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The Effect of Information Technology Management on Customer Satisfaction in E-Bank Services

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ABSTRACT

The banking industry is currently growing rapidly by utilizing and optimizing management information and technology in the form of e-banking as an efficient means of a satisfying customer. Online-based services at banks are more efficient services to help customers. Technological advances have been used to attract customer for bank transactions. Therefore, customer satisfaction is a priority in banking activities. Customer satisfaction is an important factor in maintaining a competitive advantage in the era of technological development. This research is a form of replication that will use the subject of e-banking user bank customer in Indonesia which aims to determine the factors that affect customer satisfaction of e-banking service users. This research uses quantitative methods with multiple linear regression analysis. The results of this study state that cloud service, e-learning, and service quality are factors that can increase customer satisfaction when using e-banking services.

Keywords : customer satisfaction, e-banking, e-learning, security, service quality, the role of cloud service

1. INTRODUCTION

The development of information and communication technology presents new opportunities for all sectors of the economy, these developments have an impact on fundamental changes in the business sector (Shaqiri & Namani, 2015). One of the factors of business success is information technology (IT) which is useful for optimizing business management in generating profits. IT-based business is considered the main source of success in the business world (Nikoloski, 2012). The development of IT in business aims to make it easier for customers to interact with companies (Hugh & Kim, 2019). The era of the digital economy for cellular services is one aspect that is experiencing rapid development in the world, this opportunity offers significant added value to services. In the last few decades, competition in the banking industry has become increasingly intense. Technology-based banking activities in this era emerged as a strategic innovation for responding to changes and increase competitive power for customer convenience (Ho, Wu, Lee, & Pham, 2020).

The development of information technology has made it easier for bank customers to access accounts via the internet network (e-banking). The e-banking application is a banking activity that utilizes information technology that provides services as needed (Li, Lu, Hou, Cui, & Darbandi, 2021). E-banking products provide transaction services at low costs to increase efficiency and productivity. The e-banking service is one of the fastest-growing bank products in the world, especially in Indonesia (Ho, Wu, Lee, & Pham, 2020). Based on the Financial Services Authority (OJK) noted that the number of e-banking users increased 270% from 2012 to 2016, this increase occurred due to customer needs in utilizing technology (Yani, Lestari, Amalia, & Puspita, 2018). In terms of transactions, in 2020 the number of customers transacting via e-banking was 60,912,342 transactions. This data increased by 36% from 2019 with 44,872,107 transactions (Richard, 2020).

Customer satisfaction with e-banking users has been confirmed as the key to success in information technology and communication systems (Geebren, Jabbar, & Luo, 2021). Customer satisfaction is also an important parameter for banks (Ahmed, Rezaul, & Rahman, 2014), and banks must have a strategy that aims to get customer satisfaction (Ayo, Oni, Adewoye, & Eweoya, 2016). Satisfaction is one of the reasons customers continue to use e-banking as a transaction facility (Nustini & Fadhilah, 2020). Customer satisfaction in using e-banking services is influenced by several factors, namely cloud service, security system, e-learning and service quality (Li, Lu, Hou, Cui, & Darbandi, 2021). Technological advances are part of the emerging trends in information technology, such as the internet of things (IoT), big data, cloud computing, and industry 4.0 (Kim, 2017). Cloud computing is a large-scale parallel system that provides computing resources such as servers, networks, and applications via the internet (Song, Kim, & Shon, 2020). Cloud computing enables the growth of cost-effective information technology services (Ali, Shretha, Chatfield, & Murray, 2020). The rapid development of cloud computing has an impact on cloud service, which is a component needed to measure the quality of a service that has a direct effect on customer performance and satisfaction (Ding, Wang, Wu, & Olson, 2017).

With increasing concerns regarding cloud security and privacy, the security system dynamically provides a reliable computing environment according to customer needs (Huang, Chen, Yuan, Ding, Jian, Tan, Chen, Chen 2020).

System security is a series of services such as passwords and authentication services that are mostly used in cloud systems. Complex security services derive from the coordination of several different services (Hamdy, Abbas, & Hegazy, 2021). The security system is currently a major concern in the banking sector for better service improvements (Neeraja, Rao, Maloji, & Hussain, 2018).

The sophistication of information technology allows individuals to learn effectively using electronic services (e-learning) (Tan, Chen, Li, Li, Tang, Wang, 2015). E-learning is a type of service that is one of the new developments in the company. This system makes it possible to access the latest knowledge which aims to increase the productivity and performance of the company (Chen & Kuo, 2011). E-learning is a solution to avoid problems related to physical mobility that allows customers to access online information anywhere (Dominici & Palumbo, 2013).

