Investment in Accounting Information Systems, Financial Performance and Productivity of Malmquist and IFR as Intervening in the Banking and Financial Industry

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Abstract. *The purpose of this study was to examine the effect of investment in information systems in the banking industry and financial institutions as measured by IT capital expense on profitability as measured by return on assets and productivity as measured by the malmquist measurement, and how will it affect if it is intervening with disclosure of information through Internet Financial Reporting. This research method is quantitative using SPSS-assisted regression analysis. Research on the topic of productivity is usually carried out in manufacturing companies, but this research uses the banking industry and financial institutions. Based on the results of the study, it shows that investment in accounting information systems as measured by IT capital or investment in software or hardware has a strong influence on the level of profitability both directly and through disclosure of internet financial reporting (IFR). However, investment in IT in the banking industry and financial institutions has no effect on malmquist productivity. If through IFR, there is an influence between IT capital and malmquist productivity.*

Keywords: *capital IT; ROA; productivity; IFR; banking*

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INTRODUCTION

Companies use information technology as a potential strategy considering that the strength of Information Technology is an illustration of the company's competitive strategy which indicates the ability to compete through changes in industrial structure. The Industrial Era 4.0 encourages all parties to compete to win the competition. This technology is also widely used by organizations as a strength to face increasingly fierce competition. The banking and financial industry is an industry that is very sensitive to information technology issues. So the issue that becomes important is how the availability of funds and the readiness of human resources in the consideration of developing Information Technology. A number of organizations that have implemented IT are also not at the same level of innovation.

The sustainability of a business is also influenced by the effectiveness of the company in its Information Systems & Technology (Technology, 2016). Information technology includes all forms of technology used for data collection, processing, storage and presentation to be transformed into information required by all business activities, whether software, hardware or communication networks (Utomo & Dodgson, 2001). Investment in IT can be categorized into operating expense or capital expense. The choice of this category depends on management judgment. In theory, if the investment is only beneficial for 1 period, it will be categorized as revenue expense, but if it is useful for more than 1 period it will be categorized as capital expense. Operating expense will be included as a deduction for current year revenue which will have an impact

on current year's income. Meanwhile, the capitalized charges will have an impact on total assets, namely the consequence of the allocation of costs for each utilization of these assets in the coming years.

The use of IT today has affected all aspects of life. IT investment in hospitals and health care centers greatly influences the efficiency of health services, and results in positive financial returns (Menon et al., 2000). Information technology costs, both IT Operating Expense and IT Capital Expense, are positively related to ROA and Productivity (Wang et al., 2018). Investments in this field also have a positive effect on medical record recording and service quality. However, the results of other studies indicate that the expected efficiency and quality improvements remain difficult to understand because they are intagible. Large investments in information technology such as Electronic Health Record (EHR) systems, it has always been a problem with management that whether return on assets or related financial returns is sufficient to benefit the entity (Wang et al., 2018). EHR is actually an information system to fulfill the objective of integrating a patient's medical history with the medication being administered so as to facilitate improved quality of care and increased productivity, however, it cannot be denied that the investment is very costly for the organization, potentially impacting financial performance and productivity (Devaraj & Kohli, 2003) (Li & Collier, 2000).

In the travel sector, it is known that the use of IT and the internet has made online travel agents dominate the market (Xiang et al., 2015). In the field of agriculture, the IT component is mainly used to predict weather conditions, access markets for both inputs and products, improve communication and mobilization so as to improve farmer welfare (Burhan, 2018). The research mentioned above was carried out in the healthcare, manufacturing, and travel industries. This research tries to be carried out in the banking industry, which is an industry with very high IT utilization. IT also plays a very important role in banking. Computer applications and telecommunications technology in the banking sector (Banking Technology Information System-TIS). Banks are encouraged to compete in implementing information technology into the system.

Bank Indonesia as the monetary authority has issued regulations on the use of Information Technology Systems by banks. Bank Indonesia establishes the principles that need to be considered in good IT management in banks. This investment in IT will increase automation in banks and financial institutions. Faster services, diversified products, distance that is no longer a problem and the convenience of the public to access information regarding the condition of the bank itself (through Internet Financial Reporting / IFR) are expected to improve bank performance as measured by Return on Investment (ROA) and Productivity. as measured by the Malmquist index.

LITERATURE REVIEW

Research on the relationship between IT and banking has been conducted by several previous researchers (Jakšič & Marinč, 2019; Rusydiana, 2018; N, 2016; Eltivia, 2013; Dangolani, 2011; Ho & Mallick, 2010; Roses et al., 2009) Research with customer respondents and employees of Bank Keshavarzi Iran shows that the use of IT can also save service time, reduce costs, and simplify transactions (Dangolani, 2011). IT can also develop banking products, improve facilities to customers, reduce risk and eliminate distance (Thyaga Raju N, 2016).

