

INFORMATION TECHNOLOGY INVESTMENT AND DIGITALIZATION OF PROFITABILITY AND FEE-BASED INCOME

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ABSTRACT

This study aims to examine the concept of information technology investment and digitalization in increasing profitability and fee-based income with company size as a control variable. The purpose of this study is to contribute to banking companies in improving performance, especially in the field of technology and digital. The population of this study is all banking companies listed on the Indonesia Stock Exchange. This research uses quantitative methods with secondary data from the company's financial statements. Analysis of the data in this study used Eviews 8 software. The results showed that information technology investment had a positive effect on profitability and fee-based income. While digitalization has a positive effect on fee-based income but its effect on profitability is not significant. This shows that digitalization increases fee-based income but the operational costs of digitalization are still relatively high so that revenues from digitalization and operating costs are still relatively balanced as a result of the digitalization's contribution to profitability is not significant.

Keywords: information technology, digital finance, bank profitability.

I. INTRODUCTION

The growing trend of banking acquisitions in the country amid the intense penetration of financial digitalization through the presence of financial technology companies (fintech) will further shrink the number of domestic banks. Referring to the Indonesian Banking Statistics data in the Financial Services Authority (FSA) in May 2019, the number of commercial banks currently reaches 112 commercial banks, while in December 2018 there were still 115 commercial banks. This category is state-owned banks, foreign exchange BUSN, non-foreign exchange BUSN. BPD, mixed banks, and foreign banks. The Financial Services Authority (OJK) states that banks must utilize technology to improve their systems, one of which is by developing digital banking systems (digibank). If it is not done quickly then the bank will be disrupted by technology.

The banking industry is one of the leading sectors in the use of information technology. Over the past three decades, the development of information technology in the financial industry has impacted new ways in how banks serve their consumers. Specifically, self-service technology provides a new way of data access and analysis and decision making regarding a person's financial management (Syarifudin, 2014). The first self-service technology in the financial sector emerged in the 1970s when banks first used automatic teller machines (ATMs) (Dabholkar, 1996). Initially, the ATM was only used for cash withdrawals but now it can be used for cash deposits, sending money, paying, and even opening accounts. The number of ATMs throughout Indonesia also increased by 54, 3 percent in the 2012-2016 period to 104,419 ATMs. At the global level alone, the growth in the number of ATMs has reached 11.2 percent annually. Asian countries recorded the highest average growth per year which reached 16.3 percent with China, Indonesia, and Thailand as the top three countries with the highest number of ATM growth (Source:<https://economy.kompas.com> accessed September 18, 2019).

Based on the results of an international research institute, MIT Sloan Management in 2017, that companies that get 50% of revenue from the digital ecosystem, can achieve 32% higher

revenue growth, and profit margins 27% higher than private companies. One of the technological innovations being developed by PT Bank Mandiri Tbk. (BMRI) is a digital wealth platform as a medium that enables priority customers or high net worth individuals (HNWI) to make investments, such as buying mutual funds or bonds directly. Also, PT Bank Rakyat Indonesia Persero (Persero) Tbk. (BBRI) plans to launch its second satellite in 2023 to update digital services and increase efforts to mitigate the risk of network bottlenecks. Currently BRI, as the largest bank in Indonesia, has total assets that have a satellite named BRIsat. BRIsat was launched on 18 June 2016 in French Guiana and made BRI Bank as the first and only bank in the world to own and operate its satellite. The purpose of this study is to formulate an appropriate strategy in terms of the use of information technology and digital services in improving company performance, especially on ROA and fee-based income. From the results of this study, it is expected that the application of information technology and digitalization can contribute to improving banking performance in Indonesia.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Investment or spending is a term with several meanings relating to finance and economics. Information technology investment is an advanced decision made after the formulation of business strategies and information technology strategies. The strategic alignment between the business strategy and the information technology strategy agreed upon is very influential on the return on IT investment. Opinion Michael E. Porter said that information technology investment provides a competitive advantage for companies. This is because the information technology investment inherent in the value chain of potential companies to create a competitive advantage (Indrianita, 2007).