Service quality aims to meet the needs and expectations of customers. Customer satisfaction results from good employee performance (Chen & Kuo, 2011). Service quality has a role in influencing customer satisfaction, the better service provided, the higher customer satisfaction (Nunkoo, Teeroovengadum, Ringle, & Sunnassee, 2020). Service quality for e-banking users in the banking industry is considered important to maintain a higher quality of service. Customers are more interested in banks that provide fast transaction services when using e-banking (Raza, Umer, Qureshi, & Dahri, 2020).

The four variables which are factors that affect customer satisfaction in this study have never been done before in Indonesia. This is an important achievement in this research to provide a research instrument that looks at the effect of management IT e-banking services on customer satisfaction in Indonesia.

2. THEORETICAL BACKGROUND AND LITERATURE REVIEW

2.1 Cloud Service

Cloud services refer to the various services that are provided according to the demands of companies and customers over the internet. This service provides easy and affordable access to applications and resources without the need for infrastructure or internal hardware (Li, Lu, Hou, Cui, & Darbandi, 2021). Cloud service has attributes related to cloud computing such as payment models, self-service customers, scalability, and various accessible resources. Service providers add all providers to offer specific information for each customer (Binz, Breiter, Leymann, & Spatzier, 2012). Currently, many services use cloud computing to drive profitability levels amid the growing demand for technology-based services (Shang, Kauffman, Huang, & Yang, 2020). The rapid development of cloud computing impacts cloud service, which is a component needed to measure the quality of a service that directly impacts customer performance and satisfaction (Ding, Wang, Wu, & Olson, 2017). Technological development mechanisms will improve data security management in cloud computing systems (Wang, Wang, Su, & Ge, 2019). Song, Kim, & Shon, (2020) provide insights to businesses about the adoption of cloud computing systems at the individual level and explore information technology trends applied by several industries. This research conducted in South Korea shows that cloud computing can retain users and attract new users.

2.2 E-learning

E-learning makes it easy for individuals to carry out cooperative learning efficiently anywhere and anytime (Li, Lu, Hou, Cui, & Darbandi, 2021). E-learning is a type of electronic service that helps users access the latest knowledge and find solutions that aim to increase company productivity (Chen & Kuo, 2011). The quality of e-learning services is one of the factors that can increase satisfaction and loyalty to individuals (Pham, Limbu, Bui, Nguyen, & Pham, 2019). Karaaslan (2013) investigated the role of e-learning in the success of improving professional performance and developing the career of bank employees based on the e-learning used. The research was conducted on employees of the Aegean region of foreign banks. As a result, e-learning training was effective in increasing the bank's performance in creating professional employees. Purnomo & Lee, (2013) conducted research in Indonesia, aiming to determine whether the technology acceptance model can be used to understand the benefits of customer perceptions in using the e-learning system. The analysis method used is the structural equation modeling technique. The results of this study suggest that the model used provides a conceptual framework for individuals and organizations to better understand the crisis factors that most play a role in influencing the acceptance of e-learning in developing countries.

2.3 Banking System Security

Security is defined as protecting, ensuring and preventing hackers from attacking customer information and data. Banks with secure electronic systems can protect customers regarding financial information and personal data, especially when making online transactions (Li, Lu, Hou, Cui, & Darbandi, 2021). Complex security services are obtained by coordinating several different services (Hamdy, Abbas, & Hegazy, 2021). The security system is useful for minimizing the risk of the threat of abuse and other criminal acts. In particular, the security system aims to control access to reduce wiretapping and limit access to sensitive data (Mogos & Jamail, 2021). Security in using e-banking services is one of the factors of important concern regarding banking services (Armend, Metin, Hajrizi, & Ahmeti, 2019). Research conducted by Al-Azzam (2015) states that the security system is an indicator that plays a role in increasing customer satisfaction in using banking services. The results of research conducted by Huang, et al., (2020) show that the security system has an impact on improving services. Security systems also work within the scope of cloud computing to meet specific security system requirements. The research developed a new security framework

called a policy-customized trusted cloud service (PC-TCS) using a prototype based on the Xen Hypervisor. As a result, the PC-TCS system can be integrated into the cloud system as part of a trusted computing base. Mogos & Jamail (2021) conducted a study to identify the security situation of the e-banking application and analyze the risks and attacks that can be encountered by bank customers. The method used is the analysis of IT threats with potential vulnerabilities and IT system control. The result is that online applications are essential to ensure environmental security in a way that is authentic, available, and confidential and has a high level of security. Banks must regularly look at developing risks and provide solutions to address security problems

