ISSN: 2614-6754 (print)
ISSN: 2614-3097(online)
Halaman 8829-8838
Volume 6 Nomor 2 Tahun 2022

Information Technology And Profitability: Empirical Evidence In Indonesia

Feronika[1], Heny Kurniawati[2]
[1] Accounting Department, Binus Graduate Program-Master of Accounting, Bina Nusantara University
[2] Accounting Department Bina Nusantara University
e-mail: Feronika001@binus.ac.id[1], heny.kurniawati@binus.ac.id[2]

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh layanan perbankan elektronik, investasi teknologi informasi, dan tata kelola teknologi informasi terhadap profitabilitas bank. Penelitian ini menggunakan sampel 301 bank yang terdaftar di Bursa Efek Indonesia dari tahun 2014 hingga 2020. Hasil pengujian hipotesis menunjukkan bahwa investasi teknologi informasi berpengaruh positif terhadap profitabilitas bank, sedangkan layanan perbankan elektronik dan tata kelola teknologi informasi tidak berpengaruh terhadap profitabilitas bank. Dengan demikian, manajemen bank perlu mempertimbangkan peningkatan investasi di bidang teknologi informasi sebagai upaya untuk meningkatkan dan meningkatkan profitabilitas di masa mendatang.

Kata kunci: *Layanan Perbankan Elektronik; Investasi Teknologi Informasi; Tata Kelola Teknologi Informasi; Profitabilitas*

Abstract

This study aims to determine the effect of electronic banking services, information technology investment, and information technology governance on bank profitability. This study uses 301 samples of banks listed on the Indonesia Stock Exchange from 2014 to 2020. The results of hypothesis testing indicate that information technology investment has a positive effect on bank profitability, while electronic banking services and information technology governance do not affect bank profitability. Thus, bank management needs to consider increasing investment in information technology as an effort to increase and improve profitability in the future.

Keywords : *Electronic Banking Services; Information Technology Investment; Information Technology Governance; Profitability*

INTRODUCTION

The rapid development of information technology requires business people to be able to adapt to all forms of changes that occur. The results of the Jenius Financial Study: Indonesia Digital Savvy Behavior (2019) in collaboration with Nielsen stated that the growth of smartphone users in Indonesia is increasing from 19 percent in 2014 to 56 percent in 2018. The rapid growth of smartphone users in Indonesia has an impact on the industry. banking, especially in terms of the number of bank customers and the number of internets or mobile banking users. The number of bank customers has increased from 23 percent in 2014 to 36 percent in 2018. From the growth in the number of bank customers, internet or mobile banking users have also increased from 28 percent in 2014 to 30 percent in 2018 (Bareksa, 2019).

According to the Financial Services Authority (2018), the increase in the use of information technology in services to customers personally directs banks in a new era, namely the era of digital banking (digital banking). This service is more oriented towards meeting customer needs by utilizing digital technology through devices (devices) and

applications (software) as a distribution channel (delivery channel). In accordance with POJK Number 12/POJK.03/2018 Article 3, examples of distribution channels (delivery channel) of electronic banking services include Automated Teller Machine (ATM), Cash Deposit Machine (CDM), phone banking, Short Message Services (SMS). banking, Electronic Data Capture (EDC), Point of Sales (POS), internet banking, and mobile banking.

Several studies have tried to examine the effect of electronic banking services on banking profitability. Research conducted by Nwakoby, et al. (2020), Onay & Ozsoz (2013), Chipeta & Muthinj (2018), Skvarciany, et al. (2019), Siddik, et al. (2016), Sujud & Hashem (2017), Hu & Xie (2016) prove that internet banking, mobile banking, and Automated Teller Machine (ATM) are considered to be able to improve the performance of commercial banks because they can increase banking efficiency, effectiveness, and productivity. This confirms that internet banking, mobile banking, and Automated Teller Machine (ATM) services can increase banking profitability by providing convenience to customers and saving costs, thus attracting banks to be interested in expanding the market through internet banking, mobile banking, and Automated Teller Machines. Machines (ATMs).

