

## **CHAPTER II LITERATURE REVIEW**

### **2.1 Literature Review**

#### **2.1.1 Resource Based View (RBV)**

Resource based view (RBV) is a theory that highlights the combination of a firm's resources to achieve competitive advantage, several researchers develop the RBV by defining the resource characteristic of competitive advantage, interconnect RBV nature environment as a Natural Resource Based View (NRBV), other researchers suggest that a firm's resource as a knowledge-based view. Resource Based Theory (RBT) focuses on elaborating the resources that have characteristics of valuable, rare, inimitable, and non-substitutable (VRIN), enabling the firm to win in competitions (Ristyawan et al., 2023). It is crucial for directors to have micro foundation of dynamic capabilities to sense opportunities through scanning, searching and exploring available resources, create critical decision on resource investments opportunities and allocating to increase return advantage and leverage resources to create a product or service, transforming resource configuration to create a competitive advantage for the product or service.

#### **2.1.2 Information Technology Productivity Paradox**

Digital technology investments have created mixed results on company's performance. The economic impact of IT investments can be classified into two categories; production function based and business value

modeling. The latter involves measuring IT impacts on various performance metrics. Production theory-based studies use specifications for technology to convert inputs to outputs. Several studies have failed to provide evidence of significant productivity gains from IT investments while other studies find that IT was positively related to an increase level performance measures in capacity utilization, inventory turnover, quality, relative price, and new product introduction; the variables were predictors of higher level of measures such as return on assets and market share (Barua & Lee, 1997). IT investments or digital transformation can give mixed results to a firm, as it requires high capital expenditure or initial investments for the company to receive results regarding their investments.

### **2.1.3 Digital Transformation in Financial Industry**

As globalization has created a huge impact in worldwide connections, enabling interconnections between economies, culture and population between countries and societies. Globalization opens opportunities for countries to do trades such as movement of goods, services, capital and people, Globalization enables acceleration integration between corporations and minimize trade barriers. As globalizations creates a stronger impact on the world, it enables the creation of digitalization where people are able to use digital technologies and data that enables a mutual connection that result in a new or changes to the existing digital technology, Digitalization have a significant impact in the growth of society, business and science (Walter et al., 2022). The increase of digitalization has influenced the activities in

business enabling companies to create business models (BMs) by enabling companies to work together to create certain product or service offerings as well as enabling a new form of company relationship with its customers and its employees. As digitalization rises, companies have gotten pressure on reflecting their current strategy and exploring new business opportunities systematically at early stages. It is shown that the importance of digitalization is not to be mess with, as it can solve customer problems and create achievable partnerships and network between companies to be critical for digital business model innovation (BMI) (Rachinger et al., 2019). As digitalization transforms the traditional concept of economic growth and competitiveness. The impact of digitalization has accelerated development on economic growth and competitiveness, changing the economy as a whole, the digital economy stimulates economic growth, increases capital and labor productivity, a reduction on operating costs and promotes access to global markets (Aleksandrova et al., 2022).

The rise of digitalization has created a huge transformation for the banking industry. It all started with a simple online service that is used to check account balances and enable users to transfer funds to peers. Over the years, there has been a high increase in customer demand which creates or evolves the service into a full financial product that is available online. In the last few decades there has been a rapid transformation in the financial industry.

Financial sectors have undergone a huge shift that is due to the rapid advancement and application of digital technology. The digital transformation in the banking industry has fundamentally changed on how financial services are delivered, consumed, and regulated. The use of new digital technologies has enabled significant improvements in enhancing customer experience, optimizing operation and creating innovative business models that disturb conventional banking practices (Shanti et al., 2022). According to (Warner & Wäger, 2019), define digital transformation as the use of new digital technologies such cloud, artificial intelligence, blockchain and the internet of things (IOT) technologies, that enables businesses to improve efficiency on operations, augmented customer experience, and new business models.

Digital transformation in banking originates from a combination of information technology and the work of companies. Traditional banking institutions are based on physical interactions between customers, with digital transformation, it will enable banks to improve their performance by influencing the organization internally, externally and comprehensively. With digital transformation, companies can improve their performance and organization positions in the market. The research by Naimi-Sadigh et al (2022) define digital transformation as a collection of actions by the organizations to implement new disruptive digital technologies which modify the organization. Digital transformation is not as simple as it seems such as deployment of information communications technologies. As a comprehensive grasp, digital transformation is most associated with the skills

and abilities for effective and efficient operations, on a more particular and focused understanding, digital transformation is defined as a strategic change, performance or culture.

