



Digital Innovation and Bank Profitability: A Literature Review

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¹ University Putera Batam, Batam, Indonesia

Abstract

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This study aims to analyze the relationship between digital innovation and bank profitability through a literature review of scholarly publications from the last five years. The research focuses on digital banking and mobile banking as forms of financial innovation influencing operational efficiency, financial performance, and competitiveness in the banking industry. The findings reveal that digital innovation generally improves cost efficiency, service accessibility, and transaction speed. However, its short-term impact on profitability remains varied across countries and types of financial institutions. These differences are influenced by infrastructure readiness, implementation costs, digital literacy levels, and control variables such as bank size, credit risk, and non-interest income. The study emphasizes the importance of a sustainable and adaptive digital transformation strategy to optimize the economic benefits of banking digitalization. The results are expected to provide a conceptual foundation for further empirical research and inform strategic banking policy development in the era of global digital transformation.

1. Introduction

Banking is an institution that has a central role in maintaining financial system stability and supporting economic growth through the function of intermediation, fundraising, and credit distribution to the public. In the last two decades, the banking sector has faced structural changes due to the development of digital technology that has driven the transformation of banks' business and operational models. The industrial revolution 4.0 and advances in information technology are accelerating the digitalization process of financial services, including the implementation of mobile banking, internet banking, and various other financial innovations that are key factors in increasing the efficiency and profitability of financial institutions (Giaretta & Chesini, 2018).

The digital transformation adopted by banks is not only a response to changing consumer preferences, but also a strategy to maintain competitiveness and profitability. In this context, financial innovation is defined as the ability of banks to create and implement technology-based services and products to improve accessibility and operational efficiency (Magallón González et al., 2022). However, empirical results related to the impact of digital innovation on bank profitability still show inconclusive findings. Some studies found positive associations, while others showed negative or insignificant results (Akani & Tony-Obiosa, 2020).

These inconsistencies indicate that there is a research gap that needs to be explored further. In the context of developing countries, the adoption of digital banking still faces challenges in terms of infrastructure, digital literacy, and regulatory readiness. Research by Boateng (2020) in Ghana and Udobi-Owoloja et al. (2020) in

Nigeria shows that although digital banking contributes to service efficiency and increased non-interest income, its impact on profitability has not been significant. This is similar to the findings of Imamah and Safira (2021) who found that the implementation of mobile banking in national banks had a positive, but not significant, effect on profitability indicators such as ROA, ROE, and NPM.

Furthermore, the research of Wijayanti et al. (2021) highlights that although the adoption of digital innovation brings efficiency and expansion of services, the financial impact is often delayed due to the high cost of technology investment and low utilization rates by customers. On the other hand, Fentaw and Thakkar (2022) found that financial innovation in Ethiopia has not been able to provide a significant increase in the profitability of private banks, which suggests the need to re-examine this relationship in a broader context.

Based on these various results, it can be seen that banking digitalization is still in the transition stage towards the maturity of digital business models. The difference in empirical results can be explained through control variables such as firm size, credit risk level (non-performing loans), and non-interest income (net interest income), which have been shown to influence the relationship between digital innovation and profitability (Imamah & Safira, 2021). Therefore, this literature-based study aims to conceptually examine the extent to which digital innovations, especially mobile banking and internet banking, contribute to increasing bank profitability in the era of digital transformation in the last five years, as well as identify the factors that led to the diverse empirical results in previous studies.

2. Literature Review

2.1. Digital Banking and Financial Innovation

Digital banking has become a major manifestation of modern financial innovation, where information technology is integrated to improve efficiency, expand market reach, and strengthen banks' relationships with customers. According to Giaretta and Chesini (2018), digital innovation in European banking significantly affects long-term profitability through reduced operational costs and increased digital transaction volume. However, this positive impact depends on infrastructure readiness and effective technology adoption at the organizational level. In the context of developing countries, the adoption of digital banking serves as a catalyst for increasing financial inclusion, although it is often faced with digital literacy constraints and high implementation costs.