Digitalization is a process in which an organization moves from an analog process to a digital process. In this process, the use of paper began to be abandoned or commonly called paperless, to move towards more modern digitization, in every line of the company. Some company activities that need to be digitized

immediately, such as customer service, document archiving, and database storage. This effort also led to innovations in overall production flow management, namely the digitalization of companies in product design and development.

Profitability is a measure used to measure a company's ability to generate profits derived from investment activities. Or in other words, profitability is an indicator of a business unit to obtain a return on several assets owned by the business unit. This measure is used to measure management's ability to obtain overall benefits. The greater the profitability, the greater the level of profits achieved by the company, and the better the company's position in terms of asset use. Fee-based income is the profit gained from transactions provided in other bank services. According to Lapoliwa and Kusnadi (2000), the notion of fee-based income is the purpose of providing these services in addition to developing the bank's market share but also to increase bank income in the form of commissions. Susilo (2004) states that fee-based income is revenue or income that comes from providing banking services other than credit services.

Company size is a scale that can be used to determine the size of the company (Aryani, 2011). The size of the company will determine the company's capacity to carry out operations, the possibility of generating profits, and to influence market reactions (Crisostomo et al., 2011). On the other hand, the larger size of the company shows the more established and more stable company growth.

2.1 Effects of Information Technology Investment and Digitalization on Profitability

To carry out daily operational activities, capital investment or capital expenditure is needed in the form of tangible assets such as factories, machinery, equipment, supplies, and other tangible assets to produce each unit of the sale in the long run (Elmasry, 2004). Investment in goods or capital can be tangible and intangible. One of the effects of investment here is reflected by the company's profitability. Some studies suggest that technology has an important role in increasing access to public banking by providing sustainable

financial services. Harumadina (2018) states that investment in software and IT services has a significant positive effect on the financial performance of banking companies, while investment in information technology in hardware has no significant effect on the financial performance of banking companies.

According to Hernando and Nieto (2005), the use of the internet as a bank distribution channel has a positive impact on ROA and ROE. This is in line with De Young's research (2006) which shows that banks with internet banking have a significantly better ROA and ROE development economically and statistically compared to banks without internet banking. In this research, the writer wants to know whether information technology investment and digitalization have a positive influence on profitability. So the hypothesis in this study:

H1 : information technology investment has a positive effect on profitability

H2 : digitalization has a positive effect on profitability

2.2 Effects of Information Technology Investment and Digitalization on Fee-Based Income

Several studies suggest that technology has an important role in increasing access to public banking by providing sustainable financial services. The development of technology, especially mobile, made Bank Indonesia encourage banks to provide mobile-based digital financial services. Several studies have been conducted regarding the effect of digital services on banking performance. A survey conducted in America (Palsokar, 2000) shows that the use of internet banking has the lowest cost burden compared to the use of branch offices, telephones, and ATMs.

According to Malhotra (2009) banks with internet banking have better assets, more customers, and lower operational costs than non-internet banking banks. Farliana (2019) states that technology investment is proven to affect the return on assets and return on equity positively and is proven to have a negative effect on operational costs of operating income. But information technology has not been proven to have a positive effect on non-

interest income. According to Permadi (2018), electronic banking influences the fee-based income of PT BRI and PT CIMB. PT Bank Rakyat Indonesia has a significant influence on the variable fee-based income of 95.063%, while the remaining 4.938% is influenced by other factors not observed. PT CIMB Niaga Tbk's electronic banking transactions have an influence of 95, 26% of fee-based income while the remaining 4.74% comes from other factors. This is in line with research by Syarifudin & Viverita (2014) which states that the mobile banking application has a positive relationship with profitability but is not significant. This positive relationship encourages banks to bring financial inclusion through digital financial services in Indonesia. So the hypothesis in this study are:

H3 : Information technology investment has a positive effect on fee-based income

H4 : Digitalization has a positive effect on fee-based income

III. METHODOLOGY

3.1 Population and Research Sample

The sample in this study was taken from banking companies listed on the Indonesia Stock Exchange (IDX) for the period of 2004-2018. On the Indonesia Stock Exchange banking companies listed 44 companies. Based on the predetermined sampling criteria, 30 banking companies meet the sample selection criteria while the rest are outliers.

