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A Systematic Review on Banking Digital Transformation

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ABSTRACT

This study explores different perspectives on the definition of digital transformation on banking sector. Ultimately, to facilitate future research, we summarize several research techniques used in the literature reviewed. We set well-established selection criteria to select relevant literature from Scopus, the most recognized database. Based on the bibliometric information of the papers selected, we did a bibliometric analysis. Afterward, we reviewed the literature. The results of this study are There are mainly four findings. Firstly, according to the bibliometric analysis, literature about banking digital transformation is growing exponentially. Secondly, banking digital transformation is the use of new digital technologies to enable significant business improvements in augmenting customer experience, streamlining operations, or creating new business models with innovative breakthroughs that alter conventional banking practice. Thirdly, there are some financial reasons for implementing banking digital transformation which are to increase customer satisfaction, competitiveness, efficiency, and profitability. Finally, key dimensions of banking digital transformation involve individuals, processes, technology, content, and state, while the strategy for the successful banking digital transformation should consider technology, value creation, structural change, and financial aspects.

Keywords: Bank digital transformation, bank transformation, digital banking, bank performance, systematic review.

INTRODUCTION

In recent decades, digital technology are changing our perspective towards the world at a fast pace. Every sector of human daily life had been exposed with digital transformation, including financial sector. Many types of digital technology such as robotic processing, application programming interface, internet of things, distributed ledger, blockchain, artificial intelligence, big data analytics, and machine learning, are getting widely used in financial sector. The development of digital technology in financial sector cause the emergence of new players such as fintech, bigtech, and e-commerce, which gives rise to a huge disruption for incumbent players such as bank.

To be relevant in the financial industry, banks need to transform their technology infrastructure from the analogue-based conventional technology to digital technology, in delivering their products and services. Digital transformation is the solution to the challenges faced by banks. Banking digital transformation is carried out in various mechanism. Some of them use step by step transformation, other use partial transformation, while the others choose fully digital transformation. Despite the popularity of banking digital transformation, the research related to banking digital transformation in terms of number of papers in the databases is limited. The lack of studies that systematically summarize the existing research in banking digital transformation encourage us to do the research on this issue. In order to clarify the current knowledge about banking digital transformation, we propose three main research

questions: What are the definition of banking digital transformation? What are the reasons and purposes of banking digital transformation? What are the challenges and strategy to implement the banking digital transformation? To answer the questions, we conducted a systematic literature review with literature obtained from the widest recognized and the most cited bibliometric (Harzing & Alakangas, 2016).

the introduction, we present the methodology of this study and the process of analysis. We also conduct bibliometric analysis to have an overview of the trend, the scope, the top journals, top authors, and the countries in which the authors did their research. Then, we summarize the research techniques discovered. These sections dedicates to the exploration of different perspectives on the definition of bank digital transformation, its process and functionality, and the relation with the technology investment. The last section will concludes the study.

METHOD

Assessment of research techniques serves as a valuable reference for future studies in designing the research process. Since the study of digital banking is relatively new and has a broad scope of analysis, many new methods have been tried. The literature review is a standard method in this field. Almost half of the empirical papers have used this qualitative analysis. This qualitative approach is mainly used in research that has a broad or global research scope. For example, research conducted by (Artemenko & Zenchenko, 2021; Feher & Varga, 2019; Pramanik et al., 2021; Theiri & Alareeni, 2021; Votintseva et al., 2019) has scope at the country level. In addition, this literature review method is also used in industrial-level research as conducted by (Haapio, 2020; Krasonikolakis et al., 2020; Priambodo, 2019).

Table 1. Distribution of Research Methodology

Research Methodology	Σ
Literature review	24
Regression study	6
Data Envelopment Analysis (DEA)	3
Correlation Study	2
Delphi	2
Descriptive analysis	2
Interview	2
ANOVA	1
Case Study	1
Comparative study	1
Decision-Making Trial and Evaluation Laboratory (DEMATEL)	1
Logistic regression	1
NPV model	1
Panel data study	1
SEM PLS	1
The Search-Access-Test (S-A-T) model	1

Other qualitative methods also used are interviews, descriptive studies, comparative studies, and Decision Making (DEMATEL). This method is commonly used for research that analyzes general coverage and is non-statistical. The case study method is used by (Bernini et al., 2022), who analyzes several cases (multiple case studies) to see the relationship between digitalization and the reputation of banks in Italy. Data Envelopment Analysis (DEA), a quantitative method to measure efficiency, is also widely used. The Delphi model will transform the results of the expert interview into a quantitative model. Among those who use this method are (Do et al., 2022; Reitz et al., 2019; Zuo & Strauss, 2021).

