Juridical Review Of Indonesian Banking Consumer Services (Commercial Banks And BPR) In The Digitalization Era

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Abstract. The global banking sector is undergoing a significant transformation driven by disruptive technologies, particularly artificial intelligence. Banks worldwide, are embracing these technologies to reshape their future. By integrating AI, the banking sector can better understand human behaviour, improve automated processes, and reduce operational costs, enhancing customer retention, satisfaction, and overall performance. This adoption of AI is crucial for the sector's development and sustainability. The research is classified as normative juridical research, utilizing written materials as data sources. Qualitative research methods are employed to describe and analyze various phenomena and perspectives. The research relies on secondary data from library research, including official documents, research reports, and primary legal materials with authoritative significance. The legal framework governing the banking sector encompasses regulations issued by both Bank Indonesia (BI) and the Financial Services Authority (OJK), with the latest addition being the Financial Services Strengthening Law, specifically Law No. 4 of 2023, which includes provisions related to banks. The examination of consumer services banks provide is associated with compliance with the Consumer Protection Law, specifically Law No. 8 of 1999. Moreover, with the establishment of the Otoritas Jasa Keuangan (OJK), a comprehensive regulatory framework for digital banking in Indonesia, exemplified by Regulation Number 12/POJK.03/2018 has been made. This regulation highlights the increasing role of Information Technology in enhancing customer services, marking the banking sector's transition into the digital banking era. This transformation encompasses various customer interactions, from opening savings accounts to conducting financial transactions, driven by Information Technology's pervasive utilization.

Keywords: Banking, Technology, Law

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1 Introduction

From time to time, the conditions in the banking world of Indonesia have undergone significant changes. These changes are not only driven by internal developments within the banking sector. Still, they are also closely tied to external influences from various sectors, including the real economy, politics, law, and society. The ever-increasing digital era has resulted in profound changes in the lifestyles of Indonesians, particularly within the financial industry, such as banking. These changes necessitate swift responses to ensure financial institutions are well-prepared to embrace digital innovations in banking.

Currently, the banking sector is in the process of transforming towards a digitalized era. This transformation directly responds to the growing impact of financial technology (Fintech) development and the digital technology revolution, often called the 4th industrial revolution or digital industry. These developments are steering banks into a new era, characterized as the era of digital banking services. Such services are expected to expand and streamline financial inclusion, enabling the public to access financial services without being constrained by time or place.[1]

Due to advancements in information technology, the utilization of digital systems within the banking sector is steadily evolving into what we now recognize as digital banking. The Otoritas Jasa Keuangan (OJK) established the regulatory framework for digital banking through various regulations, including Regulation Number 12/POJK.03/2018, which pertains to the Implementation of Digital Banking Services by Commercial Banks. The explanatory notes provided within this regulation highlight that the increasing integration of Information Technology in enhancing customer services guides banks into a new era—commonly referred to as the digital banking era. This transformation spans the entirety of the customer's relationship with the bank, encompassing activities from the initial setup of a savings account to the execution of financial transactions and eventual account closure, all facilitated through the utilization of Information Technology.[2]

Several factors contribute to the rapid development of digital banking in Indonesia. Firstly, ongoing digital innovations continue to emerge, gaining significant traction. Secondly, there is a growing awareness among almost all Indonesian citizens about the convenience and advantages of the digital realm. Additionally, the widespread availability of Internet networks across various regions in Indonesia has transformed the Internet from a once costly and exclusive luxury into an essential daily necessity for the general population.[3]

The prevalence of smartphones has also played a pivotal role in the surge of digital banking in Indonesia. Smartphones, available in various price points, now offer internet connectivity as a

standard feature, making them indispensable technological devices for nearly everyone. Furthermore, the expansion of digital banking in Indonesia is driven by the surging trend of online shopping. Today, one can conveniently meet various daily needs through numerous e-commerce platforms, eliminating the need to physically leave one's home for shopping. This shift in consumer behaviour has propelled digital banking to become the preferred mode of payment for online shopping transactions. Notably, digital financial transactions have experienced significant growth during the first quarter of 2022. According to a report from Bank Indonesia (BI), the value of electronic money transactions saw a substantial year-on-year growth of 42.06% during this period. BI also forecasts an 18.03% year-on-year growth, amounting to IDR 360 trillion, in the total transaction value throughout 2022. [3]