In Indonesia specifically, Indonesia's Financial Services Authority (OJK) recognized this shift and has introduced OJK Regulation No.12/PJOK.03/2021, which established the legal framework for digital bank and replaces BUKU (*Bank Umum berdasarkan Kegiatan Usaha*) classification system with the KBMI framework, demonstrating the government's dedication in supporting innovation in banking in the digital age (Assegaf Hamzah & Partners, 2021).

Although the beneficial effects of digital transformation are widely acknowledged, perceived usefulness plays a crucial role in encouraging the market's adoption of digital transformation, while characteristics like security and trust have a major impact on user satisfaction. This highlights the complexity of digital transformation as a phenomenon that functions simultaneously at the institutional, regulatory and consumer level, each of which may interact variously with financial performance outcomes.

#### **2.1.4 External Factors of Digital Transformation**

Digital transformation in banking has been affected by external factors such as regulation and compliances. Development in digitalization in banks is decelerated due to regulatory requirements and obstacles (Diener & Špaček, 2021).

The literature analyzes that customer is part of the crucial external factor in digital transformation in banking. According to the literature, customer acceptance and trust have several contrasts towards the utilization of applications and technology, digital customers also expectations and knowledge regarding the use of digital technology and evolving varies (Diener & Špaček, 2021). According to António Porfírio et al.(2024), initial adoption of digital transformation is driven by economic advantages and user-friendly user utilization. Having customer retention within electronic channels had a huge impact on the bank's ability to provide security and protection for the user transactions. Conventional approaches might have vulnerable effectivity due to initial targeting stages that can be easily passed by competitors, where the search stage in which customers have spent less time comparing options on deciding on digital technology. A bank can create an advantage as they integrate technology with their existing traditional assets, creating rapid customer demand as younger generation expected (Pousttchi & Dehnert, 2018). Higher privacy barriers and access barriers will minimize the intention of adopters in fully committing to the adoption of digital payment method, while a higher personalization barrier enable an increase in adopters to fully emerge in digital payment method (Dimitrova, 2024).

#### **2.1.5 Internal Organizational Factors of Digital Transformation**

There are several factors in digital transformation on banking, one of the main factors is the comprehension of digital transformation. The

implementation of digital transformation initially leads to employees' overwhelming and causes burnout, as employees did not reveal acceptance and reject innovation at the initial changes. Digitalization also causes an increase process transparency which is feared by the employees (Diener & Špaček, 2021).

The intrinsic communication process in Digital Transformation is another crucial internal factor, the insufficient and incompleteness of digitalization creates too much freedom for banks in terms of report formulation (Diener & Špaček, 2021). Many companies have outsourced parts of their information technology, leading to a shortage of information technology employees, and this arises in problems with communication about new product innovation. Bank's previous administrative systems do not comply with more recent systems that is necessary to be integrated with the "combined products". This becomes more difficult due to the complexity of existing information systems, The possibility for adjustment is not fully possible by external personnel outside the bank IT department. This resulted in IT driven financial products will lose several innovative values of their initial, impacting the bank's performance and business volume. This creates difficulties in synchronizing technology and business (Munira, 2025). Communication between IT developers and non-IT employees was difficult, this resulted due to unclear goals, poor communication interpretation and difficulty in expressing and understanding requirements (Rodrigues et al., 2023). This resulted in hindering DT result, as the communication and other

factors worsened their work relationship as colleagues, project failure and relationship conflict in workplace.

Several factors such as corporate sustainability and diversification combined with digital transformation create influence on banking limitation, scope and stability. According to Nyagadza (2022) Digital transformation is considered as an evolution of IT transformation, due to its scale, extent and speed. By implementing digital tools and sustainable reputation, banks are able to narrow their operational boundaries, enabling them to expand the banks scope for providing new services and products (Forcadell et al., 2020).

#### **2.1.6 Digital Transformation for The Economy as For Companies**

The rise of information technology or digital transformation has a positive relationship with the economic growth (Hajli et al., 2017). Although digital transformation plays a role in the economy, it does not have a positive impact on labor productivity. In macroeconomic terms, digital transformation enables business to grow and improve their business activities creating a more efficient management in the business Kaur & Sood (2017) This creates an increase in GDP contribution of business to the economy in general (Galindo-Martín et al., 2019).