In responding to opportunities from developments in technology and information, the banking industry requires a substantial cost component to support the provision of electronic banking services that exert a strong influence on bank operations and strategies. According to Beccalli (2007), investment in information technology can increase profitability by creating a competitive advantage. Andriani (2019) adds that the contribution of information technology investment for companies can create a sustainable competitive advantage.

In a study conducted by Binuyo & Aregbeshola (2014), Appiahene, et al. (2019), Luka & Frank (2012), found that investment in communication and information technology can increase bank profitability. This indicates that the benefits obtained are greater than the initial investment issued by banks. Luka & Frank (2012) stated that investment in information technology systems and infrastructure has become a key element in banking productivity to support industrial growth. However, Gupta et al. (2018) found that information technology investment did not have a positive impact on bank profitability because information technology investment resulted in a small possibility of a bank's competitive advantage.

On the other hand, information technology as an important asset in banking operations contains various risks such as system failure, system downtime, system performance degradation, consumer data leakage, and so on. This causes banks to need to implement information technology governance to prevent risks and improve the efficiency and effectiveness of the implementation of information technology (Financial Services Authority, 2015). In a study conducted by Vugec et al. (2017), it was found that more mature information technology governance increases the opportunity to foster business model innovation to create incentives for further information technology investment (Vugec et al., 2017). Lunardi et al. (2014) also found that firms adopting information technology governance practices can increase profitability, where the effect of the adoption of information technology governance mechanisms on profitability is more pronounced in the year after adoption than in the year in which information technology governance mechanisms were adopted (Lunardi et al. ., 2014). On the other hand, research conducted by Muslih et al. (2020) proves that information technology governance does not have a positive effect on company performance.

Profitability is considered the main measure that reflects the overall success of the business and shows how effectively the business has used its resources (Do et al., 2020). Profitability can be measured by using the ratio of Return on Assets (ROA) (Munawir, 2004). Sinkey & Joseph (1992) argues that Return on Assets (ROA) is a comprehensive measure of the bank's overall performance from an accounting perspective which is the main indicator for managerial efficiency because it shows the ability of bank management to convert bank assets into net income. The higher the Return on Assets (ROA) of a company, the higher the profit and the better the bank's position in terms of asset management (Karamoy & Tulung, 2020).

This study provides a better understanding of the determinants of bank profitability because the researcher builds a data set by combining three different data sets namely electronic banking services, information technology investment, and information technology governance. The results of this study contribute to the literature by presenting empirical evidence of the relationship between electronic banking services, information technology investment, and information technology governance on bank profitability.

The remainder of the study is structured as follows. Part two provides a brief overview of relevant empirical studies regarding the relationship of electronic banking services, information technology investment, and information technology governance to banking profitability. Section three discusses research methods. Section four describes the results and discussion of the empirical analysis. Finally, section five concludes the research.

RESEARCH METHODS

The population used in this study are all banking companies listed on the Indonesia Stock Exchange. The sample was selected using a purposive sampling technique with sample selection criteria, namely commercial banks listed on the Indonesia Stock Exchange from 2014 to 2020. The final sample in this study amounted to 301 samples. This study uses secondary data collection methods from the publications of the Financial Services Authority through www.ojk.go.id and publications from the official banking website.