In the Law of The Republic of Indonesia Number 10 of 1998 Concerning Amendments to Law Number 7 Of 1992 Concerning Banking, a customer is an individual or business entity that holds a savings or loan account with a bank. Customers are divided into two types, namely Saving Customers and Debtor Customers. Saving Customers deposit their funds in the bank in savings based on an agreement between them and the customer. Meanwhile, Debtor Customers obtain credit or financing facilities based on an agreement between the bank and the respective customer.

Customers are crucial to banks for several fundamental reasons. Firstly, customers serve as banks' primary source of revenue through various financial transactions, such as deposits, loans, and other banking services. The funds deposited by customers give the bank the capital necessary to lend and invest, contributing to its overall financial stability and growth. Additionally, loyal and satisfied customers are more likely to engage in long-term relationships with the bank, fostering a sense of trust and reliability. This trust is essential for the bank's reputation and helps attract new customers through positive word-of-mouth. Moreover, a strong customer base is a key factor in a bank's ability to compete in the financial market, as it reflects the institution's ability to meet the diverse needs of its clientele and adapt to changing market dynamics. Overall, customers are the lifeblood of a bank, playing a pivotal role in its economic viability, reputation, and sustained success.

The primary imperative for the banking sector to thrive in the global market lies in its unwavering commitment to delivering high-quality services to consumers. Technology-driven systems have ushered in novel avenues for banks to engage with their clientele. The ubiquity of the internet has not only facilitated electronic marketing and service delivery. Still, it has also empowered internet banking customers to perform traditional banking transactions with remarkable ease, including accessing savings accounts at their convenience, monitoring account balances, receiving electronic statements, making online bill payments, engaging in e-commerce, conducting fund transfers, and more – all within a few clicks and mere minutes.[4]

Several technologies within banking services, such as Automated Teller Machines (ATMs), online banking, mobile banking, self-check-in kiosks at airports, online shopping, and online bill payments, have garnered widespread popularity among consumers. Beyond these, banks must steadfastly remain attuned to the rapid technological evolution by incessantly enhancing the quality of their electronic services. This strategic dedication fosters trust and engenders service satisfaction among banking consumers. Consequently, consumers are more inclined to consistently utilize mobile banking services, contingent upon the presence of a dependable and gratifying service system.[4]

Nonetheless, the advent of the digital era and the relentless pace of innovation compel business actors to continuously adapt by developing solutions tailored to consumer demands. In light of this pivotal juncture, the financial sector must remain vigilant and proactive in its pursuit of innovation. The primary emphasis should be on enhancing consumer satisfaction, ensuring that the established market segmentation, cultivated over several years, can be sustained due to consumers' contentment with the services offered by the banking sector. Hence, this article will delve deeper into the ramifications of digital banking policies on consumer services within the banking sector, using the policies implemented by commercial banks and Bank Perkreditan Rakyat (BPR) as case studies.

Before the establishment of the Financial Services Authority (OJK), Indonesian banks were under the authority of Bank Indonesia (BI). However, since the formation of OJK in 2011, the banking sector has come under the authority of OJK in accordance with the mandate of Law Number 21 of 2011 concerning the Financial Services Authority. OJK was established with the aim of ensuring that all activities in the financial services sector are conducted in an orderly, fair, transparent, and accountable manner; capable of realizing a sustainable and stable financial system; and able to protect the interests of consumers and the public. As a result, the supervision, licensing, examination, and regulation of banks are now carried out by OJK, including digitalization activities falling under the OJK Work Unit.