3.2 Operational Definitions

3.2.1 Dependent Variable

The dependent variable in this study is profitability and fee-based income.

a. Profitability

Profitability is a measure used to measure a company's ability to generate profits from the use of all its resources or assets. As a profitability ratio, ROA is used as an operational definition to assess the quality and performance of a company in generating net profits from the utilization of its assets.

$ROA = (\text{net profit after tax} : \text{average total assets}) \times 100\%$

b. Fee-based income

Fee-based income is the profit gained from transactions provided in other bank services. Definitively the term "fee-based operating" is the provision of bank services in return for a bank. In this study, fee-based income is measured using a ratio of other operating income or non-interest operating income divided by the total income presented in the company's annual comprehensive income statement.

Fee based income = (other operating income: total income) x 100%

3.2.2 Independent Variables

The independent variable in this research is an information technology investment and digitalization.

a. Information technology investment

Investment is a term with several meanings related to finance and economics. Information technology investment is an advanced decision made after the formulation of business strategies and information technology strategies. The strategic alignment between the business strategy and the information technology strategy agreed upon is very influential on the return of information technology investment. Measurement of information technology investment in this study is the addition of machinery and equipment divided by the total investment assets listed in the cash flow statement in investment activities.

IT investment = (addition of machinery and equipment: total asset investment) x 100%

b. Digitization

Digitalization is one of the elaboration programs of inclusive financial strategies that adjust to the times. The banking industry is one of the leading sectors in the use of information technology. Over the past three decades, the development of the financial industry has impacted new ways in how banks conduct their operational activities, one of them with digital mobile banking financial applications. Digitalization is assessed using a dummy variable where it has a value of 1 if the banking company has a

mobile banking application and a value of 0 if the banking company does not have a mobile banking application.

3.2.3 Control Variables

The size of the company is included as one of the control variables because large companies are more likely to increase their profitability, such as buying large quantities of inventory so they can get discounts, get various facilities from suppliers/distributors and get a longer payment period or period than these suppliers, then, are also better able to maintain the level of the collectibility of their receivables better than smaller companies.

SIZE = Ln (Total Credit granted)

IV. RESULT AND DISCUSSION

Table 4.1 The Effect of Information Technology Investment and Digitalization on Profitability

Variable	Coefficient	Prob.	t-Statistics
A constant	-0.159793	0.0402	-2,070,523
IT	0.051543	0.0359	2.207561
DIG	-0.020517	0.2684	-1.111021
SIZE	0.075894	0.0014	3.259095
Adjusted R-squared			0.27742
F-statistics			2,006,847

Source: Processed Data Eviews 8

Table 4.2 Effect of Information Technology Investment and Digitalization on Fee-Based Income

Variable	Coefficient	Prob.	t-Statistics
A constant	0.435623	0.0000	9.985109
IT	0.099639	0.0435	3.071014
DIG	0.013657	0.0929	1.808223
SIZE	0.058609	0.0000	4.452134
Adjusted R-squared			0.530959
F-statistics			57.22313

Source: Processed Data Eviews 8

4.1 Test the Coefficient of Determination

Based on the test results above can be seen the value of Adjusted R Square in the first regression model of 0.277420 or 27.74%. These results indicate that the ability of the independent variable, namely information technology investment and digitalization in explaining the dependent variable profitability is still very limited in the amount of 27.74% while the remaining 72.26% is influenced or explained by other variables that cannot be explained by the independent variables in this study. While in the second regression model it is known that the Adjusted R Square value of 0.530959 or 53.09% shows that the ability of the independent variable, namely information technology investment and digitalization in explaining the dependent variable fee-based income is quite strong at 53.09% while the rest is 46,

4.2 Test Statistics F

Based on table F with df value 1 = 2 and df 2 = 147 then the table's F value is 3.06. From the first regression results in Table 4.1 above it can be seen that the calculated F value (20.06847) > F table value (3.06), while in Table 4.2 it can be seen that the calculated F value (57.22313) > F table value (3.06). So it can be concluded that the independent variables in the two regression models in this study together affect the dependent variable.

4.3 Test the Significance of Individual Parameters (Statistical Test t)

1. Variable information technology investment on profitability

The results of the t-test for information technology investment variables obtained t value (2.207561) > t table (1.65529), this means that with the presence of firm size control variables, information technology investment individually has a significant effect. So it can be concluded that the first hypothesis about investment in information technology has a positive effect on supported profitability.