Similar studies such as a study by Ardito et al (2021) analyze that digital transformation can enhance innovation to US small businesses. Investigation on the effect of revenue on the financial performance of the service industry,

with digital tools such as social media and instruction to capture digital transformation and proves that the elements improve business success (Ribeiro-Navarrete et al., 2021). Digital transformation has transform the farm industry as technologies such as AI, IoT , and robotics are able to increase efficiency in the olive sector, digital transformation such as machine learning and advance sensors have enhance quality control enabling the detection of olive fraud and ensure its authenticity, the study concludes that a high investment cost and digital literacy are barriers that is needed to be overcome to create a sector's long-term sustainability and competitiveness (Parra-López et al., 2025).

#### **2.1.7 Digital Transformation and Bank Financial Performance**

Having a strong digital transformation and implementing it on banks creates a more solid business strategy. Digital technologies are often integrated within the bank's operation with the means that the banks will receive a higher corporate value and create efficiency in their process (Zhai et al., 2022). Implementing digital transformation is expected to improve the banks' image, enabling an increase in customer attraction and retention. Digitalization improves banks' strength while it also increases competition between banks (Ardito et al., 2021b). Not only does digital transformation has an impact on the banks system, but it also creates a much easier way of communication between leaders, employees and customers.

Digital transformation helps improve operating costs, applying digital transformation will enable banks to have a more efficient in product and

service execution process as well as better manage risks. This resulted in an improvement in banks' service quality to their customers Boufounou et al (2022). A reduction in operating and increase efficiency in the workflow increases the bank's performance.

#### **2.1.8 Non-Performing Loans (NPL) and Credit Risk**

Non-Performing loans are classified when the borrower fails to make payment on the period agreed, commonly 90 days or more, Loans are considered non-performing loans when there are delay or missed payments on loan interest or principal. The loans create negative impact on bank profitability and increase risks (Arhinful et al., 2025). A high NPL can weaken liquidity, which banks are forced to utilize alternative funding to retain their capital adequacy. Long-term operation and financial stress may result from a bank's lending capacity and growth being limited by a persistent increase in non-performing loans (Lehmann, 2021).

Two major global crises, the 2008 global financial crisis and the Covid 19 pandemic, have shown the significant importance of non-performing loans as a measure of bank financial health, profitability, and long-term stability. Both global crises have demonstrated how rapid NPL levels can destabilize a well establish banking system when there is a sharp decrease in macroeconomic conditions. During the 2008 global financial crisis, NPL level have rapidly spike across all banking sectors worldwide as most borrowers defaulted on mortgage loans, corporate credit facilities and bank loans all

together. This shows a loop-hole on the systematic fragility of banking institutions that have leveraged their loan portfolios aggressively without sufficient credit risk management (Aracil et al., 2021b). The crisis demonstrates the accumulation of non-performing loans have a negative impact on bank profitability and exhaust capital buffers, limit future lending capacity and threatens the institution's long term financial sustainability. High non-performing loans limits lending, discourage investors and limit bank's growth capacity due to the increase of risk, limit resource utilization from innovation, wear profitability and capital buffers making effective credit risk management a critical priority for banking institutions focusing on maintaining financial resilience over the long term (Ozili, 2025).

The Covid-19 pandemic has presented an equally challenging period for the banking sector specifically on its NPL management, as a quick shift on the economic contraction triggering a sharp decline in borrowers payback capacity across multiple sectors simultaneously. The pandemic has severely affected bank credit risk designed primarily for financial stability, showing Covid-19 impact on the variation in non-performing loans across banks,(Acheampong et al., 2024). In contrast to the 2008 global financial crisis which emerge from the financial sector itself due to excessive risk-taking and lending, the Covid-19 pandemic was an extreme shock from external factors that affected borrowers across all sectors in the economy, providing an empirical examination of the connection between macroeconomic shocks and the accumulation of non-performing loans that

seems fundamentally distinct and equally instructive. The OJK implemented a loan restructuring policy in Indonesia specifically during bad economic conditions such as the pandemic to prevent a sharp increase in NPL ratios. With this policy, banks are allowed to temporarily reclassify restructured loans without triggering NPL classification threshold, which had major implications for the reported NPL levels of both conventional and digital banks during the continuous recovery period (*Otoritas Jasa Keuangan, 2021*).