Currently, online banking consumer services are leveraging recently developed artificial intelligence (AI) capabilities, a portion of which is possessed by technologically advanced banks. Therefore, this research aims to discuss a Juridical review in accordance with the law on Banking Principles and consumer services in accordance with the Consumer Protection Law. This research aims to serve as a valuable reference for banking institutions as they enhance their electronic service offerings, emphasizing the importance of service quality and trust to foster customer satisfaction and loyalty. Additionally, this study can also serve as an evaluative tool for customers, enabling them to assess the electronic services provided by banks and make informed choices that align with their satisfaction and preferences. Furthermore, it is anticipated that this research will

provide a valuable resource for students and academics, aiding in the advancement of legal science.

2 Method

This research is classified as normative juridical research.[5] Consequently, the data sources utilized in this study are derived from written materials pertinent to the research problem. Qualitative research is employed to describe and analyse various phenomena, events, individual and group perspectives, gathered from data, documents, and notes. In this research, the collected data is first compiled, elucidated, and subsequently analysed.

To maintain alignment with the research's objectives and the subject of study, the author adopts a library research method and approach. The data source for this research consists of secondary data, which refers to data collected indirectly through intermediary sources, including materials obtained from library research,[6] such as official documents, research reports, and other documents relevant to the research subject.

Meanwhile, the legal materials employed are considered primary legal materials, characterized by their authoritative nature.[7] These materials possess absolute and binding authority in the form of laws with significant influence on the regulation of social life.

3 Result And Discussion

3.1 Legal Regulation of Digital Banking in Indonesia

The importance role of Information particularly in light of the growing prevalence of mobile devices and computers as primary mediums for conducting financial transactions. This significance is further underpinned by the increasing utilization of internet networks in Indonesia, accompanied by the ongoing expansion of internet infrastructure development. Information Technology is fundamentally integral to the provision of financial services by banks. The heightened incorporation of Information Technology to enhance personalized customer services propels banks into a new era, aptly labeled the 'digital banking era.' Within this era, personalized services for customers span the entire duration of their business relationship with the bank, from its initiation to its conclusion. The processes of opening a savings account, conducting financial transactions, and closing a savings account are seamlessly facilitated through the adept utilization of Information Technology.

Regulation Number 12/POJK.03/2018 by the Financial Services Authority (Otoritas Jasa Keuangan) addresses the Implementation of Digital Banking Services by Commercial Banks. This regulation encompasses a set of provisions pertaining to digital banking services. It is noteworthy

that the absence of such regulations in Law Number 7 of 1992 and Law Number 10 of 1998, both of which concern banking, underscores the significance of Regulation Number 12/POJK.03/2018 in governing this aspect.

Financial Services Authority Regulation Number 12/POJK.03/2018, as stated in Article 2, authorizes banks to offer Electronic Banking Services or Digital Banking Services. Banks providing these services are obligated to implement risk management, adhere to the principle of prudence, and comply with the provisions outlined in this regulation. The accompanying explanation clarifies that the provision of Electronic Banking Services or Digital Banking Services is a proactive measure by banks to contribute to the broader goal of enhancing public financial access. This enhancement encompasses several aspects, including facilitating independent savings account openings at banks and streamlining financial services to simplify the management of customers' finances.[8]

Article 2, paragraph (2) of Financial Services Authority Regulation Number 12/POJK.03/2018 provides an explanation concerning the implementation of risk management, specifically referring to the stipulations set forth by the Financial Services Authority for banks. This regulation distinguishes between Electronic Banking Services and Digital Banking Services. The focus of this discussion revolves around Digital Banking Services, as elucidated in Article 10, paragraph 1 of Financial Services Authority Regulation Number 12/POJK.03/2018. According to this article:

1. “Digital Banking Services, as defined in Article 8, paragraph 1, encompass:

    a. Account administration
    b. Transaction authorization
    c. Financial management
    d. Other financial product services, contingent upon approval from the Financial Services Authority.

