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ANALYSIS OF CLOUD COMPUTING CHARACTERISTICS, SERVICES AND SECURITY AGAINST INFORMATION TECHNOLOGY STRATEGY FOR SMALL MEDIUM ENTERPRISES

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ABSTRACT

Along with the development of the economy and technology, especially in cloud computing in Indonesia, Small and Medium Enterprises (SME) services also take part in this development. Cloud computing is an information technology innovation that allows users to use resources based on demanding utilities. Limited capital, human resources, and access to marketing networks are no longer a problem for SME businesses significant because of the benefits of Cloud Computing. Based on partial testing, the results of this study indicate there is no influence and insignificance of cloud computing security on variables characteristic variables of cloud computing. Similarly, the security variable has no influence and insignificant on the adoption of the strategy variable. While service variables have a positive and significant effect on security variables.

Keywords : *Cloud computing; characteristics; security; utilities; adoption; SMEs of Indonesia*

INTRODUCTION

Sectors of the economy and technology in developing countries are currently well developed. Market players do not cease to innovate in advance their business. This also applies to the sector of Small and Medium Enterprises (SMEs). In sum, SMEs in Indonesia 100 times more than large-scale enterprises (Fardani & Surendo, 2011). In 2018, there were 1,032,643 billion. The role of SMEs is highly recognized as the spearhead of a country's economic progress (Ministry of Cooperatives and SMEs, 2009). However, in some aspects, SMEs have not been able to compete with large-scale enterprises in the industry competition.

The concept of cloud computing has been raised since 2005 and sparked the enthusiasm of the business to improve its performance by relying on information technology solutions more practical and economical. Services that can be used in cloud computing are very diverse to target the wider sector. Cloud computing is also one solution for the SME sector which is plagued procurement of information technology resources. Service that is generally found on Cloud Computing services is Infrastructure as a Service, Platform as a Service, and Software as a Service.

For this research, the studied variables are the characteristics of cloud computing needed by SMEs, the basis of cloud computing services that became the foundation of SME IT infrastructure, and data security issues that can help the development of the SME business (Kuyoro S. O et al., 2011). In the future, cloud computing will become a trend in the IT field who provide bright prospects for industry players (V. Chawla & Sogani, 2011; Raj et al., 2014; Varghese & Buyya, 2018). However, to get optimal performance requires the right strategy for SMEs in Indonesia to adopt Cloud Computing technology effectively and efficiently for the SME business transform into a better direction (Adiyasa et al., 2018; Gui et al., 2020; Mangula et al., 2012). The proposed research aims to formulate a strategy on SME adoption of cloud computing in Indonesia. Business opportunities in this cloud will be an opportunity also for doing research (Meyer et al., 2013; Sangupamba et al., 2014; Дресвянников et al., 2019). In the future, the characteristics, services, and cloud security can grow much more rapidly because of the needs of the various sectors are quite extensive (Ibrahim & Kusnawi, 2013). The formulation of the problem which is the basis of this research include: Does the characteristics of cloud computing affect the security level of cloud computing for SMEs; Does the analysis of cloud computing services affect the level of security of cloud computing for SMEs; Does cloud computing security affect the adoption of information technology adoption strategies for SMEs; Do the characteristics, services, and security of cloud computing influence the implementation of information technology

adoption strategies for SMEs?

Restrictions issue in this study is limited to the object of research by small and medium business customers in the field of Financial Technology at PT Blue Power Technology and already using the cloud provider that Alibaba Cloud. This research is limited by research on the characteristics, services, and security variables towards the adoption of cloud computing strategies.

In Indonesia, an Act to regulate the Micro, Small and Medium Enterprises (SMEs) is Law No. 20 of 2008. In these laws SMEs are described as: "A company is classified as SMEs are a small company owned and managed by a person or owned by a small group of people with a certain amount of wealth and income ". And engaged in SME startup world is of course very diverse. But the startup business field is on the rise today is Financial Technology. The business was highly controlled by the government primarily because of financial issues crucial for the wider community.