## 2.2 Previous Research

**Table 2.2 Previous Research**

| Author(s)                                                                         | Research Title                                           | Result                                                                                                                                                                                                                                                                                                                                                                                                              | Similar                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Difference                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| Lan Nguyen-Thi-Huong, Hung Nguyen-Viet, Anh Nguyen-Phuong & Duy Van Nguyen (2023) | How does digital transformation impact bank performance? | The study investigated the effect of digital transformation on bank performance among Vietnam's commercial banks over the period 2015-2021 using dynamic panel data regression. The measurement of digital transformation was through keyword frequency analysis of annual report, where the total count was standardized across all banks on an annual basis to create a comparable index. The research resulted a | The research implements several similarities with this current study. Using panel data regression analysis and both examine the effect of digital transformation on bank performance. Both studies implement common bank specific control variables such as bank size, loan growth, NPL, and GDP growth. Measures of digital transformation using data from annual report. Both studies use dynamic panel data over multiple year period and operate within | The significant difference between both studies is that this study uses ROA as the dependent variable while Nguyen-Thi-Huong et al. (2023) implements the use of ROA and ROE as dependent variables which is commonly used to measure profitability. This study measures Bank size using market capitalization rather than total asset, to create a more market-based perspective on bank scale that was not used in Nguyen-thi-Huong et al. (2023). Nguyen-Thi- |

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|                                                 |                                                                  | negative effect of digital transformation on bank performance on ROA and ROE, the negative relationship is due to significant capital expenditures cost requirements for digital transformation, including in infrastructure, software, labor and system integration, this leads to a high increase in operational cost in a short period of time. The investment on digital transformation may take several years to obtain its benefits. | an Asian banking context that is undergoing rapid digital transformation. | Huong et al., (2023) study only focuses on the effect of digital transformation in Vietnam's commercial banks, where this research focuses on the effect of digital transformation in Indonesia's commercial banks. Nguyen-Thi-Huong et al (2023) research time period starts from 2015 – 2021, in contrast to this thesis which focuses on 2020-2024 period, analyzing the huge shift in the growth of digitalization post pandemic. |
| Dadoukis, A., Fiaschetti, M., & Fusi, G. (2021) | IT adoption and Banking Performance During the Covid-19 Pandemic | The study looked at whether US banks had invested more in                                                                                                                                                                                                                                                                                                                                                                                  | Both studies share the core argument that IT adoption strengthens bank's  | This study focuses solely on public banking in Indonesia as its research                                                                                                                                                                                                                                                                                                                                                              |

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|  |  | <p>technology before the pandemic held up better when Covid-19 pandemic hits. In the study, Dadoukis et al., (2021) classifies banks into two categories, high-IT or low-IT on whether their ratio of technology and communication expense to total operating expense was above or below average for 2018. Banks that have invested in their IT capabilities pre-pandemic experience a gentle drop in stock prices, keep lending at a high level, and had less loans that were needed for modification due to the pandemic stress. Banks</p> | <p>financial resilience , both research investigates bank's performance during the economic shock from the Covid-19 pandemic, Both research uses loan growth and analyze its relationship to digital transformation.</p> | <p>object in contrast to using U.S commercial banks. (Dadoukis et al., (2021) uses a different dependent variable in the study, where it focuses on market returns, loan volumes and loan modification rates which differs from this research dependent variables, using ROA as a measurement for bank's financial performance. The usage of the ROA in this study reflects profitability, The research by Dadoukis et al (2021) uses different measurement method for digital transformation, using financial expense ratios rather than textual</p> |
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|                                       |                                                         | that are heavily invested in IT processed more paycheck protection program loans, indicate that their digital infrastructure enables them to handle high amount of demand for credit during times of distress effectively. Ultimately IT investment not only is efficient in normal times, it creates a buffer against financial instability in condition of stress. |                                                                                                                                                        | keyword analysis. Dadoukis et al (2021) uses a different analysis method instead of using Generalized Method of Moments (GMM)                   |
| Nicola Pierri & Yannick Timmer (2022) | The importance of Technology in Banking During a Crisis | Pierri and Timmer (2022) study questions on how IT adoption matters for bank resilience during times of distress. Their findings indicate that banks with                                                                                                                                                                                                            | Both studies use panel data regression to examine the relationship between IT adoption to bank financial performance and its financial stability, both | The most notable difference between both studies is in the dependent variable. Pierri & Timmer, (2022) focus primarily on NPL ratio and lending |