2. For Banks offering Digital Banking Services in the form of transaction authorization, as referred to in paragraph (1), subclause (b), it is mandatory to utilize data or information whose accuracy can be substantiated.”

Article 10, paragraph (1), subclause (a) of the regulation also specifies that account administration comprises activities such as opening an account, updating customer data, and closing an account, all conducted through electronic media. In paragraph (2), it is stated that the term 'data and/or information whose veracity can be verified' encompasses various forms, including biometric data such as fingerprints, voice recognition, and iris scanning, as well as other electronic tools like QR codes and NFC.

The provisions of Article 10 is pertain to the Bank's Digital Banking Services, which encompass activities within account administration, including but not limited to savings and credit accounts. From a legal perspective, customer deposits held by the Bank are classified as Fund Deposits. These Fund Deposits are defined as monies entrusted by the public to the bank under a fund deposit agreement, taking the form of demand deposits, time deposits, certificates of deposit, savings, or equivalent financial instruments.

In addition, with the implementation of the Personal Data Protection Law (Undang-Undang Perlindungan Data Pribadi / UU PDP) passed on September 20, 2022, the banking sector, engaged in data collection processes as part of its business operations, naturally falls under the category of personal data controllers, subject to the provisions outlined in this legislation.

In Article 16, paragraph 2 of the law, eight core principles of Personal Data Protection are outlined, encompassing collection limitation, data minimization, data quality, security safeguard, accuracy, openness, purpose specification, and accountability. Consequently, the banking sector, which engages in the collection of consumers' personal data, is obligated to adhere to these principles by securing, collecting, and obtaining consent for the use of personal data from data users. These processes must align with the provisions specified in the Personal Data Protection (PDP) Law. As Personal Data Controllers, banks are further responsible for maintaining the confidentiality of user data and promptly informing data users of any breaches, violations, or other issues concerning the handling of their personal data. Therefore, the banking sector is one of the entities obligated to comply with these regulations.

3.2 Example of A Digital Financial Transaction Model Based on Financial Services Authority Regulations

Based on Financial Services Authority Regulation Number 12/POJK.03/2018, this chapter would discuss several digital service models that the banking sector can provide to consumers. Financial Services Authority Regulation Number 12/POJK.03/2018 offers illustrative examples of account administration, transaction authorization, and financial management within the banking sector:

Account Administration:

1. A customer initiates the opening of a savings account through the Bank's mobile application on their smartphone. The customer completes the required data entry to fulfil identity requirements, leveraging tools such as fingerprint scanners, identity card scanners, and cameras. Banks may verify customer data by utilizing information from third-party collaborators.

2. The Bank's mobile application on the customer's smartphone is equipped with data updating features that can be verified in real-time by the Bank. Changes to customer data are authorized through biometric information, passwords, and/or electronic means, such as Quick Response Codes (QR Codes).

3. Banks offer online account closure options via ATMs equipped with fingerprint and identity card scanners. Account closure requests are thoroughly verified.

Transaction Authorization: Transaction authorization encompasses both financial and non-financial transactions. As an example, a mobile banking application, developed with advanced technology capable of analysing customer voice data, is provided by banks. Customers with smartphones featuring voice scanners can access the mobile banking application using specific voice commands. Moreover, customers with smartphones equipped with QR codes and/or Near Field Communication (NFC) capabilities can make payments at collaborating merchant locations by scanning QR codes or using NFC on their smartphones. This enables automatic deduction of the transaction amount.

Financial Management: Banks extend financial management services to assist customers in analysing and planning fund utilization. These services empower customers to make more informed decisions about their fund management."

For individual customers:

1. Based on customer data, banks can offer personal financial management facilities, such as planning term savings for children's education needs. The bank's application analyzes customers' financial capabilities and suggests suitable financial products. Interested customers can apply for the desired product through the bank's application, following an authorization process tailored to their needs. Banks also furnish periodic reports and notifications regarding the benefits of the proposed products.

