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Determinants of digital bank transformation: a systematic literature review with prisma and bibliometrics

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ABSTRACT

In response to emerging financial technology (fintech) that might disrupt the banking industry, several financial institutions are undergoing digital transformation. Banks are increasingly integrating digital strategy into their business planning rather than adding it on. This research aims to identify the determinants that influence digital bank transformation. The research was conducted through a systematic literature review of 364 published papers using PRISMA and bibliometric approaches. This method is commonly used in various fields, including medicine, psychology, social sciences, and more, to provide a comprehensive and impartial summary of the current state of knowledge on a particular subject. The approach used in this systematic literature review method is the PRISMA approach. The results of the literature review show that there is an increasing trend of research related to digital banks from 2015 to 2023, which is in line with the trend of digitalization in the banking industry in both developed and developing countries. The analysis is deepened to see the important factors influencing digital bank transformation. The determinants in the digital bank transformation process include the level of digitalization, application user growth, IT investment, IT committee, cyber security, and ecosystem stocks. The results of this literature review will be a reference for further research related to digital banks, in line with the rapid digital transformation process in banking.

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Introduction

The acceleration of the progress of the technological revolution that has been going on since the 21st century is moving faster and faster, changing various aspects of human life and activities. Starting from the way humans interact, communicate, access information, make decisions, to transact has been much different compared to what happened in the 19th or even 20th century. Work processes in various sectors of the economy, which previously reached the level of mechanization and industrialization, have changed dramatically with technological advances and digitalization.

The work process centered on digitalization facilitated by information technology has allowed the birth of new business models that are different from "traditional" business models. The new business model is the digital business model where the services and services provided by the digital business model memiliki additional-value-proposition What is typical of digital, namely: can be accessed anytime (24 hours a day and 7 days a week) and anywhere by people who need it. In addition, the delivery time of services and services (delivery-time) in the

digital business model is faster and the price offered is relatively cheaper with the efficiency of operational processes. In summary, the additional-value-proposition of the digital business model is: cheaper access, globalized, easy to use and multiplier effects – which is the competitive advantage of this business model over the "traditional" business model.

Research conducted by Rhys Grossman in 2016 as published in the Harvard Business Review as shown in figure 1 shows the position of a number of industries based on their level of disruption (most disrupted) with the presence of digital business models as follows:

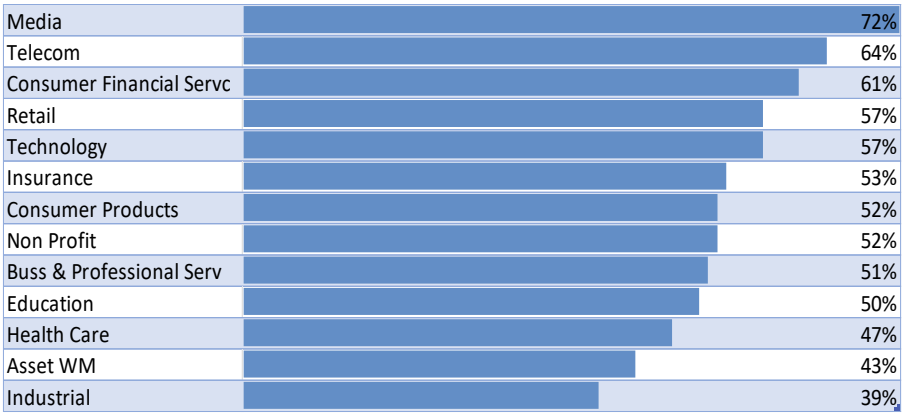

Figure 1. The Position Of A Number Of Industries Based On Their Level Of Disruption
Source: Harvard Business Review, 2016Picture

Digitalization Disruption Survey

The development of digital technology in the financial services sector has given rise to various alternatives to non-bank financial services, referred to as financial technology or fintech (Nizar, 2017) Fintech is defined as technological innovation in financial services that offers faster processes, more efficient business models, and lower costs than banking services in general (Nizar, 2017). Activities and services developed by fintech include payment transactions (payments, clearing, settlement), raising funds (deposits, lending, capital rising), insurance (insurance), investment (investment management), (market support) seperti aggregators, digital authentication, cloud computing, including digital security providers (Nizar, 2017)