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|  |  | <p>higher investment in IT before crisis ended up with notable fewer non-performing loans during times of crisis, maintaining a higher lending volume in contrast to banks with lower IT investments. The authors calculate that the spike in non-performing loans during the crisis could have been prevented by around 15% with a one standard deviation increase in IT adoption. The loan level data revealed that mortgages originated by high IT banks performed better later on, indicating better borrower screening were made attainable by</p> | <p>uses NPL as a central indicator of how well a bank manages credit risk in relation to its IT capability. Both studies shared a common proposition that IT adoption strengthens long-term bank stability. The study investigates positive effects of lending volume which is similar to loan growth as a control variable.</p> | <p>volumes as their measurement of financial resilience, while this study uses ROA which focuses solely on the banks financial profitability, capital adequacy, and return volatility simultaneously. Both research have different geographical and time period, where (Pierri &amp; Timmer, 2022) examine US commercial banks during the 2008 financial crisis, while this study examines Indonesian top 30 banks according to market capitalization, over 2020-2024. The research method for analyzing</p> |
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|                              |                                                         | <p>more advanced data processing capabilities. The study proves that IT is more than just a tool for cost-efficiency, it fundamentally alters a bank's ability to manage risk and sustain operations under extreme conditions.</p> |                                                                                                                                                                                                              | <p>digitalization differs where the research measures IT adoption through hardware equipment, software and communication expense rather than analyzing through text based keyword frequencies in an annual report. The research uses a different method to analyze the variables relationship, differs from GMM approach.</p> |
| (Safiullah & Paramati, 2024) | The impact of FinTech firms on bank financial stability | <p>The researcher examined whether the rise of FinTech firms in Malaysia financial system enable conventional banks to be more stable over the period of 2003 to 2018. The study uses Z-score as a</p>                             | <p>Both studies implement dynamic panel Generalized Methods of moments for the analysis, focusing on emerging market banking in Malaysia which have a similar institutional and economic similarities in</p> | <p>How technology adoption is measured became the difference between Safiullah &amp; Paramati (2024) and this study, The study uses total number of FinTech firms in the market as their technology</p>                                                                                                                       |

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|  |  | <p>measurement on financial stability and traces FinTech presence through the number of FinTech company operating in the Malaysian market each year. By using both OLS and GMM estimation, Safiullah &amp; Paramati, (2024) discovered that greater number of FinTeh firms was consistently correlated with higher Z-score among conventional banks, This indicated competitive pressure drive banks to improve their technology and operation undoubtedly made them more resilient. The effect was consistent across</p> | <p>Indonesia. The research uses similar control variables, bank size, non-performing loans, and macroeconomic indicators like growth GDP.</p> | <p>representative. By using keyword-based analysis from the representative banks annual report, it provides information regarding the banks investments in digital transformation, Furthermore, bank size is measured differently. This study uses market capitalization as a measurement instead of using total asset to reflect the scale of the bank. This study uses 30 top tier banks in Indonesia using market capitalization as their size following the Indonesia regulatory framework, using loan growth, NPL</p> |
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|                       |                                                                                     | banks of various sizes, Islamic and conventional banks and across banks with varying corporate governance. The consistency resulted in a suggestion that the stabilizing effect is not specified to any bank                                                                                              |                                                                                                                                                                                                                                                                                             | and GDP growth as control variable.                                                                                                                                                                                                                                                    |
| Jihen Bousrih, (2023) | The Impact of Digitalization on the Banking Sector: Evidence from FinTech Countries | The study by (Bousrih, 2023) investigated the effect of digital banking services affected bank performance across several fintech countries over the period of 2012 – 2019, digital services including ATMs, internet banking, mobile banking, credit, debit, charge and e-money. The study resulted in a | Both studies evaluate bank performance using the same dependent variable of Return on Asset (ROA), both studies investigates the all forms of digital banking services such as electronic payments, regulations, profitability and efficiency of the banking sector in implementing digital | The difference between this study and Bousrih, (2023) study is that the calculation of digital transformation differs. This study uses digital transformation consisting specific keywords that aligns to digital transformation at each individual bank annual report, in contrast to |