2.4 Service Quality

Service quality is the diversity of customer anticipation and understanding of the services provided. If service quality has a good value, customer satisfaction will arise (Li, Lu, Hou, Cui, & Darbandi, 2021). Service quality is very important to determine the level of success of a business in defining the customer experience. Service quality is used by organizations to create a competitive advantage (Raza, Umer, Qureshi, & Dahri, 2020). Service quality for the banking industry's e-banking users is considered important to maintain a higher quality of service. Customers are more interested in banks that provide fast transaction services when using e-banking (Raza, Umer, Qureshi, & Dahri, 2020). The aim of the research by Raza, Umer, Qureshi, & Dahri (2020) is to explore the dimensions of e-banking-based service quality and its effect on customer satisfaction. The results show that all dimensions have a positive and significant impact on customer satisfaction. Service quality plays an important role. This study uses a quantitative approach with 500 bank customers in Pakistan. The data obtained were then analyzed using the partial least square structured equation modelling (PLS-SEM) test.

2.5 Customer Satisfaction

The idea of customer satisfaction is still unclear and seems abstract. Real satisfaction is different for each person, product and service. Satisfaction with service is an understandable result of value or quality. Customer satisfaction is a parameter for services such as ease of use, product attributes, usability, enjoyment, trust, and transaction experience (Li, Lu, Hou, Cui, & Darbandi, 2021). According to Ali, Kim, Li, & Jeon (2018) there are several factors that affect customer satisfaction, namely; psychological factors, economic factors, and physical factors. Satisfaction is the level or value of agreement between customer expectations on service quality and service level. High-quality service is a service that satisfies clients in certain situations. Customer satisfaction is the main criterion for determining the actual quality of products and services (Moneim, 2013). The article Li, Lu, Hou, Cui, & Darbandi (2021) aims to examine the role of bank services (cloud service, security, e-learning, and service quality) on the customer satisfaction of e-banking users. This study uses SEM with the method of structural path analysis and exploratory factor analysis. The research was conducted on the Chinese population with the results of cloud service, security, e-learning, and service quality confirmed to have a role in customer satisfaction

Table 1. Literature Review

Authors	Result	Similarities	Differences
Li, Lu, Hou, Cui, & Darbandi, (2021)	Cloud service, security systems, e-learning, and service quality are all factors that affect customer satisfaction.	Using variable cloud service, security systems, e-learning, service quality, and customer satisfaction.	The difference lies in the population of the study sample. In this study, researchers used a sample of the Chinese population who used e-banking.
Yani, Lestari, Amalia, & Puspita, (2018)	There is a positive influence between perceived usefulness and perceived ease of e-banking users.	Using e-banking users as a characteristic of the sample studied.	Yani, Lestari, Amalia, & Puspita's research (2018) aims to determine the effect of e-banking on customer interest.
Song, Kim, & Shon, (2020)	Cloud storage can retain users and attract new users.	Using cloud service variables	Examining individual acceptance of cloud services as public services using multi-groups (users and non-users).
Ding, Wang, Wu, & Olson, (2017)	Low-quality cloud services with low system security are likely to pose major risks and cause intra-organizational harm.	Using cloud service variables	Using a two-functional approach, namely, ranking similarity estimation and ranking prediction to take into account customer preferences and expectations.
Karaaslan, (2013)	e-learning can help banks achieve their targets and improve employee professionalism.	Using variables e-learning.	Using e-learning variables to see their role in improving employee performance.
Purnomo & Lee, (2013)	Provides a conceptual framework for individuals and organizations to better	Using variables e-learning.	Using the technology acceptance model as an external variable to understand the benefits and

