Arthatama
Journal of Business Management and Accounting
ISSN: 2655-786x (p), 2774-5678 (e)

Vol. 9, No. 2 (2025), pp. 246-257

Driving Digital Banking Transformation in Indonesia Amid Industry 4.0

Teguh Joni Purwanto[1*], Triwidi Atmoko[1], Susilo Toto Rahardjo[1]

[1] Universitas Diponegoro,Semarang, Indonesia
teguhpurwanto@students.undip.ac.id

Abstract

The study emphasizes the role of regulatory frameworks and government initiatives in accelerating digital transformation within the banking sector. The Indonesian Financial Services Authority and Bank Indonesia have introduced various policies to support innovation while ensuring consumer protection and financial system stability. In addition, the research explores how customer behavior is shifting toward digital channels, driven by convenience, speed, and accessibility. This behavioral shift necessitates banks to invest in user-friendly digital platforms and robust IT infrastructure. The study also discusses the importance of digital literacy among consumers and employees to maximize the benefits of digital banking. Moreover, collaboration between traditional banks and fintech companies is identified as a key strategy to foster innovation and expand financial inclusion. By addressing both opportunities and risks, this research provides a comprehensive perspective on how Indonesian banks can effectively implement digital transformation strategies. The insights gained are expected to guide policymakers, financial institutions, and stakeholders in shaping a resilient and inclusive digital banking ecosystem.

Keywords

Banking, Digital Transformation, Electronic Transactions, Industrial Revolution 4.0.

1. Introduction

The COVID-19 pandemic has had an unprecedented impact on the global economy, leading to widespread disruption that has affected even the most advanced nations. According to the Rockefeller Foundation, the virus infected nearly 20% of the world's population and resulted in over 8 million fatalities within the first seven months of its outbreak, with a disproportionately high number of victims being young, previously healthy adults. This public health emergency was not merely a health crisis; it also precipitated a severe downturn in international mobility and trade, wreaking havoc on various sectors, particularly tourism, and causing significant fractures in global supply chains (Abdrakhmanova & Shchigortsova, 2020; Ahmed, 2020; Hrytsiuk & Sak, 2021; Zayed et al., 2021). Indonesia, a nation with a rapidly growing economy, was not insulated from these shocks. The economic fallout mirrored the catastrophic financial crisis of 1998, a period when many major banks faced collapse due to liquidity shortages, soaring operational costs, and a wave of defaults. However, in stark contrast to the turmoil of 1998, the Indonesian banking sector in 2020 showcased remarkable resilience. This newfound stability can be attributed to a series of regulatory reforms implemented in the years leading up to the pandemic, as well as the accelerated adoption of digital technologies that have redefined the financial landscape (Triggs et al., 2019; Indrawati et al., 2020; Hidayatullah et al., 2020; Siregar et al., 2021).

The surge in Financial Technology (fintech) within Indonesia has fundamentally altered consumer behavior regarding financial transactions. The pandemic acted as a catalyst for this transformation, as restrictions on physical movement prompted individuals and businesses alike to gravitate towards digital platforms for their banking needs. In response to these shifting demands, the banking sector—an essential pillar of Indonesia's national economy—has undergone a significant digital transformation. Mobile banking, for example, has emerged as a vital service, empowering customers to execute transactions at their convenience, from virtually anywhere, thereby diminishing the reliance on physical bank branches and ATMs (Purba et al., 2021; Shabri, 2022; Farida et al., 2023). Widharto et al. (2020) as Indonesia steps into the digital banking era, the modernization of financial services has become increasingly critical. This transformation encompasses the integration of cutting-edge digital technologies, including sophisticated computer systems, robust network infrastructure, internet-based communication tools, smartphones, and intuitive software applications. These innovations are designed to enhance the reliability, security, and efficiency of banking operations. Ultimately, this evolution is paving the way for the emergence of fully digital banks, which promise to deliver innovative services and create exponential value for consumers and businesses alike. This shift not only signifies a new chapter in Indonesia's banking history but also sets the stage for a more inclusive and accessible financial ecosystem (Widharto et al., 2020 Said & Angelita, 2020; Soenjoto, 2022; Luthfiatussa'dyah et al., 2022; Widarwati et al., 2022).

The Rockefeller Foundation highlights the severe global impact of the COVID-19 pandemic, which infected nearly 20% of the world's population and caused 8 million deaths within seven months, primarily among young and healthy adults. The crisis disrupted international mobility and trade, damaging key sectors like tourism and global supply chains (Luković & Stojković, 2020; Nagy et al., 2020; Chakraborty & Maity, 2020). Indonesia also experienced significant economic disruption, reminiscent of the 1998 financial crisis when many banks collapsed due to liquidity issues and high operational costs. However, in 2020, improved regulations and the adoption of digital technologies helped Indonesian banks remain resilient despite rising non-performing loans (Riyanto et al., 2018; Hidayatullah et al., 2020).