Research on the influence of IT on banking was also carried out in Indonesia. Rusydiana, 2018 who measures the Efficiency and Productivity of Islamic Banks in Indonesia. The Malmquist Index is used to see the level of productivity of Islamic banks, both in terms of changes in efficiency and technology. The results showed that there were 1 bank on high technical & efficiency change, 4 banks on high technical change but low efficiency, 6 banks on low technical change but high efficiency (Rusydiana, 2018). Other researcher (Eltivia, 2013) examined the productivity level of Indonesian banks which were listed on the Indonesia Stock Exchange

during 2005-2011. Banking productivity is measured by the Malmquist Index, and the technique used is the Data Envelopment Analysis. Productivity decreased in 2006, 2008 and 2009 and technical change was the main source of negative growth for Total Factor Productivity in these years. In the following years, positive productivity growth was also due to technical changes. This shows that technical change plays a major role in the productivity of the Indonesian banking industry.

The use of the internet to deliver company financial reports also has a big impact on company value. Although IFR is voluntary, stakeholders will provide positive values for companies that implement IFR because it facilitates access to financial statement information by exploiting technology (Almilia, 2008). The benefits of voluntary disclosure are increased company reputation, accountability, investment decisions and risk assessments that are better for investors and affect share prices. IFR also has a negative side, namely it reduces the credibility and authenticity of the data because the data can be easily changed (Budisusetyo & Almilia, 2011).

Based on the results of previous research presented in the background, it shows that there is no consistent result of the effect of IT investment on bank performance and productivity. To better see the effect of IT investment in several years, this study focuses on investment in the form of capital expenditure. This study also adds an intervening variable IFR disclosure, so that the problem formulation that is built in this study is whether banking IT capital expense affects the return on assets of banking companies and financial institutions? Does banking banking capital IT expense affect return on assets with IFR as intervening banking companies and financial institutions? Does banking capital IT expense affect the malmquist productivity of banking companies and financial institutions? Does banking banking capital IT expense affect malmquist productivity with IFR as intervening banking companies and financial institutions?

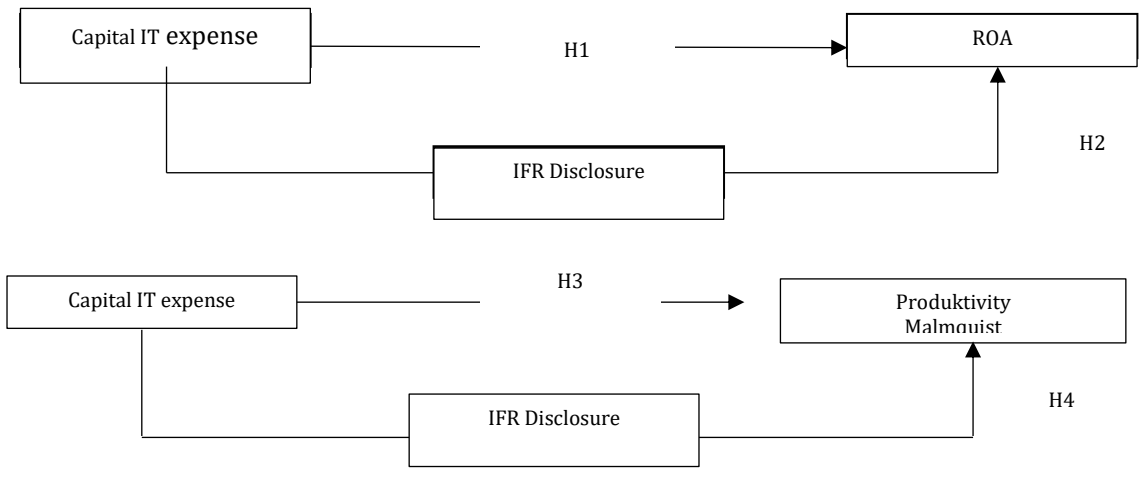

Figure 1: Research Design

Based on the framework that has been built, the following hypothesis is formulated:

H1: Bank IT capital expense affects the return on assets of banking companies and financial institutions

H2: Bank banking capital IT expense has an effect on return on assets with IFR as an intervening banking company and financial institution

H3: Bank IT capital expense affects the malmquist productivity of banking companies and financial institutions?