2. Digitalization variable on profitability

The results of the t-test for digitizing variables have a calculated t value (-1.111021) < t table (1.65529), this means that the digitization variable individually has no significant effect. So it can be concluded that the second hypothesis about digitalization has a positive effect on unsupported profitability.

3. Information technology investment variable on fee-based income

The results of the t-test for information technology investment variables obtained t value (3.071014) > t table (1.65529), this means that with the presence of firm size control variables, information technology investment individually has a significant effect. So it can be concluded that the third hypothesis about investment in information technology has a positive effect on supported fee-based income.

4. Digitalization variable on fee-based income

The results of the t-test for the digitization variable have a calculated value of t (1.808223) > t table (1.65529), this means that with the presence of a variable control size the digitizing company individually has a significant effect. So it can be concluded that the fourth hypothesis about digitalization has a positive effect on supported fee-based income.

4.4 Discussion of Data Analysis Results

1. Effect of Information Technology Investment on Profitability

Information technology investment is an advanced decision made after the formulation of business strategies and information technology strategies. The strategic alignment between the business strategy and the information technology strategy agreed upon is very influential on the return of information technology investment. Opinion Porter (2007) says that information technology investment provides a competitive advantage for companies.

The first hypothesis in this study is information technology investment has a positive effect on profitability. Based on the results of statistical tests obtained the value of prob. information

technology investment variable of 0.0359 which means that the information technology investment variable has an effect on profitability at the 5% significance level. In Table 4.5 it can be seen that the regression coefficient value of the information technology investment variable is positive at 0.051543, so it can be concluded that information technology investment has a positive effect on profitability. This means that investment in information technology in banking companies in the form of online computer networks, ATMs, EDC or mini ATMs, etc.

The results of this study are in line with the results of Farliana's research (2019) which states that technology investment is proven to positively influence return on assets and return on equity. Harumadina (2018) states that investment in software and information technology services has a significant positive effect on the financial performance of banking companies. The results of this study also support capital expenditure in which large amounts of expenditures made by companies can provide an increase in profits on an ongoing basis in this case information technology investments in banking companies can increase profitability that is profits derived from investment activities.

2. The effect of digitalization on profitability

Digitalization is one of the elaboration programs of inclusive financial strategies that adjust to the times. The banking industry is one of the leading sectors in the use of digital transactions. Over the past three decades, technological developments in the financial industry have impacted new ways in how banks conduct their operational activities. Specifically, self-service technology enables banks to follow strategy development using electronic media (Black et al., 2002). In this case, the more intensive use of digital financial services features, the acquisition of e-banking revenue will increase so that increased revenue will be able to increase bank profits.

The second hypothesis in this study is that digitalization has a positive effect on profitability. Based on the results of statistical tests obtained the value of prob. digitization variable of 0.2684 which means that the digitization variable does not affect

profitability. In Table 4.5 it can be seen that the regression coefficient value of the digitalization variable is negative at -0.020517, so it can be concluded that digitalization has a negative effect on profitability.

The results of this study are in line with previous studies Sudaryanti (2019) which states that the use of mobile banking has a negative effect on ROA. The cause is suspected because its use is not comprehensive or every customer does not necessarily use this facility. This can also be caused by various factors including the level of security, long-term maintenance, and the ability of banks to maintain mobile banking. Not yet the maximum use of mobile banking in Indonesia for banking transactions is also still a barrier to the development of mobile banking services.

3. Effect of Information Technology Investment on Fee-Based Income

Fee-based income (non-interest income) is fee income, fees, or commissions received by banks from marketing products and banking service transactions charged to customers in connection with the bank's products and services that they enjoy. Bank Indonesia has formulated a banking policy in three interrelated corridors. The three corridors are maintaining financial system stability, strengthening banking resilience and competitiveness, and strengthening the intermediary function system. In the third corridor, strengthening the intermediation function is expanding people's access to banking services at a more affordable cost through an inclusive financial program. The inclusive financial program will be carried out simultaneously from two sides, namely the supply side and the demand side. From the supply side, expanding access to affordable banking services and providing banking products that are suitable for low-income people. Subsequently, efforts were made to expand access to banking services in unconventional ways through the use of information technology, telecommunications, and agency cooperation, known as branchless banking. So that banking services can reach all levels of society without the need to present a physical bank office.