2. By analysing personal customer data, banks can offer insights into customer fund usage patterns. If customers seek to carry out transactions beyond their financial capacity, the bank can provide specific advice, ensuring prudent financial decision-making.

For business entities: The bank provides financial management facilities accessible through electronic media, including Internet banking channels, to support business processes. Leveraging customer data and information, banks deliver crucial insights related to the financial position of customers' business entities. This includes information such as payment status of customer orders, customer account balances, credit status, and collateral utilization.

3.3 Digital Products That Have Been Provided by Commercial Banks and Bank Perkreditan Rakyat (BPR)

Artificial Intelligence (AI) finds widespread utility in numerous FinTech applications, offering solutions to a range of challenges encountered by businesses. These encompass the personalization of customer experiences, the establishment of brand identity and loyalty, and the prevention of fraudulent activities, among others. The banking sector, renowned for its adaptability and propensity to invest substantially in emerging technologies, is currently undergoing a transformative shift. As a result, digital technologies, AI, and other novel innovations have become integral components in shaping the modern banking infrastructure.[9]

The inception of AI within the banking industry dates back to the 1950s when computers were first introduced to streamline and enhance the operational efficiency of banks. The primary rationale behind their integration was to enable accountants to perform calculations at a significantly faster pace and with greater precision than human capabilities allowed. With the rapid advancements in information technology, AI has become a ubiquitous presence across all facets of a bank's operations. It permeates various departments, including corporate affairs, human resources, marketing, and more, making its impact felt in every corner of the banking ecosystem.[9]

During this period of technological progress, Indonesian banking institutions are actively embracing financial technology (FinTech) solutions. Their involvement manifests in diverse ways, encompassing investments in FinTech startups using a portion of the banks' capital, cooperative initiatives wherein banks harness the platforms provided by FinTech firms, and the establishment of joint ventures with these firms. Furthermore, banks are demonstrating a proclivity for developing their proprietary FinTech products, such as contactless payment systems and Robo advisors. Concurrently, banks may contemplate the acquisition of FinTech enterprises to access their technological advancements. This strategic orientation may entail the creation of a dedicated FinTech subsidiary within the bank or forging strategic alliances with prominent Internet-based enterprises. These collaborations enable the utilization of their sophisticated, state-of-the-art technologies and internet application scenarios to drive the transformation of banking operations.[10]

Several prominent banks in Indonesia have integrated Chatbox technology into their operations, primarily utilizing it as a digital customer service tool. Chatbots serve as versatile tools with applications encompassing language acquisition, information retrieval systems, the visualization of corpus content, and domain-specific question-answering mechanisms. Furthermore, these chatbots can be configured for multilingual proficiency through appropriate training.[10] Notable examples in Indonesia include BRI with 'Sabrina', BCA with 'Vira' and BNI with 'Love'.

The utilization of this chatbot offers consumers a more efficient means of acquiring necessary information, obviating the need to navigate a lengthy FAQ page on a web browser or to physically visit a bank and engage with customer service representatives for inquiries. Consequently, the system selectively presents only the information relevant to the user's specific needs. Previous research has demonstrated the chatbot's efficacy, achieving an 84% response rate to user queries. The remaining 16% of response mismatches stem from a constrained vocabulary in handling colloquial language and the amalgamation of patterns with varying sentence structures, thereby generating similarity patterns for certain queries, along with expected limitations in responses. The system consistently provides responses to user queries, typically within a time frame of less than 20 milliseconds, with the actual response being visible within 1-3 seconds, contingent on the response length after incorporating the appropriate waiting time.[10]

Additionally, the banking sector has embraced AI technology through the use of Robo Advisors. A Robo Advisor is a digital platform engineered to autonomously manage a wide array of financial services and assist in the development of financial plans, thus reducing the reliance on human intervention. This system leverages sophisticated algorithm programming to deliver personalized solutions based on customer requirements, drawing upon input data from the investment platform and customer information.[11] In the realm of investments, a Robo Advisor serves as a technology capable of automatically constructing an optimal investment portfolio, factoring in variables such as age, risk tolerance, and life goals. This eliminates the necessity for investors to consult financial planners, as Robo Advisors can craft tailored investment portfolios through algorithm-driven processes.[12]

