Sumber: Research Result

If questions from customers cannot be answered completely by the chatbot, the system will automatically direct the conversation to a Live Agent. The role of Live Agents here is very important because they can provide more complex and personalized responses to customers. Live Agents are responsible for answering more complex Customer questions, providing additional information, and handling situations that require human expertise.

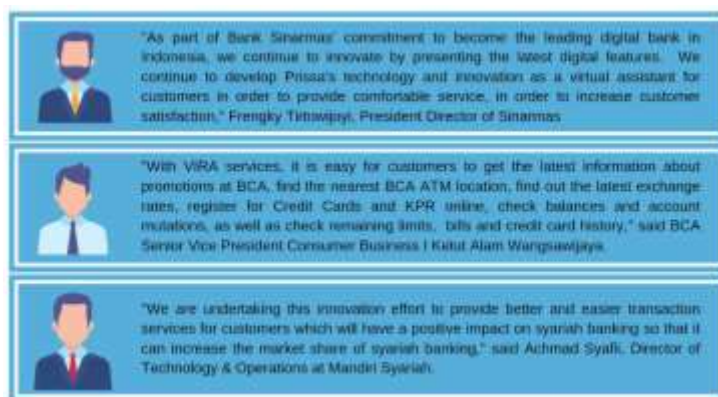
With integration between chatbot and Live Agent, this workflow allows for more efficient and responsive service to customer needs. Customers can initiate interactions with the chatbot for general questions or basic points, and if needed, they can be seamlessly directed to a Live Agent for further assistance. This creates an integrated customer experience and improves overall service quality.



Picture 4. Chatbot Digital Platform  
Source: Research Result

In the figure above, there is information illustrating the adoption of chatbots by 12 banks in Indonesia through various digital media. The results show that these banks use a number of platforms, including WhatsApp, Twitter, Instagram, Facebook, Line, and websites to provide access to customers using chatbots. An in-depth analysis of the data shows a different distribution of platform usage by the banks.

From the research results, it can be concluded that 11 banks use WhatsApp, 2 banks use Twitter, 1 bank uses Instagram, 4 banks use Facebook, 2 banks use Line, and 2 banks use websites as chatbot access media. If this data is represented in pie chart form, it can be seen that WhatsApp dominates with a percentage of 50%, followed by Facebook (18%), Twitter (9%), Line (9%), website (9%), and Instagram (5%). The pie chart reflects the proportional distribution of the use of digital media platforms in adopting chatbots by these banks. Thus, it can be concluded that WhatsApp is the main platform used by most banks, while other platforms have varying contributions in implementing chatbots in their banking services.



Picture 5. Expressions About Chatbots  
Source: Research Result



Bank Sinarmas, as a financial institution committed to becoming a bank with an integrated distribution network and excellent service, continues to innovate by introducing the latest digital features. Franky Tirtowijoyo, President Director of Bank Sinarmas, stated that they continue to develop technology and innovation for Prissa as a virtual assistant for customers. This initiative aims to provide convenient services and increase customer satisfaction.

According to Ketutas a senior Vice President Consumer Business, a representative of BCA Bank, the VIRA service helps customers get the latest information about BCA promotions, find the nearest BCA ATM location, find out the latest exchange rates, register for Credit Cards and KPR online, as well as check balances and account mutations. Additional features include the ability to check remaining limits, charges, and credit card history. Ketut emphasized that this innovation aims to provide better and easier transaction services for customers, with a positive impact that is expected to increase the market share of Sharia banking. Thus, innovation efforts in digital banking services are not only directed at operational efficiency but also at improving service quality to meet customer needs and expectations holistically.

Syafii as Director of Technology & Operation at Mandiri Syariah explained that the innovation efforts that have been implemented aim to provide better and easier transaction services for customers, with the hope of increasing change for syariah banking. Furthermore, Syafii emphasized that the positive impact expected from this initiative is not only limited to the customer service aspect but also has the potential to increase the overall syariah banking market share. By creating a better transaction experience for customers, Islamic banking seeks to position itself as the first choice in financial services. Success in increasing market share is an indicator of the success of this innovation strategy, which can then make a positive contribution to the development of syariah banking as a whole.

## **DISCUSSION**

In this research, researchers focused on the implementation of AI chatbots in the Indonesian banking industry by taking a population of 25 local banks, including conventional, private and digital banks. From an analysis of 47 banks listed on the Indonesia Stock Exchange, researchers found that 12 of them had adopted chatbots. The research results show that AI chatbots have the potential to bring change in Indonesia's digital banking transformation.

Chatbots are able to provide fast service and are available 24 hours, creating new experiences for customers. Banks that have adopted chatbots report positive impacts, including improved service quality through virtual assistants in the form of chatbots and cost efficiencies that can be saved. This is in accordance with previous literature, which has researched that the use of chatbot applications brings benefits to banks and customers. Firstly, the application allows customers to easily connect with bank services, regardless of time or location, via their mobile devices, thereby ensuring fast and relevant responses to their inquiry inquiries. Second, integrating such applications allows banks to interact with customers in a

more personal and direct way, thereby helping to save on customer service staff costs (Alt, et al., 2021).

The implications for the theory of this research suggest that the Technology Acceptance Model (TAM) assess the level of technology adoption among individuals or organizations and its use, known as behavioural intention. This intention comes from two components: *perceived benefits* and *ease of use* (Richad et al., 2019). The perceived benefits of using Chatbots are reviewed from previous research (Petersson, et al., 2023) where customers gain access to customer service without talking to a human agent. Apart from that, Chatbots can respond quickly without waiting for a long time. Meanwhile, the perception of ease of use is characterized by the application of the technology used part. Most participants stated that the chatbot was user-friendly and easy to access in the available applications, thus contributing to an overall positive experience (Petersson, et al., 2023). This is consistent with previous research exploring the influence of ease of use on customer experiences with chatbots (Trivedi, 2019). However, it is important to note that all participants are digital natives. The ease of use of chatbots can pose challenges for those unfamiliar with the technology (Petersson, et al., 2023).

According to Kurode (2018) artificial intelligence Chatbots operate using complex software, and it is important to update this software regularly to adapt to environmental changes. It is important to note that AI Chatbots are not capable of making subjective decisions; rather, their function is to facilitate learning and improvement. Control of the AI is in the hands of the individuals overseeing the system, giving them significant capabilities. However, this dynamic also carries risks because it can lead to a shift in control from humans, which can lead to inhumane consequences in various aspects.

## CONCLUSION

The conclusions of this research illustrate that the adoption of AI chatbots in the banking sector has a positive impact on customer experience, operational efficiency and service quality. These findings make a significant contribution to our understanding of how chatbot technology plays a key role in driving innovation in the banking sector.

Theoretically, this research opens the door to a deeper understanding of technology acceptance in the banking sector, while practically, its implications can improve operational efficiency and customer satisfaction. The limitations of this research lie in its focus on local banks, and suggestions for future research include expanding the scope to international banks and further research regarding the integration of chatbot technology with data security aspects.

Thus, the results of this research not only provide valuable insights regarding the adoption of chatbots in the Indonesian banking industry but also point out directions for further research and practical application in the future. This conclusion can make a positive contribution to academic literature and provide guidance for practitioners in the banking industry, which is currently transforming.

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