The development of fintech that has the potential to threaten the banking business encourages banks to carry out digital transformation. If previously the digital aspect was an enabler that supports business, now digital strategy is part of the banking corporate strategy. To carry out digital transformation, banks at least need to build and improve their digital capabilities in several aspects simultaneously. First, banks must optimize data analytics in all aspects, from product development, services, and operations. Next, banks need to build an integrated and specific customer experience for each segment. In the marketing and communication aspect, banks need to build a strong team so that they can compete with digital marketing carried out by e-commerce. Furthermore, banks need to adjust the organizational structure more concisely, to accommodate a more effective and efficient workflow so that they can make savings in terms of costs. In addition, banks must also quickly adopt the latest technologies to remain competitive with fintech and e-commerce. Finally, banks need to build good talent management and make adjustments to organizational infrastructure and policies to support digital transformation programs in companies (Harahap et al., 2017).

As for Mărăcine et al. (2020), their research suggests that there are five main areas where FinTech can provide business model improvements for banks: introducing specialized platforms, covering neglected customer segments, improving customer selection, reducing bank operational costs, and optimizing bank business processes. As digital banking offerings mature and cost pressures increase, changes to banks' operational models are inevitable. Driven by suboptimal business model performance, the concept of "digital" has evolved into more than just a channel for accessing services. Then Judijanto et al. (2023) said that an important factor in digital bank transformation lies in the extent to which innovation is integrated with the interests and needs of customers. A number of previous studies have attempted to examine certain aspects of financial innovation and banking transformation. However, there is still a gap in research regarding the lack of understanding of what factors influence their digital transformation, other than innovation and customer needs. Further research is necessary to gain a comprehensive understanding of the practical challenges and successes that banks encounter while navigating various aspects of their digital transformation journey. The purpose of this literature review is to identify important factors in the digital bank transformation process, especially those related to strategy, operations, and investment.

Method

A systematic literature review is a rigorous and structured method used in academic research to collect, evaluate, and synthesize already published studies and research papers on a particular topic or research question. This method is commonly used in various fields, including medicine, psychology, social sciences, and more, to provide a comprehensive and impartial summary of the current state of knowledge on a particular subject. The approach used in this systematic literature review method is the PRISMA approach (Page et al., 2021).

The PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses) approach was developed to ensure that authors of systematic reviews and meta-analyses provide clear and complete information about their research methods and findings, making it easier for readers to assess the reliability and validity of reviews (Selçuk, 2019). Compliance with PRISMA guidelines ensures that systematic reviews and meta-analyses are conducted and reported in a standardized and transparent manner, thereby improving the quality and reliability of such research. It also helps readers and reviewers assess the thoroughness of reviews and potential bias in research selection and reporting.

The research analyzed through the PRISMA approach is research on the topic of determinants of digital bank transformation. The journal database sources used are Scopus and Google Scholar, with the following keywords: (1) "Bank Digital Transformation". (2) "Bank Transformation". (3) "Digital Bank*" AND "Determinan*". (4) "Digital Banking" AND "Transform*". (5) "Key Factor*" AND "Bank*" AND "Digital Transform*" . Research searches with the keywords above were conducted using the Publish or Perish application and resulted in 364 studies relevant to the topic of digital bank transformation. The analysis process continued using the Covidence platform to cleanse the duplicated journals by the system, and 346 journals were produced that deserved further analysis.

The next stage was the selection of titles and abstracts, resulting in 201 studies. The research is then analyzed more deeply through full-text review, to filter out research that does not differ in context, even though it is on the same topic. The research contexts to be eliminated include: (1) Blockchain. (2) Outcome differences. (3) Features of digital banks. (4) Customer perspective. (5) Method comparison. (6) Non-bank business model. After a full-text review based on context, 78 studies were obtained that will be carried out data analysis and interpretation, as presented in Figure 2.