Robo Advisors represent a contemporary and popular software solution for providing financial services to clients. These digital platforms enable users to access personalized guidance by furnishing login credentials, such as name and password, and may involve additional layers of authentication, like instant phone calls or text messages containing unique codes. Users can input specific parameters to receive immediate financial advice without requiring human intervention.[12]

In the realm of finance, a Robo Advisors comprises a computer equipped with interactive financial software and a user-friendly graphical interface. Its purpose is to tailor investment portfolios in alignment with the user's financial needs and risk tolerance. This robo-investment software empowers individuals to consistently adjust and personalize their online investments, catering to both long-term financial objectives and short-term strategies. Notably, these systems base their recommendations on insights derived from a multitude of clients, thus ensuring a higher degree of impartiality compared to human advisors. Furthermore, top-tier Robo Advisors excel in continuously rebalancing portfolios. In contrast to human advisors, who may introduce subjectivity, errors, and time constraints, robo-advisors offer objectivity, precision, speed, efficiency, and round-the-clock accessibility.[12]

In a pioneering move, PT Bank KEB Hana Indonesia (Bank Hana) has integrated the Robo Advisor feature into its MyHana Mobile Banking application, offering customers access to an electronic Mutual Fund transaction feature known as Hana AIdvisor. Bank Hana is the first bank in Indonesia to introduce the Robo Advisor feature for Mutual Fund investments. This feature is designed to optimize returns while aligning with the customer's risk profile, reinforcing Bank Hana's commitment to delivering exceptional services and facilities. Additionally, other banks like UOB and Commonwealth Bank have also implemented Robo Advisor features.

Banks also striving to enhance their authentication processes by incorporating Artificial Intelligence (AI). For instance, in response to the growing demand for easy, rapid, and reliable services, PermataBank has introduced the Voice ID service, which represents a pioneering use of Voice Biometrics voice scanning technology in Indonesia. Voice Biometrics leverages voice patterns to establish unique individual identifications, considering over 50 distinct physical and behavioural sound factors.[13]

Behavioural attributes encompass the way individuals articulate words, their speech emphasis, speaking pace, and even their accent. These idiosyncrasies in speech contribute to the development of distinctive voice profiles. In contrast, physical characteristics involve the inherent vocal tract properties, nasal passages, and other anatomical features that influence the tonal quality of a person's voice. These physical traits play a pivotal role in creating comprehensive sound-based identifications.[13]

Bank Perkreditan Rakyat (BPR) are also partnering with ADVANCE.AI to expedite digitalization efforts in Indonesia. This collaboration combines ADVANCE.AI's proficiency in digital identity verification and Know Your Customer (KYC) onboarding processes with CBI's credit risk management solutions, promising a safer, more efficient, and inclusive banking ecosystem across Indonesia. According to 2021 World Bank data, approximately 42.7% of Indonesia's population resides in rural areas outside urban centers.

BPRs play a crucial role in driving Indonesia's economic growth, serving nearly half of the population. Presently, there are over 1,400 BPRs in Indonesia, boasting a total asset value of IDR 181.6 trillion as of March 2023, as reported by the OJK. However, BPRs face challenges in meeting customer demands and keeping pace with technological advancements. One such challenge is their reliance on manual, paper-based business processes, hindering their ability to gain a comprehensive customer profile and conduct effective credit assessments.

ADVANCE.AI, with its cutting-edge digital identity verification and risk assessment solutions, assumes a pivotal role in addressing the challenges confronted by BPRs in Indonesia. Leveraging artificial intelligence (AI) and machine learning algorithms, ADVANCE.AI streamlines the process of verifying customer identities, identifying fraudulent activities, and assessing risk levels. This AI technology enables customers in remote areas to open bank accounts within minutes

through remote KYC, simply by submitting a selfie and an identity document photo, such as an ID card. This eliminates the need to visit a physical bank and wait in line.