	understand the crisis factors that most play a role in influencing acceptance e-learning.		perceptions of customers in the ease of using the e-learning system.
Chen, (2013)	Explain that the intensity of e-banking use has different perceptual patterns regarding the benefits and risks of innovation. Then, brand awareness and brand image of the bank providing e-banking services are exogenous factors that are important to see customer attitudes and interests.	Using the same framework, namely e-banking services.	Discusses the effect of diffusion and e-banking services, risk perception, brand awareness, and brand image of e-banking service providers, related to e-banking usage attitudes and intentions to use e-banking.
Huang, et al., (2020)	The resulting PC-TCS system can be integrated into the cloud system as part of the computing base	Using a security system framework and cloud services.	This research develops a new security framework called a policy-customized trusted cloud service (PC-TCS) using a prototype based on the Xen Hypervisor.
Mogos & Jamail, (2021)	Shows how to implement several different protective measures to protect accounts of individuals and organizations from being targeted by Internet crime.	Using the banking system security variable	Identify the security situation of the e-banking application and analyze the risk of attacks that can occur on bank customers.
Raza, Umer, Qureshi, & Dahri, (2020)	All dimensions in this study have a positive and significant impact on customer satisfaction. Meanwhile, customer satisfaction has a positive effect on customer loyalty.	Using the variables of service quality and customer satisfaction.	Determine customer loyalty variables.

2.6 Development of Hypothesis

Based on the objectives and previous research on IT management of e-banking services and customer satisfaction, this study has four hypotheses:

H1: Cloud Service has a significant effect on customer satisfaction

H2: E-learning has a significant effect on customer satisfaction

H3: Banking system security has a significant effect on customer satisfaction

H4: Service quality has a significant effect on customer satisfaction

3. RESEARCH METHOD

This research is explanatory research, which is a study that examines the relationship between the independent variables (cloud service, e-learning, banking system security and service quality) and the dependent variable (customer satisfaction). The analysis technique uses multiple regression analysis with the help of the SPSS application which aims to see the estimated relationship between variables (Uyanik & Guler, 2013). The data in this study were descriptive, so the researcher also conducted literature research to find phenomena without ignoring numerical data. The conceptual model of this research can be seen in fig.1. The first measurement in this study is to test the reliability and discriminating power of items, then the second measure the relationship between variables.

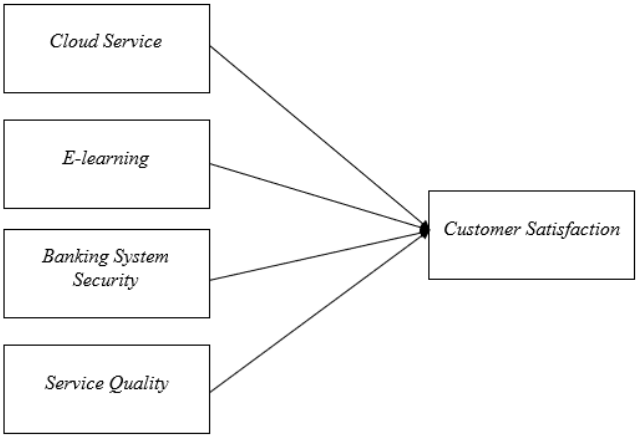

Figure 1. Conceptual of Research

3.1 Sampling Design and Data Collection

This study uses a population of bank customers using e-banking services with a minimum sample of 111 subjects as determined by the G * Power application with an effect size of 0.3; error probability 0.05; and power 0.95. Collecting data using a questionnaire distributed online with the characteristics of the subject having an e-banking application and having done transactions online. The questionnaire obtained from a random sampling of 142 respondents, table 2 describes in detail the related sample of this study.

3.2 Measurement Instrument

Measuring five variables in this study using a scale developed by Li, Lu, Hou, Cui, & Darbandi, (2021) totalling 25 items. The scale measures the variables of cloud service, banking system security, e-learning, service quality and customer satisfaction. All variables were measured using a Likert scale with the following responses: 1 (strongly disagree); 2 (disagree); 3 (neutral); 4 (agree); 5 (totally agree). A high score on this scale indicates a satisfactory e-banking service. Researchers transadapted the scale using the guidelines of Beaton, Bombardier, Guillemin, & Ferraz, (2000) with stages: stage 1 (initial translation); stage 2 (synthesis of the translation); stage 3 (expert committee); stage 4 (test of the prefinal version); stage 5 (submission of documentation).

3.3 Reliability of Research Instruments

Reliability measurement in this study used the Cronbach's alpha method. Reliability for the independent variables consisting of cloud service, e-learning, banking system security, and service quality were 0.68, 0.78, 0.76, and 0.67, for the dependent variable, namely customer satisfaction, reliability of 0.81. According to Bujang, Omar & Baharum, (2018) reliability above 0.5 can still be recommended.

4. RESULT

4.1 Descriptive Statistic

This study uses a descriptive statistical method in the form of a percentage and a frequency table. This section describes gender, age, and job status which can be seen detail in table 2. Of the 142 respondents 60% were women and 40% were men. Respondents in this study were dominated by subjects who had worked 58%, and 63% were dominated by adults.