The independent variables used in this study consisted of electronic banking services, information technology investment, and information technology governance. Measurement of electronic banking services is carried out based on calculations derived from the identification of delivery channel facilities owned by each bank in the sample, then calculated using an index. According to POJK Number 12/POJK.03/2018 Article 3, examples of electronic banking service delivery channels include Automated Teller Machine (ATM), Cash Deposit Machine (CDM), phone banking, Short Message Services (SMS) banking, Electronic Data Capture (EDC), Point of Sales (POS), internet banking, and mobile banking. Therefore, the maximum score of the electronic banking services index is 8. The electronic banking services index can be formulated as follows:

$$\text{E-Banking Service Index} = \frac{\text{Score earned by bank}}{\text{Maximal Score}}$$

Information technology investment is measured using the ratio of information technology investment to total operating costs (Beccalli, 2007; Gupta et al., 2018). Referring to the research conducted by Vugec et al. (2017) and Lunardi et al. (2014), the researcher uses a dummy variable with a value of 1 for the implementation of Control Objectives for Information and Related Technology (COBIT) and a value of 0 for the opposite.

Profitability as the dependent variable is measured using the Return on Assets (ROA) ratio which can be formulated as follows (Sinkey & Joseph, 1992):

$$\text{Return on Assets (ROA)} = \frac{\text{Net profit after tax}}{\text{Total assets}}$$

This study also uses firm size, ownership, Non-Performing Loan (NPL), Capital Adequacy Ratio (CAR), and Loan to Deposit Ratio (LDR) as control variables. Firm size is measured by the natural logarithm of total assets (Almulla & Aljughaiman, 2021; Chipeta & Muthinja, 2018; Bhattacharyya et al., 2021; Majumder, 2017; Laryea et al., 2016). Ownership is measured using a dummy variable with a value of 1 if the bank is a State-Owned Bank, a value of 2 if the bank is a National Private Bank, and a value of 3 if the bank is a Regional Development Bank. Referring to the research conducted by Natalia (2015), the Non-Performing Loan (NPL) variable is proxied as follows:

$$\text{Non-Performing Loan (NPL)} = \frac{\text{Non-performing loans}}{\text{Total credit granted}}$$

Referring to the research conducted by (Irawati et al., 2018), the variable Capital Adequacy Ratio (CAR) is formulated as follows:

$$\text{Capital Adequacy Ratio (CAR)} = \frac{\text{Bank capital}}{\text{Total Risk-Weighted Assets}}$$

Referring to the research conducted by Saiful & Ayu (2019), the Loan to Deposit Ratio (LDR) variable can be formulated as follows:

$$\text{Loan to Deposit Ratio (LDR)} = \frac{\text{Total credit}}{\text{Total third party funds}}$$

In this study, data analysis was performed by regressing panel data to see the effect of electronic banking services, information technology investment, and information technology governance on bank profitability. The following is the research model used in this study:

$ROA_{i,t} = \alpha + \beta_1 LPE_{i,t} + \beta_2 IIT_{i,t} + \beta_3 COBIT_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 OWN_{i,t} + \beta_6 NPL_{i,t} + \beta_7 CAR_{i,t} + \beta_8 LDR_{i,t} + \varepsilon_{i,t}$

Where:

$ROA_{i,t}$ = Bank profitability as measured by Return on Assets (ROA).
$LPE_{i,t}$ = Electronic banking services as measured by the index.
$IIT_{i,t}$ = Information technology investment as measured by the ratio of information technology investment to total operating costs.
$COBIT_{i,t}$ = Information technology governance as measured by COBIT.
$SIZE_{i,t}$ = Company size as measured by the natural logarithm of total assets.
$OWN_{i,t}$ = Ownership as measured by the ownership structure of local or foreign companies.
$NPL_{i,t}$ = Non-Performing Loan as the ratio of non-performing loans to total loans.
$CAR_{i,t}$ = Capital Adequacy Ratio as the ratio of bank capital to RWA.
$LDR_{i,t}$ = Loan to Deposit Ratio as the ratio of total credit to total third party funds

HASIL DAN PEMBAHASAN

Descriptive Statistics

Table 1 provides information on descriptive statistics which include the mean (mean), standard deviation (standard deviation), minimum value (minimum), and maximum value (maximum) of all variables used in this study. Based on the results shown in the table, the average value of Electronic Banking Services (LPE) is greater than the average value of Information Technology Investment (IIT) and Information Technology Governance (COBIT) so that it implies that more electronic banking services are provided in commercial banks listed on the Indonesia Stock Exchange.