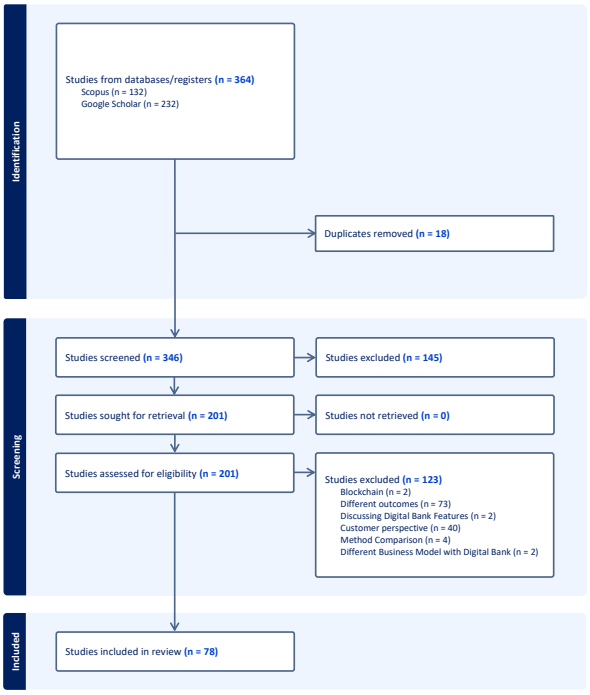

Figure 2. PRISMA Flow Chart

Results and Discussions

Bliometric Analysis and Word Cloud

Analysis of 78 studies using a bibliometric approach, where the published studies were analyzed from several aspects, including: (1) Publishing trends from 2015 to 2023. (2) Authors with the most publications. (3) Location of the object of study. (4) Journals with the highest publishing frequency. Journal publishing on the topic of

determinants of digital bank transformation has experienced an upward trend since 2015, and reached its peak in 2020 where at that time almost all industries were forced to accelerate transformation from manual to digital due to the Covid-19 pandemic. Industry players have no other choice but to pivot business models to survive during a pandemic that limits people's mobility. The financial sector is at the forefront of the digital transformation process. This is because banks have faced competition with financial-technology (fintech)) sejak sebelum pandemi. So that what happened due to the pandemic is an accelerated momentum for digital transformation that is being carried out. 2022 is recorded to be the year with the most research publications, related to digital transformation. 2022 is the momentum for the rapid development of Artificial Intelligence (AI) technology. Meanwhile, publication in 2023 is expected to be higher than 2022, considering the publication period that is still running. In line, research publishing trends related to digital bank transformation are in line with developments in the industry.

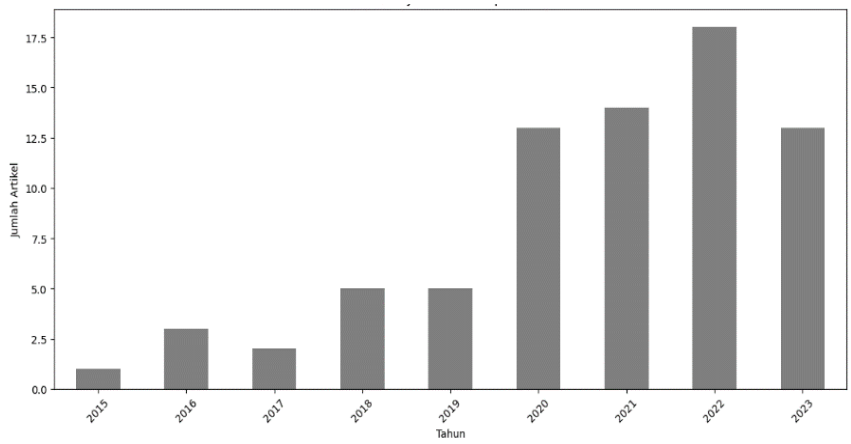

Figure 3. Distribution of Number of Articles per Year

As for the authors with the most publications, namely Riani &; Rusdiana, and Wewege, Lee &; Thomsett with two publications each, as presented in Figure 4. While the other authors only published one study related to digital bank transformation. The relatively new and still developing digital banking industry provides a very wide space for research objects, both at the conceptual and practical levels. If you see the development of the number of studies that continue to increase, then researchers have the opportunity to expand the scope of their research and deepen the discussion on specific topics.