In addition to qualitative approaches, quantitative approaches are also widely used. The regression model is one of them. Whether it is multiple regression, logit regression, or panel data regression. Regression is used in many studies that include performance, the influence between variables, and a more specific analysis of one organization. The Structured Equation Model (SEM) is also interesting to use, as is (Winasis, 2020) research which examines the impact of digital transformation on employee engagement in the Indonesian banking industry. Apart from that, ANOVA was also used by (Tsindeliani & Mavlutova, 2022), who researched the transformation of the financial sector in the digital era.

RESULT AND DISCUSSION

During the process of examining the literature, we found that there was an absence of common understanding of the term bank digital transformation. In this section, we synthesize different perspectives of the definition. We discuss the reasons, purposes and key dimensions of bank digital transformation. We also analyze the strategy framework for implementing digital transformation by examining the development, deployment and use of digital technologies in banking.

Definition of Bank Digital Transformation

Bank digital transformation can be viewed as the forefront of technological revolution characterized by rapid deployment and innovation of digital services, exponential pace of change and innovative breakthroughs that alter conventional banking practice (Krasonikolakis et al., 2020). While (Warner & Warger, 2019), defined digital transformation as the use of new digital technologies, such as mobile, artificial intelligence, cloud, blockchain, and the Internet of things (IoT) technologies, to enable major business improvements to augment customer experience, streamline operations, or create new business models. This definition quite similar with (Fitzgerald, 2013) who define digital transformation as “the use of new technologies like social media, mobile, analytics or embedded devices to enable major business improvements, such as enhancing customer experience and streamlining options”. Disruptive technologies are triggers that transform the nature of work, leading to profound changes in organizational structure, labor relations, employee skills, customer relationship and communications.

The digital transformation stems from the combination of information technology and the work of companies. Digital transformation leads to superior performance by influencing organisational dimensions "internally, externally and comprehensively". The digital transformation is the intensive use of information technology in order to achieve development

and improve the performance and position of the organisation significantly in the market. Another definition stated. Who indicates digital transformation as an organisational changes or new investment in digital business models in order to increase the interaction of digital customers more at each point of contact in the customer experience life cycle, while others define it as a business merger with digital technology.

Digital transformation is fundamentally changing the operations and bringing added value to the product offered to customers. It is also an intellectual and cultural change (Bharadwaj et al., 2013) and means "developing and improving business models, activities, processes and capabilities to take advantage of changes in digital technology and its impact on society in a strategic way". The plurality of approaches to digital transformation is evident of transformation process in the banking sector. Another definition by (Sadigh et al., 2021), they discussed that digital transformation is a collection of actions taken by organizations to adopt new disruptive digital technologies for capturing their interests and changing the organization performance significantly. The term digital transformation is not as simple as a straightforward deployment of the latest information communication technologies. In broad understanding, digital transformation often associated with the skills and abilities required for effective and efficient operations, whilst others are narrow and focus on distinct cues such as strategic change, performance or culture.

Reasons and Purposes of Bank Digital Transformation

Studies conducted by Exchanger, EY, Forrester, Gartner and IDC show that in the future, all businesses will be done in digital manners. Previous studies show that in the next five years, 2/3 of the bank customers will take the lead and select the online world. In digital transformation, bank's infrastructures are optimized for digital interactions and their culture shift to the fast-paced technological changes. The business model of such banks is based on the provision of completely digital value propositions and tends to optimize its interactions with customers via digital technologies. This condition encourages bank to do digital transformation.

There are many reasons for bank doing digital transformation, but basically the reason for shifting from analogue technology to digital technology is to be relevant and survive in the market. Most banks have acknowledged the importance of new technologies to improve their performance and client satisfaction. Specifically, according to (Rogers, 2016), the reasons for banks to do digital transformation are: (1) to be in the same level of playing field with the competitors in the market who already adopt of digital transformation, (2) to increase profits as the impact of the digitalization, (3) to be more efficient in delivering product and services, (4) to achieve customer satisfaction. (Hadi & Hmmod, 2020) concluded that the most crucial reason for bank doing the digital transformation is the economic goal to expand market share, to survive in the competition locally, regionally, and globally because competitors may carry the same vision and required digital transformation. They also mentioned the reasons for bank to do digital transformation is fro servicing remote areas without physical branches, differentiation from competitors or reduction of operating costs.