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|  |  | <p>significant and positive correlation of the bank's ROA with the use of e-money and cashless payment. Nevertheless, the impact of mobile subscription in mobile transactions creates a negative impact to the bank's performance. The study shows that digitalization reshapes the banking sector, though the effect of digitalization on profitability is possible to end in a mixed and depend heavily on what dimension of digitalization is being examined, creating an important for future research to investigate</p> | <p>transformation. Bousrih, (2023) verdict on the research suggest effect of digitalization are mixed at times negative impact.</p> | <p>Bousrih, (2023) uses country wide cashless payment volumes and mobile subscriber penetration rates,. This study focuses on Indonesia's top-tier banks as sample to understand the effect of digitalization on Indonesia's financial sector. Bousrih (2023) uses a different method of analysis, using fixed and random effect panel data models rather than Generalized Methods of Moments (GMM) analysis.</p> |
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|                                                                                                |                                                                                 | financial sustainability rather than focus solely on profitability as an outcome.                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Thiago Felipe, Rui Torres de Oliveira, Agnes Toth-Peter, Shane Mathews, and Uwe Dulleck (2025) | Digital transformation in commercial banks: Unraveling the flow of industry 4.0 | The study resulted in a multi-layered framework explaining how 4.0 technologies has moved from external or macro ecosystems through organizational process until it reaches the customer. The research by Felipe et al., (2025) has found out 16 important themes that are essential for successful digital transformation and long term value, such as RPA, AI, and Fintech collaboration. | Both studies analyze the importance and impact of digital transformation on a the institutional health or long-term values. In (Felipe et al., 2025) research, the author looks for “value creation” which is similar to this research which seeks a bank’s financial stability (Z-score). Both studies has identified the importance of digital transformation which does not only consist of technology but also the ability for an institution to | The study by Felipe et al., (2025) uses a qualitative literature review as methodology that enables the author to build a theoretical model, while its scope is universal, using general trends across the banking sector worldwide in contrast to this research which uses quantitative empirical analysis using regression model to test hypothesis with the scope of the research focusing on Indonesia’s top 30 Banks according to their market capitalization within a |

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|                                           |                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                               | adapt and create a long term value for survival.                                                                                                                                                                                                                                                     | specific time frame (2020-2024) enabling the capture of the rapid growth of digitalization post-pandemic.                                                                                                                                                                                                                                                                                            |
| Pananda Pasaribu & Bonnie Mindosa, (2021) | The Bank Specific Determinants of Loan Growth and Stability: Evidence from Indonesia | The research resulted in a discovery that customer deposits growth and gross NPL are the leading determinants of bank lending in Indonesia. The analysis shows that a high increase in loan growth and high NPL levels triggers banks to minimize their lending activities enabling a reduce in credit risk, The research has also found that Indonesian banks have an “abnormal” loan growth | Both studies focus on Indonesian commercial banks to represent the country’s total loans, Both studies implement the same method of analysis through Generalized Methods of Moments (GMM) to provide a robust result. The research uses the same control variables such as Loan Growth, NPL and GDP. | The main difference from the study by Pasaribu & Mindosa (2021) is that the study investigates the bank’s loan growth as independent variables while This study focuses on the impact of digital transformation on a bank financial performance covering 2020-2024 period, in contrast the study from Pasaribu & Mindosa (2021) covers 2002-2018 period where there is no significant implementation |