Table 1 Descriptive Statistics

	Mean	Median	Std. Dev.	Min	Max
ROA	1.123223	1.16	2.843874	-20.13	13.58
LPE	.5581395	.5	.1894185	.125	1
IIT	.4826944	.0228345	3.445135	.0000474	42.58242
COBIT	.2325581	0	.4231664	0	1
SIZE	31.09416	30.92937	1.948888	25.09338	34.95208

OWN	.9767442	1	.4034733	0	2
NPL	3.255415	2.81	2.424791	0	22.27
CAR	23.7395	20.02	21.47844	8.02	329.09
LDR	3181.396	86.82	38042.06	.13	506600

Correlation

Table 2 provides information about the correlation between the dependent variable and the independent variable. The dependent variable Return on Assets (ROA) has a significant positive correlation ($p < 0.05$) on the variable Electronic Banking Services (LPE), Company Size (SIZE), but not significant on Information Technology Governance (COBIT), Capital Adequacy Ratio (CAR), and Loan to Deposit Ratio (LDR). This means that the greater the number of electronic banking services and the size of the company, regardless of the implementation of information technology governance, the ratio of Capital Adequacy Ratio (CAR), and the ratio of Loan to Deposit Ratio (LDR) owned by a bank can lead to an increase in bank profitability.

On the other hand, the dependent variable Return on Assets (ROA) has a significant negative correlation ($p < 0.05$) to the Ownership (OWN) and Non-Performing Loan (NPL) variables, but not significant to the Information Technology Investment (IIT) variable. This correlation test shows that the increase in Return on Assets (ROA) is not in line with the type of ownership and the increase in the ratio of Non Performing Loans (NPL) in a bank.

Table 2 Correlation Matrix

	ROA	LPE	IIT	COBIT	SIZE	OWN	NPL	CAR	LDR
ROA	1.0000								
LPE	0.1828***	1.0000							
IIT	-0.0307	0.1324**	1.0000						
COBIT	0.1040*	0.2050***	-0.0695	1.0000					
SIZE	0.2782***	0.5314***	-0.3844***	0.3108***	1.0000				
OWN	-0.1590***	-0.4130***	0.0063	-0.0854	-0.3533***	1.0000			
NPL	-0.5029***	-0.0842	0.0912	-0.0109	-0.2443***	0.1479**	1.0000		
CAR	0.0704	-0.1911***	-0.0637	-0.0515	-0.2143***	-0.0001	-0.0075	1.0000	
LDR	0.0519	-0.0789	-0.0095	-0.0448	-0.1605***	0.0047	-0.0107	0.2404***	1.0000

Information:
***,**,* significant at 1%, 5%, and 10%.

Analysis

Table 3 presents the results of hypothesis testing. The results of hypothesis testing show that electronic banking services do not affect bank profitability. This result is not consistent with the research conducted by Nwakoby, et al. (2020), Onay & Ozsoz (2013), Chipeta & Muthinj (2018), Skvarciany, et al. (2019), Siddik, et al. (2016), Sujud & Hashem (2017), Hu & Xie (2016) which state that the provision of technology services in banking provides an advantage in generating higher profitability. The results of this study are supported by the argument of Kahveci & Wolfs (2018) that electronic banking services do not provide a strategic advantage for any bank in terms of financial performance or efficiency because these banks are already efficient and electronic banking services are only used to maintain competition and maintain their position. bank strategic.