Based on (Hadi & Hmmod, 2020), digital transformation has three main functions. First and foremost, digital transformation helps banks to stay relevant in the market competition and to remain competitive. Banks constantly evaluate and adapt their digital strategies because they

were under pressure to transform their business models from product-centric to a more customer-centric approach. Digital transformation will impact to customer satisfaction and at the end will bring banks' financial competitiveness. Secondly, bank digital transformation will enhance bank's efficiency within the banking industry. Thirdly, bank digital transformation will develop and improve the performance of bank's management as the objectives of stakeholders have achieved and upgrading the level of banking services provided.

Modern technologies in the internet banking increase the efficiency of the banks resources, minimize the costs and improve the client service. Moreover, the larger number and the higher quality of the distant banking services are the obvious benefit on the competitive market. The national and global digital transformation makes investments in information and communications technology (ICT) by financial institutions a necessity, not only for gaining a competitive advantage but also for expanding their knowledge and learning about their customers.

(Al-Busaidi & Al-Muharrami, 2019) use longitudinal study to demonstrate the impact of ICT investment on finance performance indicators and the result of the ICT value is significantly positive. Furthermore, the results indicated that the link between ICT and performance indicators beyond financial, is generally accepted by the business managers. ICT value is connected also to customer indicators, internal process indicators as well as learning and growth indicators in addition to sector indicators. Al Busaidi's study provides an integrated assessment that enables banks to develop their strategies and assessments in terms of ICT investments and to go beyond typical, tangible financial profitability indicators.

Profit motive in banking digital transformation also discussed who found that the banks focusing on digitalization and sustainability are profitable, even in the face of coronavirus disease 2019 (COVID-19). By using the Pearson's correlation, the research shows that the level of investment in digital transformation has a strong relationship with the net result and the digitainability in banking is an important factor in uncertain times and should be fostered and included in bank strategies in the post-COVID 19 world. But in the reality, the bankers still found many problems when performing digital transformation as many banks assume that digital transformation is about workflows and systems rather than focus on customer experience.

The assumption that banking digital transformation is only about workflows and system arose because actually only limited people known about the determinants of digital banks performance. Filled this gap by evaluating the relationship between inner factors and bank performance in Russia and found that digital banks which have more customers and more transactions through digital communication, have higher performance. Improving the technological effectiveness of banking processes is possible on the basis of digitalization using various digital technologies, which will lead to the simplification and optimization of traditional operations, prevention of fraud, create new and more personalized offers according to customer needs, while changing the way of interaction with them (Artemenko & Zenchenko, 2021).

Key Dimensions of Bank Digital Transformation

The banks are under pressure to transform their business models from product-centric to a more customer-centric approach in order to stay relevant. In order to face the challenges, Bank has felt that the digital transformation is seen as the solution. But actually, bank digital

transformation not only about technology. (Sadigh et al., 2021) based on their research, stated that the elements of the digital transformation consists of five aspects: 1). Individuals, who engage in the bank through career cooperation. 2). Processes, to increase bank efficiency and to develop new digital business models which requires a complete lifecycle analysis of the value offered to the customer and how each customer interacts during customer experience lifecycle. 3). Technology, for integrated information infrastructure as part of information management can interact to support growth-oriented. The information structure is very crucial for data and content management to determine the relationships between information categories. 4). Content, which involves management of internal enterprise information and customer-oriented content to assess all digital assets and provide product information according to reflect the customer's preferences. 5). State, for banking digital transformation which requires more concern as it involves a large number of sensitive personal data and wealth. It needs new procedures and information security to prevent the bank from incurring unaccounted losses. Another perspective on elements of digital transformation stated by (Winasis, 2020) who mentioned that high level aspects in digital transformation are strategy and management, technology and regulation, customers and employees participation, market knowledge and products, and public benefit. Each aspect is consists of several sub-part of varying importance for the digital transformation of banks and is described in detail.

According to (Feher & Varga, 2019), the core digital transformation practices such as leadership, digital trends, digital transformation skills, digital strategies, implementation of digital technologies, and customer-centric approach are influences the bank's digital maturity levels. While The Code Halo group suggests that the dimensions of digital banking include data and data analysis strategies; business processes strategies, and strategies for social networks and smart phones. Digital banking arise as a frequent used terms in the field of bank digital transformation, but it should be differentiated to electronic banking that already well developed in almost banks currently. Their difference identified by (Rogers, 2016) and can be considered as the dimension of bank digital transformation, as follows: 1). Customer can access the bank services through the bank virtual channels similar to social media in digital banking, while in electronic banking the customer can contacts the bank with electronic channels offering services in a one-way mode. 2). Products and services are typically mobile-based applications in digital banking, while electronic banking offers different kinds of accounts in their products and services. 3). Products and services are agile and based on customers' needs at the moment of interaction with the bank in digital banking. On the other hand, electronic banking's products and services are not developed in accordance with the customers' needs. 4). Integration of technologies and infrastructures is one of the leading principles in digital banking, the one that not exist in electronic banking which uses multiple old and new technologies. 5). The passage of laws results in the creation of new opportunities applied in digital banking, while it usually become a limiting factor in electronic service design.