In carrying out its operational functions, companies SME or startup requires the IT environment such as Cloud computing. NIST defines cloud computing as a model of pay-according-use (pay-per-use) in the use of computing resources (network, server, storage, applications, services) that are always available, accessible, and relies on the network (on-demand) which can be accessed by multiple users; which can quickly be used and released by the management effort or service provider interaction is minimal. The following are the five features of cloud computing:

1. Resource Pooling
   Cloud service providers provide services through resources grouped in one or multiple data center locations.
2. BroadNetwork Access
   Service capabilities available via the network can be accessed by various types of devices.
3. Measured Service
   Services are available to optimize and monitor the services used automatically.
4. Rapid elasticity
   The resource capabilities used by consumers, such as server performance and data storage size, can be easily adjusted according to their needs.
5. Self Service
   Cloud consumers can independently configure the services they want to use through a system.

The concept of cloud computing could not be separated from the service layer arranged. In general, there are three main services offered to the Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) as illustrated in Figure 1 (Balboni, 2020).

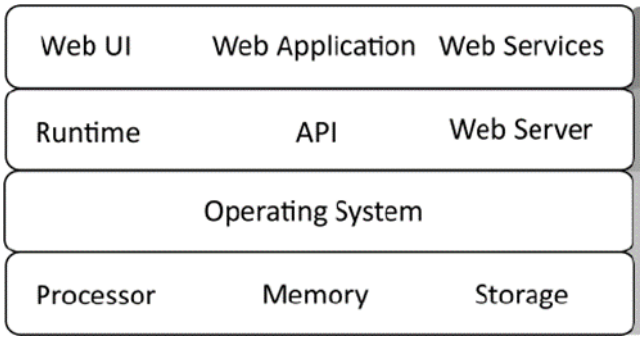

Figure 1 The main service cloud Source: Fardani and Surendro, (2011)

Cloud Computing presents many challenges to the organization Fauziah, (2014) in (Alfarizi

& Ikasari, 2023). When organizations move to the public cloud computing services infrastructure of the computing system is controlled by a third party, namely the Cloud Service Provider (CSP) and this challenge must be addressed through management initiatives. The management initiatives will require a clear picture of the role of ownership and responsibility of the CSP and the organization that acts as a customer. As renewable technologies, qualified adoption strategy would need to study the implementation of cloud computing (Rittinghouse & Ransome, 1999). ROCCA is a generic model that is based on research on matters related to the adoption of cloud computing. Because generic, this model can be applied to multiple domains cloud computing, in any organization and any cloud platform and infrastructure (Anggraini et al., 2019; Bunyamin et al., 2018; Haryanto, 2019; Maniniti, 2014; Perdana & Suharjito, 2017). This adoption model integrating factors that become the focus in the adoption of cloud computing in organizations. These factors included:

a) Confidence (trust),
b) Security (security),
c) Suitability of legal rules (legal and compliance) and
d) Organizational factors (organizational issue). Aspects or important issues that should be considered in the adoption of cloud computing is the trust, security, suitability legal rules, and organizational factors.

From background of the problem and the theoretical basis of the above, the framework of this research can be seen in Figure 2.