Table 3 Testing Result

ROA	Coef.	Std. Error.	t	P>|t|
LPE	.6521974	.7192976	0.91	0.365
IIT	.0762507	.0307638	2.48	0.014
COBIT	.2897709	.2667661	1.09	0.278
SIZE	.290027	.1064437	2.72	0.007
OWN	-.002512	.3422366	-0.01	0.994
NPL	-.5361614	.0896435	-5.98	0.000
CAR	.0148336	.0106637	1.39	0.165
LDR	4.35e-06	.0000146	0.30	0.766
_cons	-6981245	3.559.938	-1.96	0.051
R squared	0.3058			
F-statistic	8.56			
Prob(F-statistic)	0.0000			

It is proven that information technology investment has a positive effect on bank profitability. This means that the greater the company's funds are used to invest in information technology which includes hardware, software, and Human Resources (HR), the higher the profitability of the bank. The results of this test are consistent with research conducted by Binuyo & Aregbeshola (2014), Appiahene, et al. (2019), Luka & Frank (2012), Arora and Arora (2013) who have proven that information technology investment has a significant impact on bank profitability because information technology can help improve the efficiency of banking operations so as to provide a competitive advantage to offset global competition. On the other hand, the results of this test reject the results of research conducted by Gupta, et al. (2018) which states that information technology investment does not have a positive impact on bank profitability because information technology investment is more of a strategic need for banks so that it only produces a small possibility of a bank's competitive advantage. Therefore, banks need to target increased investment-related to information technology and view information technology investment as a long-term perspective in an effort to increase productivity and growth of the banking industry in Indonesia (Rath & Hermawan, 2019).

In addition, the results obtained that information technology governance does not affect bank profitability. This implies that changes in bank profitability are not in line with changes in the implementation of information technology governance at banks, thus contradicting research conducted by Lunardi et al. (2014), Vugec et al. (2017), S. M. Huang et al. (2011). In line with research from Muslih, et al. (2020) that information technology governance does not lead to an increase in bank profitability because information technology governance applied in the corporate environment is only in the form of a written statement in the company's annual report which in fact is not implemented properly so that it cannot support the increase in bank profitability. In fact, information technology governance in the banking industry is important to be implemented properly because information technology as a fundamental asset in banking operations contains various risks that need to be watched out for (Financial Services Authority, 2018).

Table 3 also provides the results of testing the hypothesis between the control variable and the dependent variable in this study. In line with the research hypothesis, Non-Performing Loans (NPL) have a negative effect on bank profitability. This is supported by the argument of Natalia (2015) which states that a high Non-Performing Loan (NPL) will increase the cost of reserves for productive assets and other costs so that it will have an impact on the decline in bank financial performance (Natalia, 2015). Firm size has been shown to have a positive effect on bank profitability where larger banks are better able to diversify banking activities thereby reducing the level of risk and thereby resulting in higher operational

efficiency and profitability (Bougatef, 2017). On the other hand, Ownership (OWN), Capital Adequacy Ratio (CAR), and Loan to Deposit Ratio (LDR) do not affect bank profitability. Thus, the type of ownership, changes in the Capital Adequacy Ratio (CAR), and Loan to Deposit Ratio (LDR) ratios cannot affect bank profitability.

CONCLUSION

This study aims to determine the effect of electronic banking services, information technology investment, and information technology governance on bank profitability. The results of the study indicate that information technology investment has a positive effect on bank profitability. These results confirm that increased investment in information technology which includes hardware, software, and Human Resources (HR) can lead to higher bank profitability, so banks need to target increased investment in information technology. On the other hand, the results show that electronic banking services and information technology governance do not affect bank profitability. This result implies that the provision of electronic banking services does not provide a strategic advantage for any bank because these banks are already efficient and electronic banking services are only used to maintain competition and maintain the bank's strategic position (Kahveci & Wolfs, 2018). Similarly, the implementation of information technology governance does not have an effect on bank profitability because information technology governance applied in the corporate environment is only a written statement in the company's annual report which in reality there is a possibility that information technology governance is not implemented properly (Muslih, 2011). et al., 2020). Thus, the results of this study can provide information about the determinants of bank profitability so that it can be used as consideration and decision making for bank management in increasing and improving profitability in the future.