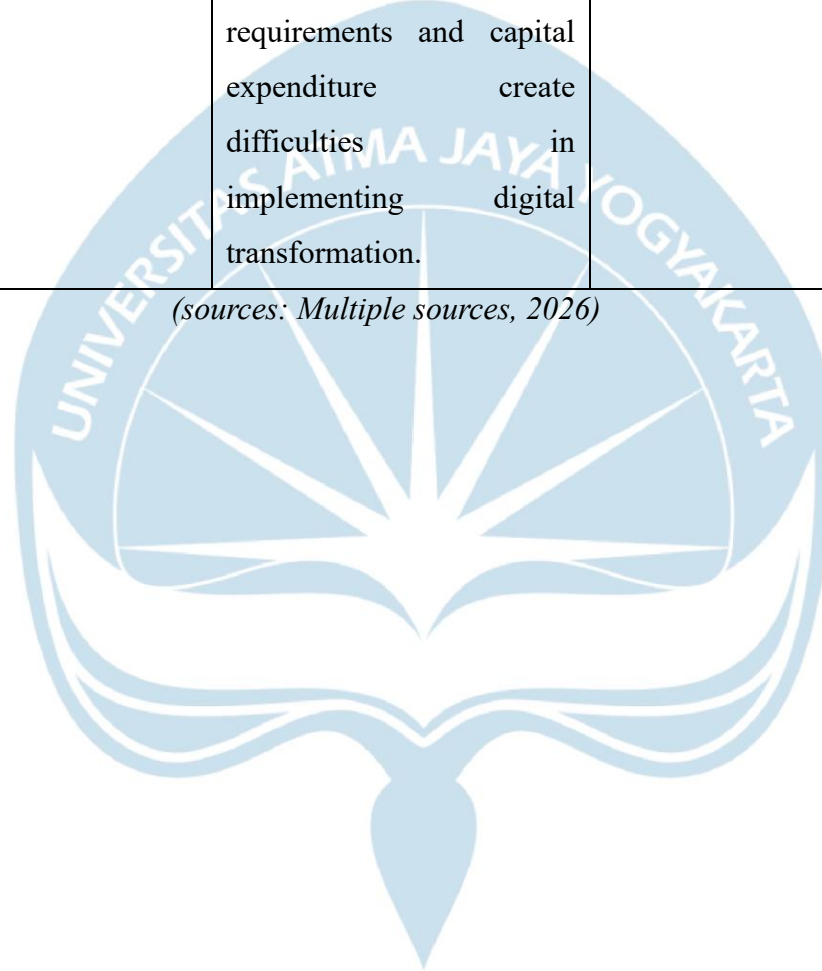
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|                                        |                                                          | which affects negatively to the banks stability.                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                       | of digital transformation during the research period.                                                                                                                                                                                                                                                                               |
| Johannes Kriebel & Jorn Debener (2019) | The Effect of Digital Transformation on Bank Performance | The author uses digital transformation keyword frequencies in a bank's annual report as a measurement for digital transformation. Banks suffers negative impacts by implementing digitalization as banks are required to have a high amount of capital to fund IT infrastructures which is necessary to store data centers and other operational needs of digitalization, therefore the high cost of investment may impact a decrease in efficiency and profitability. | The research by Kriebel & Debener (2019) have similarities in examining digital transformation as the independent variable, using text analysis frequencies as a way to measure digital transformation on each bank. The research also uses ROA as a measurement of bank performance. | The main difference between both research lies in the geographical scope, where the research analyzes U.S banks that are listed on the New York Stock Exchange in contrast to the Indonesian Stock Exchange. The research uses a different method of analysis, using two stage least square rather than General Methods of Moments. |

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|                                                                     |                                                                                                         | The result also shows lag in increased efficiency with a 5-year period.                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                           |                                                                                                                                                                                                                               |
| Wivan Febriansyah, Wita Ermawati, Anna Fariyanti, Mat Syukur (2025) | Digital Transformation and Bank Performance: The Moderating Role of Risk in Indonesian Commercial Banks | The result from the research is that digital transformation has an improvement of efficiency and profitability on Net Interest Margin of the Indonesian banks, but the effect would not appear or would be insignificant if the bank does not have high significance of financial stability. The study also showed results of relationship between digital transformation and stability is positive, banks with higher financial stability are able to | Both study focuses on Indonesian commercial banks, analyzing the impact of digitalization as an independent variable, and use several control variables alike such as NPL and Growth GDP. | The research by Febriansyah et al (2025) uses NIM and the z-score as dependent variables in contrast to ROA, The study uses panel data regression as an analysis method rather than the use of Generalized Method of Moments. |

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|--------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                    |                                                     | leverage digital technologies successfully.                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Jose António Porfírio, Jose Augusto Felicio, Tiago Carrilho (2024) | Factors affecting digital transformation in banking | The research concluded that digital transformation is a holistic process that can improve an organizational performance in banking, as digital transformation helps banks to create a more flexibility and management capacity. The research also concludes that the success of implementing digital transformation was heavily influenced by personal characteristics, employees education and internal factors such as communications, and employee's understanding | The study has several similarities, both study investigates the impact of digital transformation on the performance of an organization, mainly banks. The research also focusses on internal and external factors that might play a role on the expected outcome from digital transformation. | The research by António Porfírio et al (2024) uses a different methodological approach, as the research uses qualitative perceptions from the bank's employees, rather than using a quantitative financial data analysis with Generalized Methods of Moments (GMM). The research is set within the Portuguese banking rather than Indonesia. The research uses a different performance measurement indicator, which is based on employee subjectivity in contrast of using ROA. |

|  |  |                                                                                                                                                                                          |  |  |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|  |  | <p>plays a crucial part in the success of digitalization. Issues such as regulatory requirements and capital expenditure create difficulties in implementing digital transformation.</p> |  |  |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

