



## Use of Clouds-Based Regional Management Systems: Dual Factor Theory Approach

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### **Abstract**

The purpose of this research is to investigate the enablers and inhibitors include dual factor theory of clouds based regional information system usage. This research took samples of financial employees who worked in the Regional Apparatus Organizations (OPD) in Jember Regency consisting of 200 respondents, used a survey method and primary data. The sample selection technique in this study uses purposive sampling, data analysis uses multiple regression. The results show, the first problem of IT infrastructure has a negative effect on the use of cloud-based regional management information systems. Secondly, the problem of human resource competency has a negative effect on the use of cloud-based regional management information systems. Third, perceived usefulness has a positive effect on the use of cloud-based regional management information systems. Fourth, perceived ease of use has a positive effect on the use of cloud-based regional management information systems.

**Keywords:** Inhibitor and Enabler; Dual Factor Theory; TAM (Technology Acceptance Model)

### **Introduction**

The technology-based information system used by governments in the international world is known as e-Government. From a global perspective, the United Nations (UN) evaluates the implementation of e-government in several countries, called the E-Government Development Index (EGDI). The assessment covers 3 dimensions, namely the online service index (OSI), the telecommunications infrastructure index (ITI), and the human capital index (HCI).

Survey (2018) of the Indonesian EGDI dimension ranks 107th. In detail, Indonesia's EGDI, OSI, ITI, and HCI ratings get values that can be said to be below the average in the Southeast Asian region, EGDI with 0.5258, OSI with 0.5694, TII with the number 0.3222, and HCI with the number 0.6857. The ranking position is still far compared to Southeast Asian countries such as Malaysia (ranked 48), Singapore (ranked 7), Philippines (ranked 75), and Brunei Darussalam (ranked 59), Thailand (ranked 73), and Vietnam (ranked 88). Through the EGDI, Indonesia still needs more efforts to improve and enhance the implementation of e-government in Indonesia.

One form of e-government in the G2G category in Indonesia is the Regional Management Information System used by OPD in Indonesia. Clouds-based Regional Management Information System The system is used and implemented in only 4 districts out of 29 districts in the East Java Region. The use of clouds-based Regional Management Information System in this research is Jember Regency. The use of Regional Management Information System was adopted from BPKP, which is a Financial-based Management Information System (SimdaKeu) and PT Lawang Sewu, namely Clouds Systems.

The conditions to date the Jember Regency Government using the Clouds-based Regional Management Information System have experienced several obstacles, including: First, technical error (some accounts cannot enter the accrual journal so that it does not appear in accrual-based financial statements). Second, some Regional Apparatus Organizations (OPD) input depreciation expenses not in accordance with the goods inventory card (KIB). Third, some Regional Apparatus Organizations (OPD) present and input assets that are not in accordance with the goods inventory card (KIB).

Many researchers have conducted research related to factors that influence the use of the system, especially the regional management information system. Research conducted by Maksum *et al.* (2017), Purwitasari Mega and Pratomo (2015), Kim *et al.* (2009) explain partially or simultaneously perceptions of usefulness and perceived convenience have a positive effect on system use. However, research conducted by Rudini (2018), Rahadi (2007), Nurhayati *et al.* (2015) shows the perceived usefulness of the use and the perceived benefits do not affect the acceptance of technology. These results are due to differences in the characteristics of information technology users, one of which is the behavioral aspect. Behavior towards individuals is influenced by the user's perception of information technology, one of which is the behavioral aspect.

The behavior is influenced by the user's perception of the technology theoretically described by experts in IT developers as users and its effect on the use of computers. This is consistent with what was stated by Davis *et al.* (1989), that based on the behavioral aspects of the user also affects the perception and attitude in accepting the use of technology. The research study has indirectly tested the enablers factor, namely the variable of perceived usefulness and perceived ease of use which are the two main constructs in TAM theory. Based on this research study, it can be concluded that the researcher only raised the TAM variable which only tested the form of user acceptance of the system but, had not tested the inhibitor factors or some variables that could cause system rejection.