ACKNOWLEDGMENT

The author would like to thank Binus University and the Accounting Graduate Program for supporting and facilitating the writing of this paper. We also thank Gatot Soepriyanto and Tirta Nugraha Mursitama for providing valuable feedback on the initial draft of this paper.

REFERENCES

Almulla, D., & Aljughaiman, A. A. (2021). Does financial technology matter? Evidence from an alternative banking system. *Cogent Economics and Finance*, *9*(1). https://doi.org/10.1080/23322039.2021.1934978

Andriani, E. W. (2019). Peran Investasi Teknologi Dalam Meningkatkan Kinerja Keuangan Perbankan Yang Terdaftar Di Bursa Efek Indonesia (Bei) 20142017. *Jurnal Magister Akuntansi Trisakti*, *6*(1), 27. https://doi.org/10.25105/jmat.v6i1.5063

Anthony, & Govindarajan. (2002). *Sistem Pengendalian Manajemen*. Salemba Empat.

Appiahene, P., Missah, Y. M., & Najim, U. (2019). Evaluation of information technology impact on bank's performance: The Ghanaian experience. *International Journal of Engineering Business Management*, *11*, 1–10. https://doi.org/10.1177/1847979019835337

Arora, H., & Arora, P. (2013). Effect of investments in information technology on bank performance: Empirical evidence from Indian public sector banks. *International Journal of Business Information Systems*, *13*(4), 400–417. https://doi.org/10.1504/IJBIS.2013.055298

Bareksa. (2019). *Pengguna Internet dan Digital Banking Melonjak Karena Faktor Ini*, [Electronic version]. Available: https://www.bareksa.com/berita/berita-ekonomi-terkini/2019-02-26/pengguna-internet-dan-digital-banking-melonjak-karena-faktor-ini [2021, August 03]

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. In *Journal of Management* (Vol. 17, Issue 1, pp. 99–120). https://doi.org/10.1177/014920639101700108

Beccalli, E. (2007). Does IT investment improve bank performance? Evidence from Europe. *Journal of Banking and Finance*, *31*(7), 2205–2230. https://doi.org/10.1016/j.jbankfin.2006.10.022

Bhattacharyya, A., Wright, S., & Rahman, M. L. (2021). Is better banking performance associated with financial inclusion and mandated CSR expenditure in a developing country? *Accounting and Finance*, *61*(1), 125–161. https://doi.org/10.1111/acfi.12560

Binuyo, A. O., & Aregbeshola, R. A. (2014). The impact of information and communication technology (ICT) on commercial bank performance: Evidence from South Africa. *Problems and Perspectives in Management*, *12*(3), 59–68.

Boritz, J. E. (2005). IS practitioners' views on core concepts of information integrity. *International Journal of Accounting Information Systems*, *6*(4), 260–279. https://doi.org/10.1016/j.accinf.2005.07.001

Bowen, P. L., Cheung, M. Y. D., & Rohde, F. H. (2007). Enhancing IT governance practices: A model and case study of an organization's efforts. *International Journal of Accounting Information Systems*, *8*(3), 191–221. https://doi.org/10.1016/j.accinf.2007.07.002

Chipeta, C., & Muthinja, M. M. (2018). Financial innovations and bank performance in Kenya: Evidence from branchless banking models. *South African Journal of Economic and Management Sciences*, *21*(1), 1–11. https://doi.org/10.4102/sajems.v21i1.1681

Djalilov, K., & Piesse, J. (2016). Determinants of bank profitability in transition countries: What matters most? *Research in International Business and Finance*, *38*, 69–82. https://doi.org/10.1016/j.ribaf.2016.03.015

Do, H. L., Ngo, T. X., & Phung, Q. A. (2020). The effect of non-performing loans on profitability of commercial banks: Case of Vietnam. *Accounting*, *6*(3), 373–386. https://doi.org/10.5267/j.ac.2020.1.001