3.4 The Impact of Digital Technology on Consumer Services in the Banking Sector

In various domains, the banking industry has reaped advantages from the utilization of Artificial Intelligence, including the following areas:

a. Enhancing Sales and Marketing Processes: Banks and financial institutions can enhance their operations through improvements in sales and marketing processes. The application of Artificial Intelligence optimizes sales operations by enabling precise targeting of selected customer groups and personalizing messages. Customer segmentation based on individual requirements not only streamlines the purchasing process but also impacts the adoption of financial products
b. Enhancing Revenue Growth: Pricing optimization serves as a potent mechanism for bolstering revenue growth, yet its successful implementation can be challenging for many enterprises. The intricacies and limitations of traditional pricing optimization methods hinder their effectiveness in capturing the full spectrum of factors influencing pricing decisions. Artificial intelligence, when harnessed effectively, can prove to be a pivotal tool for augmenting business revenue across a diverse array of enterprises, irrespective of their size. Its capacity to identify and maximize sales opportunities makes AI applications particularly well-suited for addressing pricing optimization challenges, thanks to their adeptness in managing complex variables and their capacity to adapt to diverse scenarios. Additionally, these technologies contribute to revenue growth by expediting sales cycles and enhancing logistical performance, among other benefits.
c. Cost Reduction: The primary objective of Artificial Intelligence (AI) is to offer viable solutions through the analysis of vast amounts of unstructured data, resulting in cost reduction for businesses. This cost reduction is achievable due to the potential for human errors when analyzing data manually. AI enhances operational efficiency and can effectively mitigate errors. Additionally, AI enables banks to proactively identify target customers and gain actionable sales intelligence, allowing for more precise analysis of customer requirements related to loans, deposits, and other transactions. These strategies facilitate the banking sector in streamlining and planning processes efficiently. The application of AI promotes increased transparency while simultaneously lowering the costs associated with intricate business practices.
d. Risk Mitigation: Banking institutions that have extensively adopted Artificial Intelligence (AI) technologies can effectively anticipate and proactively manage risks, thereby gaining

a competitive advantage. The banking sector has emerged as a leader in the adoption of AI, with a particular focus on enhancing risk management functions. The significance of risk management has escalated following the global financial crisis, with banks, financial institutions, and regulatory bodies intensively exploring the detection, reporting, and management of risks. Furthermore, by substituting human-operated processes with AI-based technologies, banks can exercise greater control over auditing and regulatory compliance. This transition to intelligent, automated assistants not only enhances risk management but also enables human resources to engage in more value-added tasks, such as client relationship management and customer service.

e. **Enhancing Employee Productivity:** Artificial Intelligence contributes to the enhancement of the employee experience, productivity, morale, and motivation by effectively aligning individuals with suitable job roles. Contemporary Human Resource management involves the utilization of AI-based technologies to evaluate the personalities and skills of job applicants, thus ensuring a precise match with positions that best align with their capabilities. This process also aids employers in determining whether a chosen candidate aligns with the organizational culture, delivering benefits to both the enterprise and the employee. Furthermore, the implementation of digital personal assistants and chatbots, which are AI applications, has ushered in a transformative era for the customer service departments and business communications within the banking industry. These technologies not only assist individuals in their daily tasks but also provide them with personalized experiences, thereby alleviating the additional workload on employees.
f. Enhancing Process Efficiency: Regulatory agencies exert pressure on banks and other financial service providers to ensure compliance with a diverse array of regulations. In addition, banks and financial institutions must now contend with competition from fintech companies that offer innovative business models. To remain competitive with these fintech firms, the banking sector must focus on enhancing both customer experience and operational efficiency. Cutting-edge technologies, including Artificial Intelligence (AI) and Machine Learning (ML), play a pivotal role in augmenting operational efficiency by streamlining workflows, prioritizing end-to-end processes, optimizing technology integration, and enhancing data capture and reporting mechanisms. These improvements collectively lead to the enhancement of process efficiency. A notable example of the high-quality service offered by these technologies is the deployment of chatbots.
g. Enhanced Security and Data Protection: The banking sector manages a substantial volume of personal and confidential data, which must be meticulously safeguarded at all costs. Banks bear a profound responsibility to ensure the safety of their clients' financial assets and personal information, shielding them from potential data mishandling and