Boateng (2020) shows that the implementation of mobile and internet banking in Ghana has succeeded in improving efficiency and non-interest income, but has not had a significant impact on profitability due to the low user penetration rate. Furthermore, Magallón González et al. (2022) affirm that the role of digital innovation includes not only the provision of new services, but also the development of business models oriented towards technological efficiency. These findings show that digital transformation in the banking sector does not automatically increase profitability, but rather requires an integrative strategy between technological innovation, cost efficiency, and customer adoption.

2.2. Mobile Banking and Bank Profitability

Mobile banking is a form of financial innovation that allows customers to conduct banking transactions through mobile devices, thereby creating convenience and speed of service. In an empirical context, the relationship between mobile banking and bank profitability still yields varying conclusions. Imamah and Safira (2021) found that the adoption of mobile banking by national banks had a positive but insignificant effect on profitability indicators such as ROA, ROE, and NPM, due to high operational costs and uneven use of services among customers.

Research in Nigeria by Udobi-Owoloja et al. (2020) supports these findings, where digital channels such as mobile and internet banking have been shown to improve operational efficiency but have not had a significant impact on financial performance in aggregate. On the other hand, Fentaw and Thakkar (2022) highlight the importance of strategic and sustainable adoption of technology, as banks that are unable to adapt to digital developments will lose their long-term competitiveness. Thus, although mobile banking is believed to be the driver of financial system modernization, its success in increasing profitability still depends on the bank's internal readiness, regulations, and customer behavior.

3. Methods

This research method uses a literature study approach that focuses on conceptual and comparative analysis of various previous research results that are relevant to the theme of the influence of digital innovation, especially digital banking and mobile banking, on bank profitability. The literature study was chosen because

it was able to provide an in-depth understanding of the phenomenon of digital transformation in banking from a theoretical and empirical perspective without collecting direct field data. Through this approach, the research examines and synthesizes the results of research published between the last five years, so that the scope of analysis remains up-to-date and in accordance with the dynamics of the modern financial digitalization era.

The first step in this method is to identify literature relevant to the research topic through scientific databases such as Google Scholar, ResearchGate, Elsevier, and accredited national journals. Literature selection is carried out by considering the suitability of the theme, the time span of publication, and the quality of academic sources that have gone through a peer review process. The next stage is to group the literature based on the main variables studied, namely financial innovation, digital banking, mobile banking, and bank profitability. From each literature, conceptual data such as research objectives, methods, findings, and limitations are systematically analyzed to identify research gaps and empirical outcome trends.

The analysis was carried out in a descriptive-comparative manner with emphasis on comparing the results between studies and efforts to find patterns of relationships between digital innovation and bank profitability. This approach makes it easier for researchers to draw conceptual conclusions about the factors that cause differences in empirical results, such as differences in the context of countries, the scale of bank operations, the level of digital literacy, and the readiness of financial infrastructure. In addition, this literature study also pays attention to control

variables such as bank size, non-performing loan ratios, and non-interest income which are often differentiating factors in determining the level of profitability.

The end result of this literature study method is a structured summary that combines findings from various studies to provide a comprehensive picture of the extent to which digitalization and financial innovation are affecting bank performance. Thus, this method not only generates theoretical understanding, but also provides further empirical research directions in the context of the digital transformation of the banking sector in developing and developed countries.

4. Results

Digital transformation has become the main focus of the development of the modern banking industry. Literature review shows that the role of digital innovations such as mobile banking, internet banking, and financial technology is increasingly dominant in shaping the profitability structure of banks. However, the empirical impact of these innovations on financial performance has not yielded uniform results. Differences in market conditions, technological readiness, regulations, and consumer behavior are the distinguishing factors in determining the success of the implementation of digital banking in various countries.

The results of the literature review show three main patterns in the relationship between digital innovation and bank profitability. First, digital innovation has proven to be able to improve bank operational efficiency by reducing transaction costs, expanding the customer base, and increasing the volume of digital services. This is especially seen in developed countries, where infrastructure and

digital literacy are well established. Second, the impact on short-term profitability is still not significant in many developing countries due to high initial investment in digital infrastructure and suboptimal organizational internal adaptation. Third, the effectiveness of digital innovation is strongly influenced by control variables such as bank size, credit risk, and non-interest income that mediate the relationship between innovation and profitability.