Challenges and Implementation Strategy

Reasons and purposes in implementing digital transformation motivate bank to accelerate the transformation process, but there are some challenges facing digital transformation as mentioned by (Rogers, 2016) who found the challenges are: (1) Inadequate

level of infrastructure to adopt technology and provide support, (2) Vulnerability, unauthorised access, cybercrime and piracy in terms of data privacy and security and it is difficult to extend these guidelines to digital banks, (3) Requirement of different additional legal support for technology in the banking sector especially for new product types and delivery. This requires a review of existing legal definitions and authorisations.

Digital and more broadly technological innovation for banks is becoming not only an opportunity to get to incremental returns—driven mostly by better productivity and by a much more enlarged convenience offered to clients—but also a risk to become obsolete and irrelevant, with then a rapidly deteriorating revenues capacity. The margin compression and loss of market shares and of entire pots of revenues and of millions of clients is in itself. Digital transformation continue to process and impact to internal and external environment due to the development of new business model. There are many questions regarding the digital technologies acceptance in the banking sector, tried to assess the key component of digital transformation by performing a Digital Maturity Assessment.

The implementation of DT is all about organizational and strategic structural change as a day-to-day process that involves the improvement of the business model, collaboration and culture (Warner & Warger, 2019). Banks have consistently invested in high-quality technological infrastructure, large data centres and software applications. This condition makes the DT become more complex because the number of different infrastructures and legacy applications have existed in large and long-standing banks. The transformation process to change the established centralized and traditional procedures over the years within the banks, will take a long time and long list to do. Reliable and efficient are not always get to quick response to changes. These hierarchical structures impede swift adaption to new environments or embracing change.

In reviewing the literature, we found a large number implementations of bank digital transformation which prove massive digital transformation in banking industry. Banks are struggling to develop and implement digital transformation strategies. According to (Warner & Warger, 2019), banks need a clear strategy, proper organizational structure, digital capabilities, supportive organizational culture, and a balanced governance system to make the digital change. They used a project-based and measurement approach in implementing digital transformation with three categories consists of infrastructure, development, and business impact.

Many advantages, from customer satisfaction, efficiency, to profitability, can be achieved if bank applied relevant digital transformation strategies. In this study, we analyze strategy for implementing digital transformation by examining the aspects. (Artemenko & Zenchenko, 2021) found that there are four aspects that should be consider in digital transformation strategy as follows: 1). Technology: defined as the accumulated skills, experience and knowledge, organisational and administrative tools, means and materials that are available to be used by man to take advantage of resources to satisfy the material and moral needs. Organisation such as Bank, develops an integrated information infrastructure that enables information management to interact and analyze data to support growth. 2). Value Creation: is an interlinkage activities to create products, starting from using raw materials up to the finishing process with the product distribution process to the consumer. The use of new technologies changes the products or services and create new value. These changes impact to the value chain from classical to digital business and need technologies associated with products and services. 3). Structural changes: are required to support an adequate foundation for new business model

particularly with regard to new digital activities within the structures of organisation. 4). The financial aspect: should be considered in bank digital transformation strategy, before the three aspects above mentioned. Financial aspects can either slowing down digital transformation or urging the digital transformation process. Financial aspects become the engine that force the implementation of digital transformation.

One approach for the digital transformation involves leveraging innovative digital technologies such as artificial intelligence, cloud technologies and blockchain. (Demirbas et al., 2018) found those technologies applications can be categorized into two parts: evolution or revolution process, and concluded that digital transformation effect on sourcing strategies tend to be more evolutionary than revolutionary. They found that digital transformation has significantly impacted sourcing strategies among financial services providers where the strategic motivation to outsource has shifted from cost reduction to innovation while offshoring activities have declined in importance.

CONCLUSION

Based on our analysis in Scopus database, the research in banking digital transformation is growing significantly. There are various approaches in determining the definition of banking digital transformation, many mentioned the use of new digital technologies to enable significant business improvements with many reasons and purposes in doing the transformation such as for customer satisfaction, competitiveness, efficiency, and profitability. We also analyze the papers to get insight on the dimensions of the bank digital transformation, challenges and also strategy for the banks in implementing the digital transformation. Most of the papers' research techniques use literature review as this topic is a current issues that still continuously develop and deserves attention of future research.

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