Gupta, S. D., Raychaudhuri, A., & Haldar, S. K. (2018). Information technology and profitability: evidence from Indian banking sector. *International Journal of Emerging Markets*, *13*(5), 1070–1087. https://doi.org/10.1108/IJoEM-06-2017-0211

Hu, T., & Xie, C. (2016). Competition, Innovation, Risk-Taking, and Profitability in the Chinese Banking Sector: An Empirical Analysis Based on Structural Equation Modeling. *Discrete Dynamics in Nature and Society*, *2016*. https://doi.org/10.1155/2016/3695379

Huang, Q. (2020). Ownership concentration and bank profitability in China. *Economics Letters*, *196*, 109525. https://doi.org/10.1016/j.econlet.2020.109525

Irawati, N., Maksum, A., Sadalia, I., & Muda, I. (2019). Financial performance of indonesian's banking industry: the role of good corporate governance, capital adequacy ratio, non performing loan and size. *International Journal of Scientific and Technology Research*, *8*(4), 22–26.

Kahveci, E., & Wolfs, B. (2018). Digital banking impact on Turkish deposit banks performance. *Banks and Bank Systems*, *13*(3), 48–57. https://doi.org/10.21511/bbs.13(3).2018.05

Karamoy, H., & Tulung, J. E. (2020). The impact of banking risk on regional development banks in Indonesia. *Banks and Bank Systems*, *15*(2), 130–137. https://doi.org/10.21511/bbs.15(2).2020.12

Laryea, E., Ntow-Gyamfi, M., & Alu, A. A. (2016). Nonperforming loans and bank profitability: evidence from an emerging market. *African Journal of Economic and Management Studies*, *7*(4), 462–481. https://doi.org/10.1108/AJEMS-07-2015-0088

Lockett, A., & Thompson, S. (2001). The resource-based view and economics. *Journal of Management*, *27*(6), 723–754. https://doi.org/10.1016/S0149-2063(01)00121-0

Luka, M. K., & Frank, I. a. (2012). The Impacts of ICTs on Banks A Case study of the Nigerian Banking Industry. *International Journal of Advanced Computer Science and Applications*, *3*(9), 145–149.

Lunardi, G. L., Becker, J. L., Maçada, A. C. G., & Dolci, P. C. (2014). The impact of adopting IT governance on financial performance: An empirical analysis among Brazilian firms.

International Journal of Accounting Information Systems, *15*(1), 66–81. https://doi.org/10.1016/j.accinf.2013.02.001

Majumder, M. T. H. (2017). *The determinants of profitability of nationalised banks in Bangladesh Md . Tofael Hossain Majumder * Mohammad Jashim Uddin*. *13*(4), 335–348.

Manurung, A. H. (2019). *Metode Riset Akuntansi, Investasi Keuangan, dan Manajemen*. PT. Adler Manurung Press.

Munawir. (2004). *Analisa Laporan Keuangan*. Yogyakarta: Liberty.

Muslih, M., Sugianti, I., Simanjuntak, D. F., & Rahadi, D. R. (2020). The Effect of Information Technology Governance and Enterprise Risk Management on the Performance of State-Owned Enterprises in Non-Public Financial Fields Moderated by Corporate Governance. *International Journal of Science and Society*, *2*(4), 446-466.

Natalia, P. (2015). Analisis Pengaruh Risiko Kredit, Risiko Pasar , Efisiensi Operasi, Modal, Dan Likuiditas Terhadap Kinerja Keuangan Perbankan. *Jurnal Ekonomi, Manajemen Dan Perbankan*, *1*(2), 62–73.

Nwakoby, N. P., Okoye, J. N., Ezejiofor, R. A., Anukwu, C. C., & Ihediwa, A. (2020). Electronic Banking and Profitability: Empirical Evidence from Selected Banks in Nigeria. *Journal of Economics and Business*, *3*(2). https://doi.org/10.31014/aior.1992.03.02.227

Onay, C., & Ozsoz, E. (2013). The Impact of Internet-Banking on Brick and Mortar Branches: The Case of Turkey. *Journal of Financial Services Research*, *44*(2), 187–204. https://doi.org/10.1007/s10693-011-0124-9

Otoritas Jasa Keuangan. (2015). *Bijak Ber-eBanking*. Otoritas Jasa Keuangan.