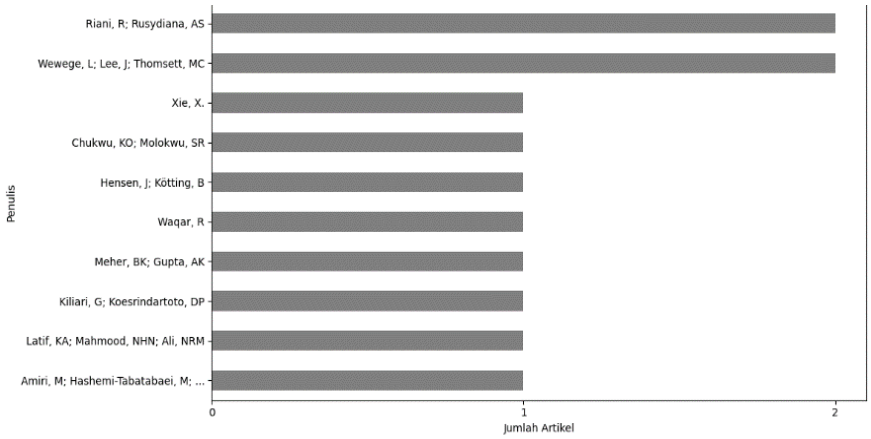

Figure 4. Top 10 Authors with the Most Publications

On the other hand, we find that the majority of research was conducted in the context of developing countries, with the number far surpassing that of developed countries, as presented in Figure 5. This shows that the dynamics of digital transformation are rife in developing countries. Apart from the economic structure and financial markets that are still developing, the rate of information adoption in the digital era is also accelerating. The economic structure in developed countries is relatively stable with mature financial markets so that it becomes a trend setter. The economic structure of developing countries is still in the growth phase and tends to be vulnerable to external shocks, causing more volatile markets and higher risks. The challenges of these economic conditions make research in developing countries relatively more numerous and diverse.

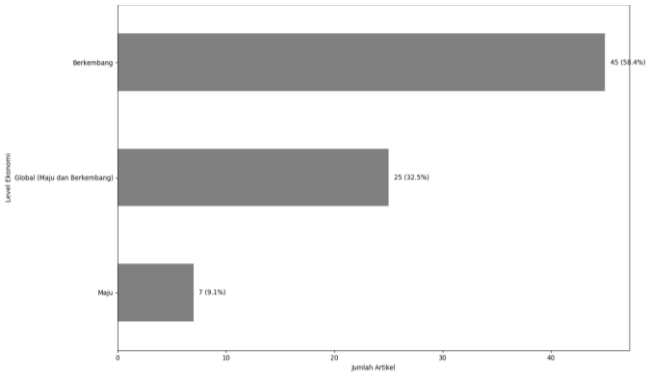

Figure 5. Distribution of the Number of Articles Based on the Economic Level of the Country of the Study Subject

Meanwhile, the journal that contains the most research related to digital bank transformation is the Journal of Digital Banking with a total of eight publications, followed by the Journal of Financial Services Marketing with two publications, as presented in Table 1. The rest only published one journal related to digital banks in the period 2015-2023.

Table 1. Frequency of Journals Containing Digital Bank Transformation Research Results

Journal	Freq.
Journal of Digital Banking	8
Journal of Financial Services Marketing	2
Qualitative Research in Financial Markets	1
Sustainability	1
Journal of Computational Methods in Sciences and Engineering	1
Journal of Critical Reviews	1
Banks and Bank Systems	1
Journal of Financial Services	1
International Journal of Interactive Mobile Technologies	1
International Journal of Scientific and Technology Research	1

The word cloud method is used to analyze research methods that are popularly used as presented in Figure 6, including: (1) Narrative; (2) Descriptive; (3) Regression; (4) Literature Review; (5) Interview; (6) Data Panel; (7) PLS-SEM; (8) Survey; (9) Systematic Review; (10) Explanatory.

Figure 6. Word Cloud Determines Digital Bank Transformation

The methods used in research related to digital transformation are dominated by qualitative-based methods, with details of conceptual/literature methods (32 journals), followed by quantitative (24 journals), and qualitative (16 journals) methods, as presented in Figure 7. While the study using a mixed method was only four journals. This is due to trends digital transformation only accelerated in 2020 during the Covid-19 pandemic.

With such a short period of time, much research is conceptual rather than empirical. Relatively new practices, limited samples, and very dynamic industrial developments make researchers face challenges in exploration and adequacy of quantitative data.