The pandemic accelerated the growth of fintech and digital financial transactions in Indonesia, driven by increased e-commerce use and restrictions on physical movement. This shift transformed consumer behavior and reduced reliance on physical banking services. Mobile banking has enabled faster, more convenient transactions, leading to a decline in ATM and teller usage (Trisnowati et al., 2020; Purba et al., 2021). As Indonesia moves toward a fully digital banking era, the modernization of financial services is essential. This involves integrating digital infrastructure—such as computer systems, networks, internet platforms, and user-friendly applications—to enhance service reliability, security, and efficiency. Ultimately, this transformation aims to shift from conventional banking to innovative digital banks that deliver greater value and accessibility (Mutiara et al., 2019; Widharto et al., 2020).

2. Literature Review

A conventional bank refers to a financial institution that conducts its operations through traditional, physical means. In this model, customers are required to visit the bank's premises in person to perform various banking transactions, such as deposits, withdrawals, account inquiries, or loan applications. This approach often leads to inefficiencies, including long wait times, limited accessibility, and increased operational costs. Moreover, the necessity of physical presence exposes customers to potential risks, such as theft or fraud, particularly in high-traffic banking areas. (Chiorazzo et al., 2018; Wulandari, 2024).

The operational framework of a conventional bank is typically centralized, with a Central Unit that oversees strategic business management and coordinates various functional departments. These include the Information Technology (IT) center, marketing division, call center, back office operations, accounting and legal services, and branch management. Each branch functions as an extension of the central unit, delivering services directly to customers while adhering to the bank's standardized procedures and policies (Auge-Dickhut et al., 2016; Ramadhani, 2024).

The following figure illustrates the general operational structure of a conventional bank, highlighting the hierarchical and departmental relationships that

support its day-to-day activities. Digitalization is fundamentally reshaping the competitive landscape across various industries by disrupting traditional business models and fostering the emergence of more complex, interconnected ecosystems for innovation and growth. One of the key advantages of digital transformation—beyond its potential to enhance efficiency—is its ability to create systems that are more agile, scalable, and user-centric (Schwertner, 2017).

In Indonesia, the rise of Financial Technology (FinTech), Electronic Payments (E-payments), and e-commerce platforms has significantly accelerated this transformation. These innovations have prompted a shift from conventional business practices to more modern, technology-driven models. The banking sector has embraced this change through the rapid development of mobile banking services, which have intensified competition in the digital financial market (Teja, 2017).

This shift is reflected in the substantial growth of electronic money (e-money) transactions. In 2020, e-money transactions in Indonesia surged by 41.2% compared to 2019, reaching a total value of IDR 204.9 trillion. This remarkable increase not only highlights the growing public trust in digital financial services but also signals a broader behavioral shift toward online transactions, especially during the COVID-19 pandemic, which limited physical interactions and accelerated the adoption of digital alternatives (Mubin & Pambudi, 2020; Anam, 2019).

These trends underscore the critical role of digitalization in shaping the future of financial services in Indonesia, where innovation, accessibility, and customer experience are becoming central to sustainable growth (Said & Angelita, 2020). According to a Personal Financial Services (PFS) survey conducted by McKinsey across Asia, physical branch transactions now account for only 12% to 21% of monthly banking activities in both developed and developing Asian countries. This significant decline highlights a growing shift in consumer behavior and suggests that conventional banking models are becoming increasingly obsolete in the digital age (Dang, 2020; Nagorny & Trade, 2020; Mariani et al., 2023). The data underscores the urgency for traditional banks to adapt to evolving customer expectations by embracing digital transformation. As more consumers turn to online and mobile platforms for their financial needs, the relevance of physical bank branches continues to diminish. This trend is not only reshaping how financial services are delivered but also redefining the competitive landscape of the banking industry (Shashikala, 2019; Martin et al., 2019).

In addition, the figure below presents data from 2015 on customer segments and product offerings of financial technology (fintech) companies. This snapshot illustrates how fintech firms have strategically positioned themselves to serve diverse market segments with innovative, technology-driven solutions—further accelerating the shift away from traditional banking channels (Sheikh et al., 2019). Based on the data, several key characteristics define the development of a successful digital business model. These characteristics include simplicity, which ensures that services are intuitive and easy to use, and transparency, which involves providing clear and

accessible information to build customer trust. Additionally, ease of customer acquisition plays a crucial role by enabling seamless onboarding processes that reduce barriers to entry. The model should also emphasize ease of distribution and commercial attractiveness, making services widely accessible and appealing to a broad customer base. Lastly, specialization is important, as it allows businesses to offer tailored solutions that address specific customer needs, thereby enhancing value and user satisfaction.