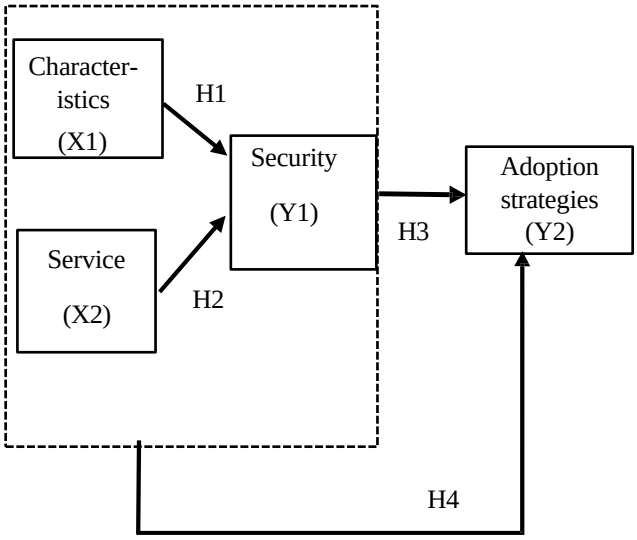

Figure 2 The Framework

Hypothesis
H1: Allegedly the characteristics of cloud computing have a positive relationship to levels cloud computing security.
H2: Cloud computing services allegedly have apositive influence on the level of security cloud computing.
H3: Suspected security of cloud computing positive influence on cloud adoption strategy computing.
H4: Suspected characteristics, services, and cloud computing security has positive effect to the adoption of information technology strategy for SMEs.

RESEARCH METHOD

The method used in this research is explanation (explanatory) with quantitative and qualitative approach. The purpose of this study was to test the hypothesis and to explain the causal relationship between the variables, is characteristics, services, and security for the strategy adoption of information technology. In this study, the type of data used is primary data and secondary data. The primary data obtained by distributing a questionnaire or a questionnaire given to respondents who selected and conducted interviews. While secondary data obtained from borrowing other documents related to this research.

The population of this research is customer SME Cloud team Xtream PT Blue Power Technology that already use products Alibaba Cloud service as many as 38 companies. Once the target population is determined, the next step is to determine the number and sampling techniques. Then after these steps are met, need to be determined number of samples taken. The sampling method used in this study is the method of sampling based on certain considerations (purposive sampling) were selected based on certain considerations were selected based on the category of companies engaged in the field of Financial Technology and the individual respondents are workers who work implementing the system of their company on Alibaba Cloud.

The model of this research is using descriptive statistics and inferential statistics (D. Chawla & Deorari, 2005; Dilevko, 2007; Khakshooy & Chiappelli, 2018; Laccourreye et al., 2021; Larson, 2006; Turner & Houle, 2019). Descriptive statistics were used in this study to measure the use of cloud computing by using the provider Alibaba Cloud against adoption strategy and its impact on the ability of technology adoption are financial companies that become customer technology PT Blue Power Technology. Descriptive statistics were analyzed in this study using the characteristics of respondents by the old establishment of the company, the number of employees at the company, revenue per year, and status monitoring of the Financial Services Authority (FSA). In this study, also using inferential statistical methods parametric with path analysis (path analysis) and the research data processing assisted by SPSS software version 20. SPSS is statistical applications to manage and analyze the data for various purposes by using statistical techniques. Model path analysis (path analysis) to determine the effect of independent variables on the dependent variable, either directly or indirectly

RESULT AND DISCUSSION

This study uses data collected from respondents who filled out the questionnaire. Questionnaires were distributed to customer teams Cloud Xtream PT Blue Power Technology that uses the services of Alibaba Cloud ranging from Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) for the functioning of the system unit respective business of the company. Total questionnaire distributed in this study amounted to 38 questionnaires. Of the 38 (100%) questionnaires distributed, 30 (80%) questionnaires received back. Of the 30 (80%) received the questionnaire, 30 (100%) the data on the questionnaire can be processed.

Descriptive statistics of Research Respondents

Respondents are divided based on certain criteria such as the old establishment of the company, number of employees, revenue per year, and status monitoring Financial Services Authority (FSA). The respondents can be seen in the following table.