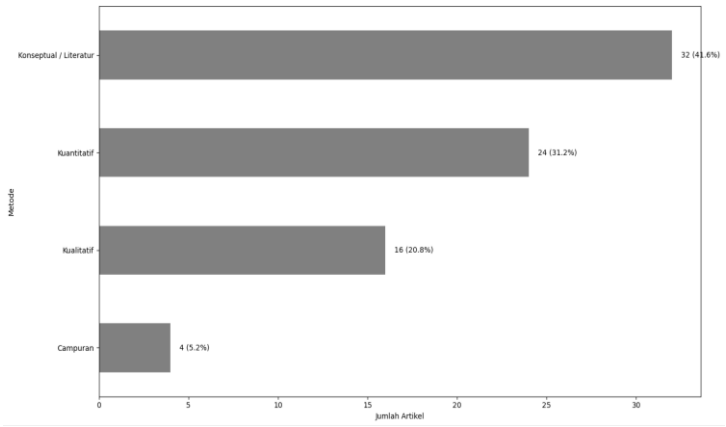

Figure 7. Distribution of Number of Articles Based on Research Methods

Important Determinants of Digital Banking Implementation

The results of the bibliometric analysis show the keywords that have the most dominant frequency of occurrence. By using the word cloud application, a visual representation of keywords is obtained according to the frequency of their appearance in research. Keywords that are in the top ten include: (1) Digital; (2) Banking; (3) Transformation; (4) Digitization; (5) Bank Company; (6) Business; (7) Company; (8) Investment; (9) Customer; (1) Organization. Word Cloud results on these keywords as presented in Figure 8.

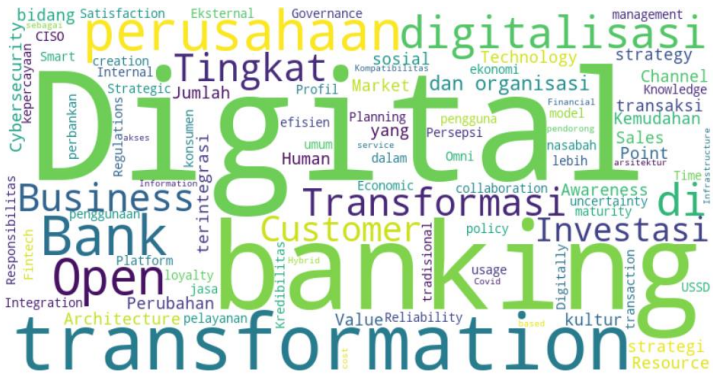

Figure 8. Determinants of Digital Bank Transformation

These dominant keywords are grouped according to category determinants generated from full-text reviews, which comprise from the level of digitalization, application user growth, IT investment, IT committee, cyber security, and ecosystem shares.

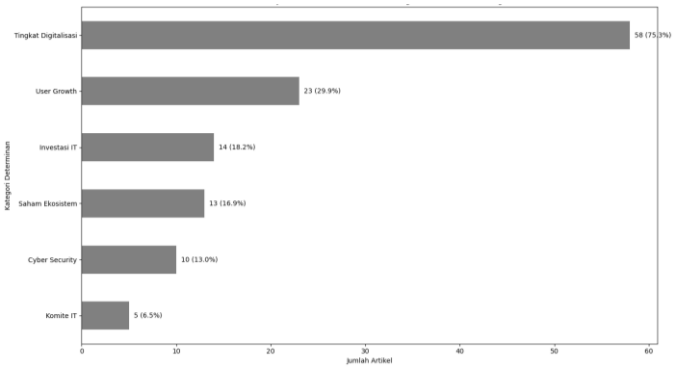

Figure 9. Distribution of The Number of Articles by Category of Important Determinants

The bibliometric analysis of research related to digital bank transformation is summarized in the following table:

Table 2. Distribution of Determinants of Digital Bank Transformation in Journals

Determine	Economic Level of Research Location	Author and Year
Cyber Security	Growing (80%), Forward (0%), Global (Forward and Growing) (20%)	(Clayton & Redshaw, 2021; Dan, 2020; Husseini et al., 2019; Mosota, 2015; Nurjannah, 2023; Sutarminingsih & Saptono, 2021; Waqar, 2022; Wewege et al., 2020a; Zahiroh, 2020)
Investment IT	Growing (43%), Advanced (0%), Global (Forward and Growing) (57%)	(Indriasari et al., 2022; Kahveci & Wolfs, 2018; Lin et al., 2022; Megargel, Shankararaman, & FAN, 2018; Megargel, Shankararaman, & Reddy, 2018; Mosota, 2015; Mourshoudli et al., 2020; Nurjannah, 2023; Otieno & Ndede, 2020; Versal et al., 2022; Wewege et al., 2020b)
IT Committee	Growing (80%), Forward (0%), Global (Forward and Growing) (20%)	(Latif et al., 2019; Megargel, Shankararaman, & Reddy, 2018; Nurjannah, 2023; Panova, 2021)
Ecosystem Stocks	Growing (46%), Forward (8%), Global (Forward and Growing) (46%)	(Bhagat, 2019; Dehnert, 2022; Kahveci & Wolfs, 2018; Kaur et al., 2021; Mourshoudli et al., 2020; Murtanto & Dewi, 2018; Papathomas & Konteos, 2023; Prayudya et al., 2023; Riani & Rusydiana, 2022b; Riza et al., 2022; Samosir & Jayadi, 2023; Sutarminingsih & Saptono, 2021; Versal et al., 2022; Wewege et al., 2020b)
Level of Digitalization	Growing (55%), Forward (12%), Global (Advanced and Growing) (33%)	(Amiri et al., 2023; Anastasiia et al., 2022; Balkan, 2021; Bandara, 2016; Baskerville et al., 2020; Carbo-Valverde et al., 2020; Chukwu & Molokwu, 2022; Damenshie-Brown & Ofosu-Ampong, 2023; De Venn, 2023; Dehnert, 2022; Ercegovac & Jovin, 2018; Hang et al., 2021; Harvey, 2016; Hensen & Kötting, 2022; Ilankumaran, 2019; Kaur et al., 2021; Kolodiziev et al., 2021; Kovács & Vinkóczi, 2022; Li, 2021; Lin et al., 2022; Lisman, 2023; Maltsevich et al., 2021; Megargel, Shankararaman, & FAN, 2018; Megargel, Shankararaman, & Reddy, 2018; Merkt et al., 2021; Mosota, 2015; Mourshoudli et al., 2020; Nguyen et al., 2020; Nikum, 2021; Nurjannah, 2023; Petrović, 2020; Riani & Rusydiana, 2022a; Riza et al., 2022; Samosir & Jayadi, 2023; A. Sharma & Piplani, 2017; B. Sharma & Dubey, 2022; Singh et al., 2023; Sutarminingsih & Saptono, 2021; Theiri & Hadoussa, 2023; Vander, 2022; Versal et al., 2022; Waqar, 2022; Wewege, 2017; Wewege et al., 2020b; C. Xie, 2022; X. Xie & Wang, 2023; Yıldırım & Erdil, 2023; Yu-chen, 2021; Zahiroh, 2020)
User Growth	Growing (65%), Advanced (0%), Global (Forward and Growing) (35%)	(Ali & Ghildiyal, 2023; Barber & Gill, 2016; Barquin et al., 2019; Bhagat, 2019; Chukwu & Molokwu, 2022; Dan, 2020; Ghani et al., 2022; Megargel, Shankararaman, & Reddy, 2018; Moghni et al., 2020; Mosota, 2015; Mourshoudli et al., 2020; Nguyen-Thi-Huong et al., 2023; Nguyen et al., 2020; Otieno & Ndede, 2020; Panova, 2021; Singh et al., 2023; Sutarminingsih & Saptono, 2021; Thanh, 2021; Vander, 2022; Versal et al., 2022; Waqar, 2022; Wewege et al., 2020b)

The results of a literature study conducted on 78 studies related to digital bank transformation show that important determinants of the digital bank transformation process can be grouped into six categories, namely: (1) The level of digitalization, which is how far the level of digitalization carried out by banks is measured by how many aspects have been transformed, both operational, human resources, policies, products, and business models. (2) User growth, which is a factor that affects the adoption rate and growth of customers using digital banking services. (3) IT investment, which is how much investment banks make in the context of digital

transformation. In banking, investment is not only in the form of physical devices, but includes infrastructure to support digital strategies, which are recorded as capital expenditure. (4) Ecosystem stocks, namely linkages with retail industry networks, both direct relationships between business entities and business synergies so as to provide added value for user customers. (5) Cyber security, which is a security factor in digital transactions.