Table 2. Statistic Descriptive of participants

Measure	Indicator	Frequency	Percentage
Gender	Male	57	40%
	Female	85	60%
Job status	Student	50	35%
	Already working	82	58%
	Unemployment	10	7%
Age	Under 21	17	12%
	21-30	89	63%
	31-40	23	16%
	41-50	11	8%
	Over 50	2	1%

4.2 Inferential Statistik

Based on table 3, it is known that the coefficient of determination or R square is 0.655 and the adjusted R square is 0.645. This value means that the variation (change) in the customer satisfaction variable is 64.5% explained by cloud

service, e-learning, banking system security, and service quality variables, while 35.5% is explained by other variables.

Table 3. The coefficient of determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.809[a]	.655	.645	1.427

Before conducting multiple regression tests, this study has met the assumption test criteria. Table 4 illustrates the results of multiple regression tests. The result shows (β = 0.517, sig = 0.009 <0.05) so that hypothesis 1 can be accepted. Cloud Service has a significant effect and has a positive relationship with customer satisfaction. Therefore, banks must ensure that cloud services work optimally. Cloud systems must be designed according to their needs so that customers can easily get benefits when using that system (Li, Lu, Hou, Cui, & Darbandi, 2021). Cloud services are currently believed to be able to increase the profitability of a company and can bind customers (Shang, Kauffman, Huang, & Yang, 2020), cloud services are also a component that can measure the level of customer satisfaction directly (Ding, Wang, Wu, & Olson, 2017).

Table 4. Summary of research result

Multiple regression Dependent Variable: Customer satisfaction	Beta	Sig. (sig<0.05)	Confirmation of hypothesis
Cloud service	0.517	0.009	Confirmed
E-learning	0.446	0.000	Confirmed
Banking system security	0.071	0.240	Rejected
Service quality	0.305	0.000	confirmed

Hypothesis 2 test results show that e-learning has a significant and positive effect on customer satisfaction (β = 0.446, sig = 0.000 <0.05). According to Pham, Limbu, Bui, Nguyen, & Pham, (2019) the quality of e-learning services is an important factor that affects user loyalty and satisfaction. In addition, Pham, Vu, & Tran, (2020) said that organizations that have e-learning programs must realize the importance of customer loyalty related to trust and satisfaction in general. To make this happen, Chen & Kuo, (2011) explain that e-learning must have several criteria so that usage satisfaction can be increased. These criteria are content that is stable, easy to use, has up-to-date content, and has good service response.

Hypothesis 3 has different results, (sig = 0.240> 0.05), namely the banking system security variable has no significant effect on customer satisfaction. This means that even though the bank has a good security system, it does not affect customer satisfaction. Satisfaction does not always guarantee someone to become a regular customer. Many factors influence a customer's desire to continue subscribing (Elizar, Indrawati, & Syah, 2020). Even though the bank has made efforts to optimize the banking system security, security risks in e-banking services remain a concern for customers. Threats of crime and fraud can be in the form of loss of customer funds, hoaxes of bank information via SMS and email, theft of personal data, and hacking of verification via SMS causing customer concern (Poornima & Sridharan, 2020).

The results of testing hypothesis 4 show that service quality has a significant and positive effect on customer satisfaction (β = 0.305, sig = 0.000 <0.05) it means that the better service quality, the more customer satisfaction increases. Customers who are satisfied with e-banking services will have a positive impact on the bank's brand (Nguyen, Pham, Tran, & Pham, 2020). Service quality for e-banking users is considered important to maintain a higher quality of service. Bank customers are more interested in banks that provide fast transaction services when using e-banking (Raza, Umer, Qureshi, & Dahri, 2020). The banking industry has a major focus on service quality. Service quality has an important point to increase customer satisfaction, if customers are satisfied because of the quality of service provided by the bank, it will increase customer loyalty to remain customers (Alam & Al-Amri, 2020). Literature related to service quality and customer satisfaction has explained that in the era of digital transformation, banks need to understand customer needs to evaluate services (Zouari & Abdelhedi, 2021).

5. CONCLUSION

Customer satisfaction is an important point that must be considered by banks to increase competitiveness in the era of digital development. The conclusion of this study is that cloud service, e-learning and service quality are proven to have a significant effect on customer satisfaction, while banking system security has no significant effect on customer satisfaction. The results of this study are different from previous studies which prove that banking system security is one of the factors that has a positive influence on customer satisfaction. This can be caused by customers who until now have received threats of fraud and crime from the e-banking services used.

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