Research by Giaretta and Chesini (2018) found that digital innovation in European financial institutions improves cost efficiency and expands market penetration, but its contribution to short-term profitability is still limited due to the high cost of digital transformation. This is in line with Boateng (2020) who researched banks in Ghana and found that digital banking does improve the efficiency and speed of services, but its effect on ROA and ROE has not been significant. Akani and Tony-Obiosa (2020) in Nigeria also showed similar results, where financial innovation had a positive impact on non-interest income, but not significantly on overall profitability due to low technology penetration among rural customers.

In contrast to the African context, research by Wijayanti et al. (2021) in Indonesia found that digital banking innovation is able to strengthen bank operational performance, although its direct contribution to profitability is still limited. Imamah and Safira (2021) emphasized that mobile banking in national banking has a positive but not significant influence on ROA, ROE, and NPM due to high operational costs and uneven technology adoption across all customer

segments. This shows that the implementation of digital innovation has not been fully utilized optimally to increase long-term profitability.

Research by Fentaw and Thakkar (2022) reinforces this conclusion through a study in Ethiopia that highlights that financial innovation has not been able to have a significant effect on the profitability of private banks. Despite the increase in efficiency, problems such as limited digital networks and the lack of uniform regulatory policies are the main obstacles. Meanwhile, the study of Magallón González et al. (2022) in Latin America shows that the success of financial innovation depends on the integration of digital systems with adaptive managerial strategies. Banks that do not adapt their business models to digital technology tend to lag behind in terms of efficiency and profitability.

In addition to geographical and infrastructure factors, control variables such as bank size, credit risk level (NPL), and non-interest income (NIINCOME) play an important role in determining the extent to which digital innovation is able to affect profitability. Raharjo (2021) explained that large-scale banks generally have a higher technology investment capacity and are able to bear the costs of long-term transformation. In contrast, small banks face limited resources that hinder the acceleration of digitalization. Therefore, the results of the study tend to show a positive correlation between digital readiness and profitability in large banks, while the effect on lower-middle banks tends to be insignificant.

The results of the literature synthesis also show that the impact of digital innovation on bank profitability is greatly influenced by the organization's internal readiness, such as human resource competence, cybersecurity, and digital risk

management capabilities. Digital banking implemented without an integrative strategy can actually increase operational costs and data security risks, which ultimately reduces profit margins (Aripin, 2021). Therefore, the effectiveness of digitalization depends not only on technological aspects, but also on managerial readiness and policies that support sustainable implementation.

Another important finding from the results of this study is that most studies highlight a lag effect between the implementation of digital innovation and increased profitability. This means that the positive impact of digital banking is often only seen after a few years of implementation, when investment costs begin to decrease and the volume of digital transactions increases significantly. This explains why some studies have found positive but insignificant effects in the short term.

Conceptually, the results of this literature review show that digital banking and financial innovation have great potential in driving bank profitability, but their influence depends on the structural conditions and readiness of the banking ecosystem. The main challenges identified include: (1) high initial investment for digital systems; (2) low level of digital literacy in most customers; (3) weak cybersecurity; and (4) imbalances in financial infrastructure between regions. Taking into account these factors, further research needs to develop a more comprehensive empirical model, which considers the control variables as well as the mediating influence of cost efficiency and technology adoption on bank profitability.