IT Committee, namely the implementation of IT governance to ensure that the transformation process is carried out with good corporate governance. The existence of the IT committee illustrates that in carrying out digital transformation, banks do so with the principle of prudence and mitigate the risks faced. The IT Committee not only performs supervisory functions, but also takes important decisions such as strategy and investment. The more intense the IT committee meeting is held, the more aggressive the digitization process in a bank will be. In the process of digital bank transformation, the level of digitalization is the most dominant factor. This is related to the strategies and stages carried out by the bank, where the implementation of transformation is carried out gradually. The Bank will identify existing operational processes and services to be transformed into digital. The banking industry is a relatively leading industry in technology adoption. Transactional banking services such as ATMs, EDC machines, and mobile banking applications are technology applications in banking services. However, in operational aspects and business processes, there are still many areas that are still manual (Riani & Rusydiana, 2022a). Therefore, banks will develop transformation strategies and digital architecture that will be carried out (Megargel, Shankararaman, & Reddy, 2018). Based on metadata analysis, the level of digitalization is also the most dominant determinant in research, both in developed and developing countries. This explains that a mature transformation strategy is essential before starting the digitization process.

The next thing related to the level of digitalization is the customer value element that is the main concern of every bank in the transformation process. The digitalization agenda must be based on the mission to provide added value to financial solutions presented to customers (Airport, 2016). In addition, in its implementation, it must also be ensured that services to customers are not interrupted, and are expected to increase customer loyalty (Barquin et al., 2019). Thus, it will have an impact on one of the determinants of digital transformation, namely the growth of digital service users, or those who are often proxied with mobile banking users. If the growth of digital service users consistently increases from time to time, it can be assessed that the digital financial solutions presented have met customer expectations so that they become the main choice in carrying out transactional activities (Moghni et al., 2020).

To provide optimal value for customers, banks also need to pay attention to the usability of their digital services. Among them are increasing cooperation and expanding merchant networks so that customers can easily, comfortably, and safely transact in various places and conditions. This then encourages banks to build their digital ecosystems to provide optimal user experience and value. Some banks work with large retail companies that have extensive networks to increase the scope of their services. Some even become part of existing retail companies and build closed-loop ecosystems. This condition is certainly an advantage when compared to banks that do not have a retail cooperation network, because transaction costs will be higher and there will be minimal benefits (Kaur et al., 2021).

The growth of digital service users is one of the indicators of the success of digital transformation carried out by banks, and cannot be separated from supporting factors. Among the supporting factors that emerged in the study was the level of cybersecurity in a bank (cyber security). Cyber security is a very sensitive aspect considering the high concern of customers over their personal data and financial data when migrating to digital systems (Dan, 2020). Not only customers, the issue of confidentiality and data security is also a concern for regulators to ensure consumer protection. In its implementation, the bank's commitment related to digital security is reflected in the existence of a special function that handles cyber security, which in the industry is known as the Chief Information Security Officer (CISO). And considering that this function is relatively new in the industry, socialization is needed for all organizational functions to understand the roles and responsibilities of each unit in order to maintain digital security (Husseini et al., 2019).

Management commitment is also an important determinant in the digital transformation process of a bank. Management's commitment can be seen from how much investment is allocated to support the digitalization program. This investment will be closely related to the IT strategy and architecture designed (Indriasari et al., 2022). The allocation of IT capital expenditure will also affect how far the level of digitalization achieved by a bank (Megargel, Shankararaman, & Reddy, 2018). Decisions regarding IT strategy and investment are usually made by a special committee that handles IT. The existence of the committee, as well as the frequency of meetings conducted, illustrates how aggressive the digitization process is. The higher the frequency of meetings, the more decisions are made. In addition, the existence of the committee is also a means of maintaining good corporate governance so that the transformation process runs directed and still pays attention to the interests of relevant stakeholders (Panova, 2021).

Conclusion

In conclusion, the extent of digitalization plays a crucial role in shaping the digital bank transformation, impacting the strategies and steps taken by banks to effectively implement this transformation. The banking industry is known for its advanced technology adoption, which includes ATMs, EDC machines, and mobile banking applications. Nevertheless, even with these advancements, manual processes continue to exist in operational aspects and business processes. It is important for banks to develop transformation strategies and digital architectures, highlighting the need for a well-thought-out approach before starting the digitization process. The digitalization agenda places a strong emphasis on customer value, aiming to provide additional benefits to financial solutions in order to increase customer loyalty and satisfaction. The growth of digital service users is a crucial factor in determining the success of digital transformation. It is closely tied to important elements like cybersecurity, management commitment, and investment allocation for the digitization program. The focus on usability of digital services, expanding collaboration, and building digital ecosystems is crucial for enhancing user experience and value in the ever-changing world of digital banking.

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