*(sources: Multiple sources, 2026)*

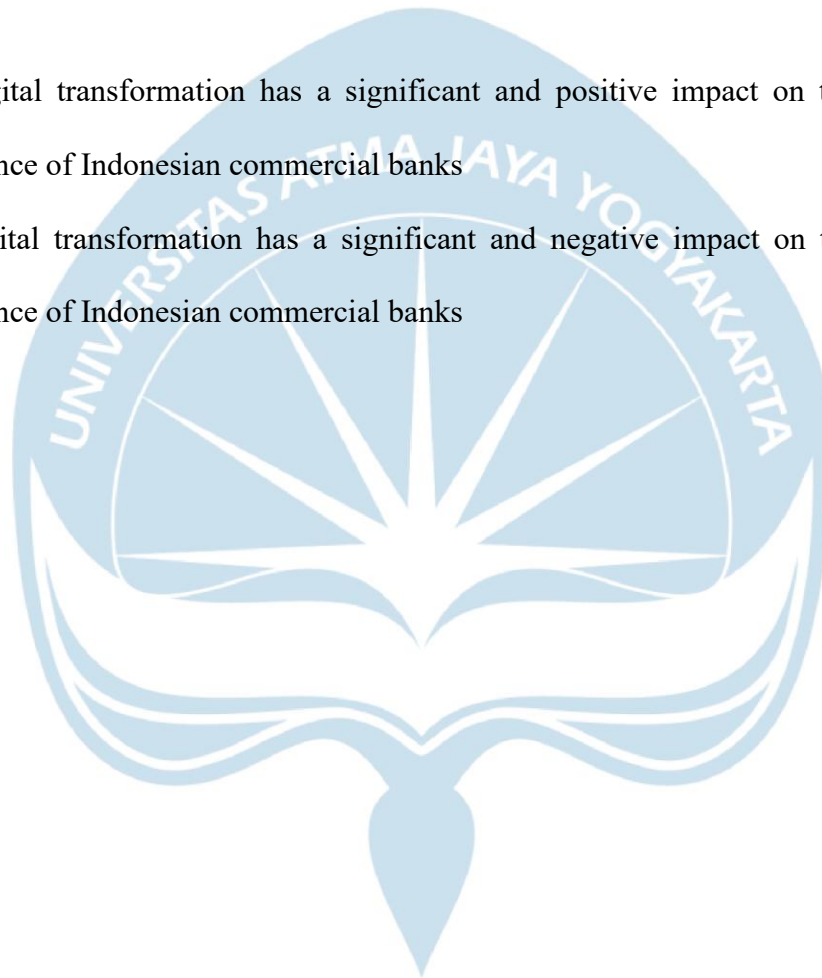


### 2.3 Research Hypothesis

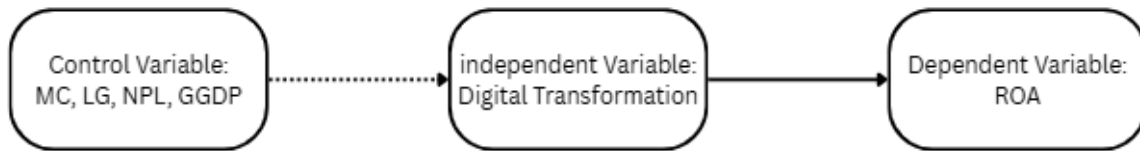
This study includes hypotheses, as to test the theoretical relationship in the conceptual framework, a hypothesis is a speculation between two or more variables in the form of a testable statement, where it is important in explanatory analysis to ensure the conclusion regarding financial performance are based on empirical evidence in contrast to subjective observations (Bougie & Sekaran, 2020). The following hypothesis are:

H0 : Digital transformation has a significant and positive impact on the financial performance of Indonesian commercial banks

Ha : Digital transformation has a significant and negative impact on the financial performance of Indonesian commercial banks



## 2.4 Theoretical Framework



**Figure 2.4 Conceptual Framework**

*(source: Data Processed, 2026)*