theft. The digital age has ushered in the era of cybercriminals who operate remotely, rendering them challenging to trace and penalize. Consequently, banks are compelled to fortify their security measures, and in this endeavor, Artificial Intelligence emerges as a valuable ally. AI-driven security systems exhibit an exceptional level of resilience against hacking attempts, often regarded as exceedingly difficult or nearly impossible to breach. These AI-enhanced security measures also contribute to fraud prevention, empowering bank systems to detect and flag suspicious transactions before they reach completion. The integration of biometric authentication methods, such as fingerprints, iris scans, and voice recognition, has gained prominence within the banking sector to bolster security. The inherent characteristics of biometrics render them nearly impervious to forgery, positioning them as a compelling substitute for conventional banking passwords and Personal Identification Numbers (PINs).

h. Data Management and Business Analytics: Artificial Intelligence technology operates on the fundamental premise of data collection and analysis. The effectiveness of AI systems hinges on the quality of the data sets they can access. A mobile banking application enhanced with AI technology has the capacity to gather and process relevant and valuable customer data, thereby refining the understanding of each customer's preferences and requirements, ultimately augmenting the overall customer experience. Once data has been collected, aggregated, and analyzed, the mobile application can be further personalized. For instance, by scrutinizing the customer's financial transactions, the application can readily discern their spending patterns. This wealth of data empowers the bank to craft tailored investment strategies and provide invaluable assistance to customers throughout this process. Banks may also proactively offer recommendations regarding expenditure and budgeting to support their clients in achieving their financial goals.

i. Personalized and Enhanced Customer Services: AI technology excels in conducting in-depth analyses of client preferences and decisions, enabling it to provide precise and relevant product recommendations tailored to individual needs. It formulates resilient recommendation models that offer substantial value. By harnessing the extensive database and daily customer interactions forged through these models, banks are poised to offer meaningful and highly personalized customer experiences. Notably, the recommendation models developed for banks exhibit greater complexity than those commonly utilized in conventional e-commerce settings.

4 Conclusion

The banking sector across the globe is experiencing a significant impact from disruptive technologies, and in response to the associated challenges, it is heavily investing in a diverse range

of digital technologies. Many banks worldwide, including those in the Indian banking industry, are in the midst of profound changes as they embrace technologies such as artificial intelligence. The implementation of these technologies is poised to reshape the future of the banking sector. With the integration of AI, the banking sector can effectively discern human behavior, enhance the efficiency of automated processes, and curtail operational costs. AI technologies are expected to enhance various facets of the banking sector, including customer retention, satisfaction, revenue creation, and overall performance. Consequently, the adoption of AI technologies is deemed imperative for the development and sustainability of the banking sector.

The Otoritas Jasa Keuangan (OJK) has set forth a comprehensive regulatory framework for digital banking in Indonesia, encompassing a series of regulations, notably Regulation Number 12/POJK.03/2018, which specifically addresses the Implementation of Digital Banking Services by Commercial Banks. In the accompanying explanatory notes, the regulation underscores the growing integration of Information Technology as a catalyst for improving customer services. This integration signals the banking sector's transition into a new phase commonly known as the digital banking era. This transformation spans the entire spectrum of customer interactions with the bank, covering activities ranging from the initial setup of savings accounts to the execution of financial transactions and eventual account closure, all facilitated through the pervasive utilization of Information Technology.

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