Table 1 Respondents research is based on the old foundation of the company

long standing	amount	Percentage (%)
<2 years	10	33%
2-3 years	13	43%
> 3 years	7	24%
Total	**30**	**100%**

Source: Data Proses SPSS version 20, 2020

Table 2 Respondents research is based on the number employees of the company

Number of Employees	amount	Percentage (%)
<20	13	43%
20-50 people	9	30%
> 50 people	8	27%
Total	**30**	**100%**

Source: Data Proses SPSS version 20, 2020

Table 3 Respondents research is based on the annual revenue the company

The annual revenue	amount	Percentage (%)
<Rp 700.000.000	16	53%
USD 700.000.000 - Rp 1.400.000.000	4	14%
> Rp 1.400.000.000	10	33%
Total	**30**	**100%**

Source: Data Proses SPSS version 20, 2020

Table 4 Respondents research is based on the FSA supervised the company

FSA Supervised	amount	Percentage (%)
Yes	13	43%
In the Process	0	0%
No	17	57%
Total	**30**	**100%**

Source: Data Proses SPSS version 20, 2020

Validity of Test Results

Test validity is used to measure the validity of a questionnaire (Bolarinwa, 2015; Taherdoost, 2016). In this study, the questionnaire can be said to be valid if the value of R arithmetic> R table. R table obtained from the (n-2) = 28 is 0.361 with a significance level of 5%. Test validity can be seen in Table 5 below

Table 5 Test Validity

Variable	R arithmetic	R Table	Information
X1.1	0.884	0.361	Valid
X1.2	0.553	0.361	Valid
X1.3	0.828	0.361	Valid
X1.4	0.776	0.361	Valid
X1.5	0.838	0.361	Valid
X2.1	0.805	0.361	Valid
X2.2	0.769	0.361	Valid
X2.3	0.779	0.361	Valid
X2.4	0.815	0.361	Valid
X2.5	0.791	0.361	Valid
Y1.1	0.912	0.361	Valid
Y1.2	0.683	0.361	Valid
Y1.3	0.613	0.361	Valid
Y1.4	0.882	0.361	Valid
Y1.5	0.397	0.361	Valid
Y1.6	0.958	0.361	Valid

Y2.1	0.845	0.361	Valid
Y2.2	0.810	0.361	Valid
Y2.3	0.817	0.361	Valid
Y2.4	0.868	0.361	Valid
Y2.5	0.856	0.361	Valid

Source: Data Proses SPSS version 20, 2020

On Table 5 shows that r count> r table. R table in this test has a value of 0.361. Then all the items on each variable is declared invalid.

Reliability Test Results

Reliability testing is the process of testing the entire statement in the questionnaire (Saw & Ng, 2001; Souza et al., 2017). This test specifies whether the contents of the statement have been reliable. A variable is said to be reliable if the value of Cronbach Alpha (a)> 0.6. (Ghozali, 2019). A reliability test can be seen in Table 6.

Table 6 Test Reliability

variables	Cronbach Alpha	Information
X1	0,879	Reliable
X2	0,836	Reliable
Y1	0.826	Reliable
Y2	0.883	Reliable

Source: Data Proses SPSS version 20, 2020

In Table 6 shows that the Cronbach Alpha> 0.6 and it can be concluded that all of the variables in this study is reliable.

Partial assay results (t test)

Testing the hypothesis in this study using the Alpha value of 5% is 2.042. Then criteria for acceptance or rejection of the hypothesis is Ha accepted and H0 is rejected when the value of t>2.042 and significance <0.05. The results of data processing t test using SPSS version 20 can be seen in Table 7.

Table 7 Test Reliability

Variables	t	t table	*Sig*	Significant boundary	R2
Characteristics→ Security	1.719	2,042	0.097	0.05	0.095
Service→ Security	4.973	2,042	0,00	0.05	0.469
Security→ Adoption strategies	1.487	2,042	0.148	0.05	0.27

Source: Data Proses SPSS version 20, 2020

Simultaneous Test Result (Test F)

Result data processing simultaneously with the F-test using SPSS version 20 Solid seen in Table 8.