H4: Bank banking capital IT expense affects the productivity of malmquists with IFR as intervening banking companies and financial institutions

RESEARCH METHOD

This research is a type of quantitative. The analysis technique used in this study is multiple regression analysis, which is a type of research with the characteristics of the problem in the form of a causal relationship. The variables used in this study are:

Independent variable: capital IT expenses, namely IT investments that provide benefits for more than 1 year.

The dependent variable consists of:

a. Return on Asset shows the company's ability to generate profits (Kasmir, 2014). The measurement used to measure profitability is Return On Assets (ROA). ROA is a ratio that shows the company's ability to generate profits from all funds invested in assets. Measuring ROA in research the formula used to calculate ROA is

$$\boldsymbol{ROA = \frac{Earning\ After\ Tax}{Total\ Assets}}$$

b. The productivity of the Malmquist / malmquist index is based on the concept of a production function (production function) which measures the maximum production function with predetermined input limits (Rusydiana, 2018). The productivity of this malmquist is measured by comparing the bank's operating income with the bank's operating expenses. The use of the malmquist index is based on the consideration that this index is nonparametric, does not require assumptions on the economic behavior of production units and can be used to measure technological changes (Badaruzaman, 2020). Operating income consists of interest and premium income as well as other operating income. Meanwhile, operating expenses consist of administrative and general expenses, third party funding expenses, and personnel expenses.

$$\text{Productivity of Malmquist} = \frac{\text{Operating Income}}{\text{Operating Expenses}}$$

c. The intervening variables in this study consist of IFR disclosure. Internet Financial Reporting (IFR) or internet-based financial disclosures, namely the company's ability to display website-based financial reports (Almilia, 2008). The measurement of the quality of the disclosure of reports on the internet in this study uses the unweighted disclosure index compiled by Boubaker. The index was developed to measure the quality of disclosure which consists of 100 list items and is calculated based on the sample to be studied, namely companies listed on the stock exchange in Indonesia. This item includes two components of reporting on the website, namely information relating to content totaling 67 items and features of

the website presentation format totaling 33 items. (Boubaker et al., 2011).

The population in this study are banking and financial companies listed on the Indonesia Stock Exchange in 2018 and 2019, accessed through www.idx.co.id. Sampling was carried out using census techniques, meaning that all populations were part of the research observations. The population in this study are banks and financial institutions listed on the Indonesia Stock Exchange. All populations in this study were used as samples. The number of samples in 2018 was 58 companies, while in 2019 there were 60 data. The analysis technique used in this study is multiple regression analysis which is an analysis by testing the power of influence between the dependent variable and the independent variable using a significance level of α = 5 percent in testing. . This variable will be tested in classical assumptions in order to meet the requirements in testing multiple regression analysis. Testing assumptions by testing classical assumptions can be done by performing a normality test, multicolonierity test, autocorrelation test, and heteroscedasticity test.

RESULTS AND DISCUSSION

Data on banking and financial institutions that have been successfully explored for observation up to 2019 are 118 data. From these results it can be described as follows:

Tabel 1. Descriptive Data

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
CAPITAL IT	118	18,0778	27,8488	23,517688	2,1227977	4,506
ROA	118	-,1246	,1590	,011153	,0376274	,001
PRODUCTIVITY MALMQUIST	118	,0462	14,5075	1,676726	2,5206725	6,354
IFR DISCLOSURE	118	17	28	22,37	2,604	6,783
Valid N (listwise)	118					

Based on these data, it can be seen that from 118 data, the most IFR disclosures are 28, while the least is 17 items. For malmquist productivity, there is data whose operating expenses are higher than operating income as seen from the minimum value which is only 0.0462. Observations in terms of profitability, then there is data on companies that have suffered losses, it can be seen from the minimum data of -0.1246.

Observations are also illustrated each year as seen from the following data:

Table 2. Descriptive Analysis of 2018

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
CAPITAL IT EXPENSE	58	18,0778	27,3438	23,474540	2,1862543	4,780
ROA	58	-,1123	,1590	,011455	,0398253	,002
PRODUKTIVITY MALMQUIST	58	,0462	14,5075	1,809422	2,7714404	7,681
IFR DISCLOURE	58	17	28	22,36	2,634	6,937
Valid N (listwise)	58					

Table 3. Descriptive Analysis of 2019

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
CAPITAL IT EXPENSE	60	18,9895	27,8488	23,559398	2,0772287	4,315
ROA	60	-,1246	,1231	,010860	,0357097	,001
PRODUKTIVITY MALMQUIST	60	,0500	9,4180	1,548453	2,2683326	5,145
IFR DISCLOURE	60	17	28	22,38	2,598	6,749
Valid N (listwise)	60					

The observations in tables 2 and 3 show that banking companies and financial institutions in Indonesia have homogeneous data distribution, in terms of a short data range.