To meet evolving customer expectations, many banks have introduced a range of innovative digital products and services, such as mobile banking, internet banking, QRIS, and other electronic financial tools. These innovations are designed to simplify and enhance customer experience, allowing users to perform banking transactions anytime and anywhere using only a smartphone (Devi, 2020; Borges et al., 2020). The emergence of these digital solutions supports the notion that traditional banking operations and organizational structures must evolve. With 24/7 access to banking services, the need for physical infrastructure—such as regional offices, branch locations, and service units—is gradually diminishing. This shift reflects a broader transformation in the banking industry, where digital platforms are becoming the primary channel for customer interaction (Ajupov et al., 2019; Butt & Butt, 2020).

According to Forbes, digital banking is broadly defined as the transition of banking services from traditional, in-person methods to fully online platforms. As competition intensifies and digital banking becomes the norm, the shift from cash-based to digital transactions is not just a trend—it is an inevitable evolution. Eventually, we may reach a point where physical cash becomes obsolete, replaced entirely by digital financial ecosystems (Niemand et al., 2021).

3. Methods

This study employs a qualitative approach using an in-depth literature review method to explore the transformation of conventional banks into digital banks. The primary objective of this method is to gather relevant information, assess the credibility of various sources, and analyze the extent to which these findings support or contradict one another. The research process is conducted through several systematic stages. The first stage is literature and data collection, which involves gathering a wide range of information from reliable sources. The reviewed literature includes academic books, peer-reviewed journal articles, online publications, research papers, and media content discussing digital transformation in the banking sector. These sources are obtained from reputable academic platforms such as Google Scholar, Scopus, ResearchGate, and other trusted academic databases. Personal insights and expert opinions relevant to the topic are also considered.

Next, all collected materials are carefully read and analyzed to gain a thorough understanding of their content and context. This analysis aims to extract meaningful and relevant information aligned with the focus of the research. Following that, an assessment is conducted to evaluate the relevance of each obtained source. This evaluation ensures that the information aligns with the research topic and contributes meaningfully to the overall discussion.

The next step involves summarizing key points, main arguments, and keywords from each relevant source. This process helps identify recurring themes and build a coherent narrative. Finally, all summarized findings are synthesized and organized into a structured and systematic format. These synthesized insights are compiled into a comprehensive review that reflects the current state of knowledge regarding the digital transformation of banking institutions.

4. Results

The rise of e-commerce in Indonesia has opened new avenues for banks to expand their services by building ecosystems in collaboration with digital platforms. These efforts include forming partnerships with e-commerce providers and fintech companies to reach broader customer segments, particularly users of integrated platforms or "superapps." Such collaborations not only enhance customer convenience but also strengthen the position of banks as central players in the digital economy. The transformation into digital banking offers several key advantages. One major benefit is the ability to provide comprehensive financial services via smartphones, where digital banks consolidate various financial products—such as savings accounts, loan applications, and investment tools—into a single platform. This integration simplifies the customer experience and increases accessibility. Additionally, digital banks can broaden their market reach through ecosystem collaboration, tapping into new customer bases by partnering with e-commerce platforms and peer-to-peer (P2P) lending services, thereby supporting the development of a robust digital financial ecosystem. Another significant advantage is operational efficiency, as digital banks operate entirely through mobile applications without the need for physical branches. This not only reduces operational costs but also enables a more agile business model with the potential for exponential growth. Furthermore, with all transactions conducted online, dependence on ATM infrastructure is significantly reduced, which aligns with the growing trend toward cashless transactions and further lowers overhead expenses. Lastly, digital banks typically adopt a streamlined organizational structure that is leaner and more responsive to market dynamics. This structure enhances operational performance and accelerates decision-making and innovation. The streamlined nature of digital banks, especially in comparison to traditional institutions, underscores their adaptability and efficiency in the evolving financial landscape.

5. Discussion

The successful transformation of a conventional bank into a digital bank requires careful planning and strategic execution across multiple dimensions. One of the most critical factors is the development of robust infrastructure. A strong technological foundation must be established, including reliable network systems, high-performance computing, secure servers, scalable databases, and advanced cybersecurity frameworks. These elements are essential to protect against cyber threats and data breaches, ensuring customers feel safe and confident when using digital banking services. In addition, banks should aim to integrate a unified SuperApp that merges e-banking and mobile banking functionalities into a single, seamless platform. This integration ensures a consistent and user-friendly experience, enhancing both usability and customer engagement.