This research is a development of individual perception research using a system with dual factor theory and combining models in previous studies that tested this, namely research conducted by Kim *et al.* (2016) and Cenfetelli and Schwarz, A. (2011). The difference from this research lies in the use of dual factor theory, namely by using variables: First, the category of inhibitors is the problem of infrastructure and human resource competency problems in the use of cloud-based regional management information systems. Second, the category of enablers is the perceived usefulness and perceived ease of use on the use of cloud-based regional management information systems.

Dual factor theory and the use of these variables have not been found in similar studies related to the use of systems in Indonesia, especially public organizations, namely cloud-based regional management information systems. Furthermore, the instrument that has been modified in this study uses instruments developed by Henderson III *et al.* (2016). In contrast to previous studies, researchers added the variable usability perception and perceived convenience as an independent variable on the use of cloud-based regional management information systems.

This study has two contributions, namely theoretical contributions and practical contributions. Theoretical contribution in this research is to provide additional empirical evidence of dual factor theory, namely the problem of IT infrastructure and the problem of human resource competence as inhibitors, and the two main constructs in TAM, which are perceived usefulness and perceived convenience as enablers of the use of cloud-based regional management information systems.

The practical contribution of this research is that it can be used as an evaluation of the Regional Organization of the Jember Regency in order to optimize the utilization of Clouds-based Regional Management Information Systems in optimizing technological infrastructure and human resources in the Clouds System so that in the future better financial report preparation can be achieved. This research also provides input to PT Lawang Sewu to increase the capacity of IT infrastructure, especially optimizing clouds systems.

## ***Literature Review***

### ***Definition of Inhibitors and Enablers***

Perception is a key that affects general user behavior, intentions, and user behavior towards a system. The core of information systems research is the design and function of a system that encourages or inhibits users (Benbasat & Zmud, 2003). Furthermore, based on some of the reasons above, Cenfetelli (2004) concludes and coined the term enablers and inhibitors, which refers to behavioral perceptions. Enablers and inhibitors are external perceptions about system attributes that influence the adoption decision and the decision to reject the system. The term enabler refers to external perceptions about the design and function of a system that can drive usage.

Cenfetelli (2004) then ask whether there are other unique perceptions, for example negative perceptions that can hinder use and are also not opposed to enablers, for example a system that is not reliable or provides irrelevant information. Inhibitors and enablers are considered as someone's perception of the attributes of a system that has a consequential effect on the decision to use the system. Inhibitors and enablers are considered as someone's perception of the attributes of a system that has a consequential effect on the decision to use the system. The design, development and function of a system is usually intended to get a positive perception of the use of technology-based systems. The unique negative attribute on the other hand comes from errors, errors, or other negative things. The presence of an inhibitor can result in system rejection, which is caused by several factors such as the individual, environment, system design and function.

### ***Dual Factor Theory***

This dual factor theory was discovered by Cenfetelli (2004). Enablers or factors that encourage the use and adoption of the system, but studies that discuss more interesting about the causes of a system are rejected are still very rare (Cenfetelli, 2004). This factor is known as inhibitors which is a factor that inhibits the use of the system.

Dual factor theory has been used by several researchers such as Herzberg (1966), Lewicki *et al.* (1998). Cenfetelli (2004) revealed that the adoption and use of the system can be called enablers, while the rejection of the system is also called inhibitors. Enablers are external perceptions, for example in this study using perceived usefulness and perceived ease of use that can encourage the use of the system. Cenfetelli (2004) also defines that there are factors that hinder system use. When these inhibiting factors are present it can lead to system rejection, and when those factors are not present it cannot encourage increased use of the system, in this study using IT infrastructure issues and human resource competency problems that can inhibit system use.