Otoritas Jasa Keuangan. (2018). *Penyelenggaraan Layanan Perbankan Digital Oleh Bank Umum*, [Electronic version]. Available: https://www.ojk.go.id/id/regulasi/Documents/Pages/Penyelenggaraan-Layanan-Perbankan-Digital-oleh-Bank-Umum/POJK%2012-2018.pdf [2021, August 03]

Peterson, R. (2004). Integration Strategies and Tactics For Information Technology Governance. Idea Group Publishing.

Rath, B. N., & Hermawan, D. (2019). Do information and communication technologies foster economic growth in Indonesia? *Buletin Ekonomi Moneter Dan Perbankan*, *22*(1), 103–121. https://doi.org/10.21098/bemp.v22i1.1041

Riadi, M. (2014). Pengertian, Sejarah dan Komponen COBIT, [Electronic version]. Available: https://www.kajianpustaka.com/2014/02/pengertian-sejarah-dan-komponen-cobit.html [2021, August 03]

Saiful, S., & Ayu, D. P. (2019). Risks Management and Bank Performance: the Empirical Evidences From Indonesian Conventional and Islamic Banks. *International Journal of Economics and Financial Issues*, *9*(4), 90–94. https://doi.org/10.32479/ijefi.8078

Scniederjans, M. J., Hamaker, J. L., & Scniederjans, A. M. (2010). *Information Technology Investment Decision – Making Methodology* (2nd ed.). World Scientific Publishing.

Sekaran, U., & Bougie, R. (2016). *Research Methods for Business* (7th ed.). Wiley.

Siddik, M. N. A., Sun, G., Kabiraj, S., Shanmugan, J., & Yanjuan, C. (2016). Impacts of e-banking on performance of banks in a developing economy: empirical evidence from Bangladesh. *Journal of Business Economics and Management*, *17*(6), 1066–1080. https://doi.org/10.3846/16111699.2015.1068219

Simpson, J. (2002). The impact of the Internet in banking: Observations and evidence from developed and emerging markets. *Telematics and Informatics*, *19*(4), 315–330. https://doi.org/10.1016/S0736-5853(01)00019-3

Sinkey, J., & Joseph, F. (1992). *Commercial Bank Financial Management, In the Financial-Service Industry* (4th ed.). Macmillan Publishing Company.

Skvarciany, V., Jurevičienė, D., & Morkunas, M. (2019). Determinants of bank profitability: Empirical research on Lithuanian market. *International Journal of Economic Policy in Emerging Economies*, *12*(5), 443–452. https://doi.org/10.1504/IJEPEE.2019.104637

Sujud, H., & Hashem, B. (2017). Effect of Bank Innovations on Profitability and Return on Assets (ROA) of Commercial Banks in Lebanon. *International Journal of Economics and Finance*, *9*(4), 35. https://doi.org/10.5539/ijef.v9n4p35

Vugec, D. S., Spremić, M., & Bach, M. P. (2017). IT governance adoption in banking and insurance sector: Longitudinal case study of cobit use. *International Journal for Quality Research*, *11*(3), 691–716. https://doi.org/10.18421/IJQR11.03-13

Weill, P., & Broadbent, M. (1998). *Leveraging The New Infrastructure: How Market Leaders Capitalize on Information Technology*. Harvard Business School Press.

Wernerfelt, B. (1984). Harmonised implementation of Application-Specific Messages (ASMs). *Strategic Management Journal*, *CINCO*(2), 1–12. http://onlinelibrary.wiley.com/doi/10.1002/smj.4250050207/abstract.