The third hypothesis in this study is information technology investment has a positive effect on fee-based income. Based on the results of statistical tests obtained the value of prob. information technology investment variable of 0.0435 which means that the information technology investment variable influences fee-based income at a significance level of 5%. In Table 4.6 it can be seen that the regression coefficient value of the information technology investment variable is positive at 0.099639, so it can be concluded that information technology investment has a positive effect on fee-based income.

The results of this study also support capital expenditure in which large amounts of expenses made by companies in this case information technology investments can increase fee-based income in banking companies. Information technology investment in banking companies in the form of online computer networks, ATMs, EDC or mini ATMs, etc. which supports operational activities can increase the number of banking transactions, the higher the number of transactions, the more fee-based income the banking sector itself has.

4. Effect of Digitalization on Fee-Based Income

The banking industry has recently begun to aggressively encourage the implementation of digital banking. In addition to adjusting to the times, this step can also improve efficiency. Thus, operational costs can be reduced through digital utilization. The application of digitalization in banks can reduce operational costs so that operating income increases. PT Bank Central Asia Tbk (BCA) in the 2011 period had 2.8 million internet banking users with 608 million transactions per year. BCA recorded a 7.7% increase in net profit to Rp. 3.359 trillion from the previous year period of Rp. 3.121 trillion, which was driven by an increase in fee-based income, one of which was income through internet banking.

The fourth hypothesis in this study is that digitalization has a positive effect on fee-based income. Based on the results of statistical tests obtained the value of prob. The digitalization variable is 0.0929 which means that the digitalization variable

influences fee-based income at a significance level of 10%. In Table 4.6 it can be seen that the value of the digitalization variable regression coefficient is positive at 0.013657, so it can be concluded that digitalization has a positive effect on fee-based income.

The results of this study support the theory of the industrial revolution in which digital services are useful for creating flexible customer-oriented markets to increase banking income other than interest income. This means that digitalization in the form of mobile banking makes it easy for customers to make more flexible transactions anywhere and anytime to increase the number of banking transactions that automatically increase fee-based income. The results of this study are in line with the results of Permadi's research (2018) Electronic Banking influences the fee-based income of PT BRI and PT CIMB. PT Bank Rakyat Indonesia has a significant influence on the variable fee-based income of 95,063%.

V. CONCLUSION

This study aims to determine the effect of information technology investment and digitalization in increasing profitability and the fee-based income of banks. An analysis of 30 banking companies listed on the Indonesia Stock Exchange from 2014 to 2018 concluded the following conclusions:

1. Information technology investment has a positive effect on the profitability of banking companies. Information technology investment also has a positive effect on fee-based income. Banks with high information technology investments will also increase banking income, especially fee-based income, and ultimately increase bank profitability.
2. Digitalization has a positive effect on fee-based income but the effect on profitability is not significant. This shows that digitalization increases fee-based income but the operational costs of digitalization are still relatively high so that revenues from digitalization and operating costs are still relatively balanced as a result of the digitalization's contribution to profitability is not significant.

VI. RECOMMENDATIONS

Based on the results of this study the authors recommend for banking companies to be wiser in managing strategies in developing technology investments and digital services. The development of information technology investment and digitalization affects increasing revenue from payment and purchase transaction fees. This will increase competition between banks to increase revenue by developing information and digitization technology. However, these conditions make it difficult for small banks to face the challenges of banking digitalization today. With the non-optimal digitalization of small banks, small bank revenues do not compete with large banks with sufficient capital to develop information technology and digitalization. This is indicated by an increase in fee-based income in most banks that have digitalized in Indonesia. This has attracted the attention of large banks to acquire small banks to be developed as digital banks. Like PT Bank Central Asia, which acquired Bank Royal in 2019 with the hope of providing added value in the development of digitalization.

VII. SUGGESTIONS FOR FURTHER STUDIES

Suggestions for further researchers is to add indicators in the measurement of independent variables. As in the digitalization variable, it can use an ordinal scale based on the number of digitization products owned by banking companies so that the size used can better explain the actual digitalization of banking companies in Indonesia.

COMPETING INTERESTS

Authors have stated that no competing interest exists.

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