Table.1 Summary of Gap Research

No	Name (Year)	Title	Findings	Gap
1	Giaretta & Chesini (2018)	Digital innovation and profitability: Evidence from European financial institutions	Digital innovation improves cost efficiency and transaction volume, but does not directly impact profitability.	It has not assessed the long-term impact and differences between types of innovation.
2	Boateng (2020)	The impact of digital banking on the profitability of deposit money banks: Evidence from Ghana	Digital banking increases efficiency and non-interest income but is not significant on profitability.	Data limitations and digital penetration are low in developing countries.
3	Akani & Tony-Obiosa (2020)	Effects of Financial Innovations on the Profitability of Deposit Money Banks in Nigeria	Financial innovation has a positive but not significant effect on the profitability of banks.	It does not consider control variables such as bank size and NPLs.
4	Wijayanti et al. (2021)	The Effect of Digital Banking Innovation on the Performance of Conventional Commercial Banks in Indonesia	Digital innovation improves the operational efficiency of banks, but its impact on profitability is still limited.	Lack of long-term investment cost and adaptation analysis.
5	Imamah & Safira (2021)	The Influence of Mobile Banking on Bank Profitability on the Indonesia Stock Exchange	Mobile banking has a positive but insignificant effect on ROA, ROE, and NPM.	Low technology adoption and high operational costs.
6	Fentaw & Thakkar (2022)	Effect of Financial Innovations on Profitability of Private Commercial Banks in Ethiopia	Financial innovation has not had a significant impact on bank profitability.	The expansion of the cross-border empirical model has not yet been carried out.
7	Magallón González et al. (2022)	Banking innovations and their effect on profitability	Digital innovation has a positive impact depending on managerial strategy and organizational readiness.	It has not assessed the influence of managerial variables and cost moderation.

5. Discussion

The results of the literature study show that the influence of digital innovation on bank profitability is still inconsistent in various research contexts. In many cases, digitalization has been able to improve operational efficiency and expand the customer base, but it has not been fully able to optimize short-term profitability. These findings are in line with the views of Giaretta and Chesini (2018), who stated that although digital innovation reduces transaction costs and strengthens access to services, its financial impact takes time to be significantly realized.

The difference in empirical results is also caused by structural variables and the business environment of each country. In the context of developing countries, as outlined by Boateng (2020), the main challenge of digital banking lies in low digital literacy and lack of technology penetration in the rural sector. As a result, while digital innovation is expanding access to finance, profitability levels have not increased significantly due to uneven adoption.

The study of Akani and Tony-Obiosa (2020) in Nigeria added that the insignificance of the relationship between financial innovation and profitability is also due to the lack of integration of digital strategies with risk management policies and cost structures. Banks often focus on technology implementation without considering long-term cost efficiencies. In contrast, the research of Magallón González et al. (2022) highlights that the effectiveness of digital innovation depends on managerial readiness and organizational culture that supports digital transformation as a whole.

In the Indonesian context, research by Imamah and Safira (2021) and Wijayanti et al. (2021) shows that there is a positive direction between digital banking and profitability, but it is not significant due to the high cost of maintaining digital infrastructure. Banks that have integrated digital innovations in their operational and marketing systems have shown improvements in cost efficiency as well as non-interest income, but net profit margins are still not optimal.

Based on the overall, the results of this discussion confirm that banking digitalization provides a great opportunity in strengthening the competitiveness of the financial industry, but its effect on profitability is highly dependent on implementation strategies, macroeconomic conditions, and the readiness of the digital ecosystem. To achieve optimal results, banks need to adopt a transformation strategy that focuses on cost efficiency, digital security, and improving customer literacy. Strengthening inclusive digital infrastructure and adaptive regulatory policies will be decisive factors for increasing long-term profitability in the era of digital transformation of banking.

6. Conclusion

Based on the results of a literature study on research published in the last five years, it can be concluded that digital innovation, especially in the form of digital banking and mobile banking, has an important role in strengthening operational efficiency and increasing the competitiveness of modern banking. Digital transformation has been proven to drive cost efficiency and expand access to financial services, but its impact on profitability still varies depending on

organizational readiness, technological infrastructure, and the business environment conditions of each country. Although most of the research results point to a positive relationship between digital innovation and profitability, the effect has not been statistically significant in the short term. This is due to the high initial implementation costs, limited digital literacy of customers, and the lack of optimal integration of technology-based management systems in many banking institutions.

In addition, the success of digital banking in improving financial performance is also greatly influenced by control variables such as bank size, non-performing loan ratios, and non-interest income which function as the main determinants in assessing profitability. Thus, to achieve the maximum benefits of digital innovation, banks need to develop a comprehensive and sustainable transformation strategy. This includes increasing the capacity of human resources, strengthening the digital security system, and implementing business models that are adaptive to technological developments and customer needs. This approach will help banks not only increase profitability, but also strengthen their resilience and relevance in the digital finance era.

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