The next observation is data processing to answer the research hypothesis. The discussion begins with data screening, so that it can be tested using the classical assumption test. Based on the results of SPSS data management in the table above, it can be seen that the Kolmogorov-Smirnov value is 0.205 with Asymp. Sig (2-tailed) 0.060 where the value is greater than the significance coefficient value is 0.05, it can be concluded that the residuals from the regression results are normally distributed and pass the normality assumption. This shows that the residual capital it expense and IFR data as intervening variables on ROA and Malmquist Productivity are normally distributed.

The test observations were also carried out with the multicoloniarity test. Based on the results of the multicolonierity test, it is known that the tolerance capital it expense is 1,000. The results of the tolerance value calculation for the independent variable and one intervening variable in this study have a tolerance value ≥ 0.10, which means that there is no multicollinearity or it can be said that the independent variable does not have a multicollinearity problem. The value of variance inflation factor (VIF) for capital it expense is 1,000. The results of the calculation of the value of variance inflation factor (VIF) show that the independent variable and one intervening variable in this study have a variance inflation factor (VIF) value of ≤ 10, which means that the independent variables in this regression do not have and are free from multicollinearity problems between variables.

Based on the results of the autocorrelation test, it shows that the DW value is 2.282 from a total sample of 118 with 4 independent variables and intervening variables (n = 118, k = 2) and a significance level of 0.05, with these data the limit of DL = 1.6653 and DU = 1.6653, the value 1.77344 ≤ DW ≤ 2.33347, it can be concluded that there is no autocorrelation.

Observations based on the heterocesdaticity test show that the heteroscedasticity test using the glacier test in the table above shows that each independent variable has a significant value, namely capital it expense of 0.189. It can be concluded that three independent variables and one intervening variable have a significance of ≥ 0.05, namely capital it expense, and IFR disclosure, which means that the intervening model does not experience heteroscedasticity cases.

The next test is the model test. Based on the F (Anova) statistical test in the table above, it is known that the significance value is 0.012 ≤ 0.05, then the decision is H0, which means that the hypothesis is accepted (H1) or the model is fit / appropriate, it can be concluded that the variation in changes in capital it expense, and IFR disclosure as an intervening variable that has an overall effect and is able to predict or explain variations in the change in the value of ROA and Malmquist Productivity so that further interpretation can be made.

After screening the data and testing the model, it is continued with hypothesis testing. The following are the results of hypothesis testing:

H1: Bank IT capital expense affects the return on assets of banking companies and financial institutions. The results of statistical testing show that there is an influence between capital IT expenses on return on assets with a significance value of 0.028. The use of technology in banking will make it easier for customers to meet their needs for banking services, save time, eliminate distance and allow banks to develop service products, thereby increasing public trust and ultimately increasing the performance assessed from the company's ROA. The results of this study are in accordance with (Dangolani, 2011), (Wang et al., 2018). Although not the overall results but research Rusydiana, 2018) slightly different from the results of this study.

H2: Bank banking capital IT expense has a significant effect on return on assets with IFR as an intervening banking company and financial institution with a significance level of 0.00

H3: Bank IT capital expense does not have a significant effect on the malmquist productivity of banking companies and financial institutions with a significance level of 0.426.

H4: However, it turns out that through IFR it has a significance level of 0.004, so the 4th hypothesis of banking capital IT expense has a significant effect on the productivity of the malmquist with IFR as an intervening of banking companies and financial institutions.

Based on the results of the study, it shows that investment in accounting information systems as measured by IT capital or investment in software or hardware has a strong influence on the level of profitability both directly and through disclosure of internet financial reporting (IFR). However, investment in IT in the banking industry and financial institutions has no effect on malmquist productivity. If through IFR, there is an influence between IT capital and malmquist productivity. The implication of this research is expected to give consideration to the banking industry in investing in IT.

CONCLUSION

The purpose of this study was to examine the effect of investment in information systems in the banking industry and financial institutions as measured by IT capital expense on profitability as measured by return on assets and productivity as measured by the malmquist measurement. And how will it affect if it is intervening with disclosure of information through Internet Financial Reporting.

Based on the results of the study, it shows that investment in accounting information systems as measured by IT capital or investment in software or hardware has a strong influence on the level of profitability both directly and through disclosure of internet financial reporting (IFR). However, investment in IT in the banking industry and financial institutions has no effect on malmquist productivity. If through IFR, there is an influence between IT capital and malmquist productivity. The implication of this research is expected to give consideration to the banking industry in investing in IT. Investment and utilization of IT is very important for the banking industry and financial institutions, because it affects profitability.

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