Table 8 Results of Simultaneous Testing (Test F)

Variables	t	t table	*Sig*	Significant boundary	R2
Characteristics Services→ Security	12.419	3.34	0.000	0.05	.479
Characteristics, Service, and Security→Adoption strategies	31.826	3.34	0.000	0.05	.789

Source: Data Proses SPSS version 20, 2020

Discussion and Interpretation of Results

Based on the partial results of testing against the security and characteristics of cloud computing cloud computing can be concluded the results of testing the effect of the characteristics of cloud computing to the user's security level indicates the positive direction with R^2 values of 9.5% and amounted to 1,719 t value is smaller than t table is 2.042 and the significance of 0.097. Value Significance testing is also greater than the value of 0.05. Thus, the characteristics of cloud computing is not significant influence and partially on user security. This means hypothesis1 is rejected. This can happen because the user already accepted the risk if their resources on cloud computing is the use of a lease and sharing (Almutairi et al., 2018; Mustafa et al., 2015). Characteristics of cloud computing do not make users believe much of the security provided cloud provider (Grobauer et al., 2011; Subashini & Kavitha, 2011).

Based on the results of the partial testing cloud computing services to the security of cloud computing can be concluded the test results influence the characteristics of cloud computing to the user's security level indicates the positive direction with R^2 values of 46.9% and amounted to 4.973 t value is smaller than t table is 2,042 and significance of 0.00. Value Significance testing is also smaller than the value of 0.05. Thus, the characteristics of cloud computing and the significant influence partially on user security. First to hypothesis 2 is accepted. The ease and familiar IT infrastructure to make the user more like this product compared to other products. In addition, the resource provided infrastructure such as processor, memory, and storage are already available and can be used directly if already paid. Specifications infrastructure cloud services available ranging from the smallest (1-core CPU, 0.5 GB RAM, and 20 GB storage) to the largest (whitelist 16 GB, 96 GB RAM and 48 TB of storage blocks). Uniquely, these infrastructure resources can be scaled at any time (Manvi & Krishna Shyam, 2014; Zia Ullah et al., 2017).

Based on the test results of partial security of cloud computing to the strategy of adoption of cloud computing can be concluded the test results influence the security of cloud computing to the strategy of technology adoption shows the positive direction with R2 values of 27% and with a t value of 4.973 is greater than t table is 2,042 and Significance amounting to 0.148. Value Significance testing is also greater than the value of 0.05. Thus, cloud computing security has no effect and no Significant partially on technology adoption strategy. This means that hypothesis 3 is rejected. The issue of data security was evidently still holding the highest attention if you want to use the services of cloud computing. There are many aspects that can be seen in assessing security holes in cloud computing (Liu, 2014; Sun et al., 2014).

Based on test results of simultaneous characteristics, service, and security to the adoption of cloud computing strategy can be summed up the characteristics influence the test results, services, and security of cloud computing to the technology adoption strategy indicates the positive direction with R2 values of 78.6% and the calculated F value of 31.826 bigger than F table is 3,34 and Significance of 0.000. Value Significance testing is also smaller than the value of 0.05. With such characteristics, services, and cloud computing security and significant effect simultaneously on technology adoption strategy. This means that hypothesis4 is accepted. At the stage of adoption, users ensure that the application will be able to function in the new infrastructure and continue to operate with applications that do not participate migrated. SLA outsourcing strategy and determination should also be determined (Lu et al., 2012). At this time the user determines the characteristics, services, and security sufficient to meet each company's standards.

CONCLUSION

There is no significant positive effect and partially of variable cloud characteristics to the security of the user's system with R^2 values of 9.5% and with a t value of 1.719 <t table 2.042 and Significance 0.097 <0.05. There is a positive and significant effect of the variable partial cloud services to the user's system security with R^2 values of 46.9% and with a t value of 4,973 > t table 2.042 and Significance 0.000<0.05. There is no significant positive effect and partially of variable cloud security to cloud computing technology adoption strategy with R^2 values of 27% and with a t value of 1.487 < t table 2.042 and Significance 0.148 <0.05. There is a positive and significant effect simultaneously on the variable characteristics, services, and cloud security

to cloud computing technology adoption strategy with R^2 values of 78.6% and the value of F value 31.826 <F table 3,34 and Significance 0,00 <0.05.

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