Another important aspect is the development of flexible and open information systems. By implementing systems that support Application Programming Interfaces (APIs), banks can facilitate interoperability with fintechs, e-commerce platforms, and other digital services, enabling broader ecosystem collaboration. Organizational restructuring is also essential. Banks must shift from traditional hierarchical models to more agile, horizontal team structures, where functions such as programming, marketing, and sales work together in cross-functional product teams. This structure promotes efficiency, collaboration, and quicker decision-making. The adoption of big data analytics is equally vital. Modern digital banking demands deeper insights into customer behavior, preferences, and habits—similar to approaches used by e-commerce platforms and P2P services. To achieve this, banks must evolve into data-driven institutions by building teams with expertise in data science, statistics, mathematics, and behavioral psychology.

Compliance with regulatory frameworks is another key factor in ensuring a sustainable transition. In Indonesia, the Financial Services Authority (*Otoritas Jasa Keunagan*/OJK) plays a central role in guiding the digital banking transformation through regulations and oversight. Understanding and adhering to evolving regulatory frameworks is essential for legal compliance and long-term stability. A significant challenge in this transformation is Indonesia's low digital financial literacy rate, which, according to the President of Indonesia, stands at only 35.5%, with just 31.26% of the population actively using digital financial services. Moreover, OECD data reveals that Indonesia's average financial knowledge score is 3.7, which is low compared to other countries. This lack of financial literacy poses a challenge but also presents an opportunity. Banks that take the lead in educating the public and raising awareness of digital banking tools can build trust, expand their customer base, and strengthen their position in the financial ecosystem.

From a regulatory perspective, both Bank Indonesia (BI) and OJK are actively developing frameworks to support digital banking innovation while ensuring security and governance. OJK is revising its regulatory approach to better align with the needs of digital banks, focusing on licensing, supervision, and appropriate governance

models. Regulation Number 12/POJK.03/2018, issued by OJK, outlines the implementation of digital banking services by commercial banks. According to Sukarela Batunanggar, Deputy Commissioner of the OJK Institute and Digital Finance, there are two main pathways for the emergence of digital banks in Indonesia. The first is through the transformation of existing traditional banks by revamping their business models, strategies, and products, with minimum core capital requirements of IDR 2 trillion in 2021 and IDR 3 trillion in 2022. The second is the establishment of native digital banks from the outset, which requires a significantly higher minimum core capital of IDR 10 trillion.

Amidst these developments, there is growing concern regarding the influx of foreign investors into Indonesia's digital finance sector. Many of these foreign-backed entities possess substantial capital, raising fears of market domination. As a result, OJK is being urged to tighten licensing and regulatory standards to protect local players and ensure a balanced, inclusive development of the digital banking ecosystem.

6. Conclusion

The rapid advancement of technology, particularly digitalization, has significantly transformed various aspects of human life, especially with the emergence of the Fourth Industrial Revolution (Industry 4.0). The banking sector is no exception. In this era of accelerated innovation, the transition from conventional to digital banking is no longer optional—it is a strategic necessity. Banks that fail to adapt risk falling behind in the face of growing competition from agile financial technology (fintech) companies and evolving customer expectations.

Becoming a digital bank offers numerous advantages that not only enhance competitiveness but also deliver substantial value to customers. These include increased operational efficiency, reduced reliance on physical branches, and the ability to conduct all banking transactions through a single mobile application. Furthermore, digital banks can collaborate with various digital platforms—such as e-commerce, ride-hailing services, and peer-to-peer (P2P) lending—to build an integrated financial ecosystem. This ecosystem not only streamlines services but also reduces the risk of physical crimes such as theft and robbery, although it simultaneously demands robust IT infrastructure and cybersecurity to mitigate digital threats.

The benefits of digital banking are supported by research, such as a 2018 McKinsey study on banking in Scandinavia, the United Kingdom, and Western Europe, which found that digital transformation could generate up to half of new banking revenues—most of which are driven by digital sales. This highlights the immense potential for growth in Indonesia, where the digital banking market remains underdeveloped and full of opportunity.

To fully capitalize on this potential, banks must focus on building a SuperApp—a unified platform that integrates various financial services and reaches a broader

customer base. Without embracing digital transformation, it will be increasingly difficult for banks to remain relevant. History has shown that companies unable to adapt to technological change often face decline or even bankruptcy.

Therefore, it is imperative for bank executives, directors, and stakeholders—both in the public and private sectors—to proactively prepare the necessary infrastructure and strategies for digital transformation. Embracing digitalization is not just about staying competitive; it is about ensuring long-term sustainability and leadership in Indonesia's evolving financial landscape.

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