Thus it can be concluded that inhibitors are not opponents of enablers, but these two factors are independent and have a relationship with enablers. For example, errors in the system can bring a user's bad perception of the quality of the system, even though the system has previously performed well (Cenfetelli, 2004). Dual factor theory is based on rationalization and statements which reveal that between positive and negative factors need to be explored, for several reasons including: First, there is a negative perception that encourages the use of the system and this negative perception is not the same as a positive perception. Second, in dual factor theory inhibitors and enablers are independent of each other, but can stand together. Third, inhibiting and pushing perceptions have different antecedents and consequent effects.

### ***Technology Acceptance Model (TAM)***

The TAM model uses TRA (Theory of Reasoned Action) as a starting point for starting theory. The technology acceptance model or TAM, introduced by Davis (1989) The TAM model is one of the models created to analyze and understand the determinants of technology acceptance and use in individuals. The TAM model has two main constructs, namely perceived usefulness and perceived ease of use. Perceived usefulness, can be interpreted as the level of individual trust that by using technology-based systems, performance will increase. While perceived ease of use, can be interpreted as the level of individual trust that by using technology-based systems, will free them from effort or can be said to facilitate their work (Davis, 1989). According to the dual factor theory perspective, TAM focuses on positive user perceptions related to system use, for example perceptions of usability and perceptions of ease (Cenfetelli, 2004; Bhattacharjee, A. & Hikmet, 2007). So it can be concluded that the perceived of ease of use and perceived of usefulness is based on enablers in the use of the system.

### ***Hypothesis Development***

#### ***IT Infrastructure Problems on the Use of Cloud-based Regional Management Information Systems***

Dual factor theory is a theory which states that the use of the system is not only the enabler factor that is influential, but the factor inhibitors are also present influential. One of the inhibitors that influences the use of the system is IT infrastructure. Furthermore, Mpofu & Watkiens-Mathys (2011), Brook *et al.* (2006) revealed that IT infrastructure problems (system problems) can make user work inefficient. The results of Braun & Davis (2003) study also found that there were only users (auditors) who used the system (audit information system). Based on the description of the theory and some of the findings above, the research hypothesis is as follows:

H<sub>1</sub>: IT infrastructure problems negatively affect the use of Clouds-based Regional Management Information Systems

#### ***Human Resources Competency Problems on the Use of Cloud-based Regional Management Information Systems***

Dharmalingan & Kannabiran (2012) prove that human resource competition is an inhibitor and influences the use of the system. Packalen (2010) found that users who have skills at a low level is one of the main obstacles in the use of information technology. Furthermore, Mac Gregor *et al.* (2005) revealed that users who lack skills in using information systems tend to avoid using information systems. Based on the description of the theory and some of the findings above, the research hypothesis is as follows:

H<sub>2</sub>: Human Resources Competency Problems negatively affect the use of Clouds-based Regional Management Information Systems

## ***Perceived Usefulness, Perceived Ease Of Use on the Use of Cloud-based Regional Management Information Systems***

Perceived usefulness and perceived ease of use were first put forward by Davis (1989) in his paper explaining TAM theory. Perceived usefulness and perceived ease of use in the journal Cenfetelli (2004) are classified as enablers, because these two variables are considered to be able to encourage the use of the system. Cenfetelli & Schwarz (2011) states that enablers are not opponents of inhibitors, but these two factors can be present simultaneously at the same time (coexist). Hsieh *et al.* (2014) argues that dual factor theory can be a bridge between research on the use of IT and problems in the use of IT (inhibitors). Although Cenfetelli (2004) does not specifically classify variables that include inhibitors in the use of IT, but based on several literature studies conducted by dual factor theory researchers can provide a theoretical explanation of the perceptions of enablers and inhibitors in the use of IT.

There are several previous studies that have grouped perceived usefulness and perceived ease of use into enablers, including research from Cenfetelli & Schwarz (2011) that examined the effect of perceived usefulness and perceived ease of use variables on system use, using dual factor theory as a theory that accommodates these variables. Cenfetelli and Schwarz (2011) find these two enablers variables can encourage the use of IT. Rudini (2018) found perceived usefulness influenced the implementation of Regional Management Information Systems and perceived ease of use did not affect the implementation of Regional Management Information Systems.

In contrast to research conducted by Purwitasari Mega & Pratomo (2015) found that perceived usefulness and perceived ease of use have a positive effect on the actual usage system. Wibowo (2012) found that perceived of usefulness affected the actual system usage, while the perceived ease of use variable did not affect the actual system usage. Wang (2002) also found that perceived usefulness had a significant effect on system adoption. Furthermore, Hsieh *et al.* (2014) found that perceived usefulness and perceived ease of use have a positive effect on behavioral intention to use. Kim *et al.* (2009), Kim *et al.* (2016) get the same research results as previous studies, namely, perceived usefulness and perceived ease of use directly affect system usage. Based on the description of the theory and some of the findings above, the research hypothesis is as follows:

H<sub>3</sub>: Perceived Usefulness positively affect the use of Clouds-based Regional Management Information Systems

H<sub>4</sub>: Perceived Ease of use positively affect the use of Clouds-based Regional Management Information Systems

## ***Methodology***

### ***Population and Sample***

The population in this study were employees of regional apparatus organizations (OPD) involved in Jember District financial management consisting of 6 Chats, 9 Parts, 1 Inspectorate, 1 Satpol PP, 3 Regional Hospitals, 21 Departments, Secretariat, and 31 Districts so that the total The Regional Apparatus Organization (OPD) obtained by Jember Regency is 73 OPD. The sampling technique in this study is to use a purposive sampling method with the type of sample selection based on certain considerations or criteria (Sekaran & Bougie, 2016). In this study the sample criteria determined are: First, the Head of the Office of the Regional Apparatus Organization (OPD) of Jember Regency as a budget user. Secondly, the head of the Jember Regency OPD financial affairs as the financial administration official. Third, the

accounting staff at each Jember Regency Organization. The total number of samples totaled 219 employees of Jember Regency.

### ***Definition of Variable Operations***

Infrastructure Problems are problems and user barriers related to operating information systems, in this case include software and hardware connected to cloud-based regional management information systems. The indicator used is an indicator developed by Henderson III *et al.* (2016), as for those indicators including system bugs (bugs), the internet response that connects to the system is very slow, the system does not function and does not run well when operated, and the system is not able to provide adequate documentation for users.

Human Resource Competency Problems are defined perceptions related to the ability, expertise and experience of an individual or an employee that prevents users from using cloud-based regional information systems. Indicator variables used in this study were adopted from the instrument by Henderson III *et al.* (2016). These indicators include lack of education, lack of experience, lack of expertise, and lack of training.

Perceived usefulness in this study shows that individual perceptions that exist in each Regional Apparatus Organization (OPD) can provide benefits to their work by using systems, especially regional management information systems. This variable shows the usefulness perceived by the user is measured by 4 indicators, which are used by Venkatesh & Davis (2000) and Henderson III *et al.* (2016) which is to improve performance, increase productivity, enhance effectiveness, and be useful.

Perceived ease of use in this study shows that individual perceptions in each Regional Apparatus Organization (OPD) are easy if used in their work using systems, especially regional management information systems. This variable shows the ease of use of information technology perceived by users, as measured by 5 indicators used by Davis (1989) and Henderson III *et al.* (2016) which is easy to learn, easy to do tasks, interactions, user skills, and easy to operate.

In this study, the use of cloud-based Regional Management Information Systems is defined as the real use or acceptance of the use of information technology both individually and collectively which is mandatory. This variable is measured by using 4 indicators namely mandatory use, based on responsibility, frequency of use, and daily system usage. This indicator was developed by researchers based on the indicators used by Moore and Benbasat (1991), Venkatesh & Davis (2000) and Livari (2005).

### ***Result and Discussion***

The number of questionnaires distributed was 219 people. The number of questionnaires filled out was 200 people. The number of questionnaires that could not be processed was 19 people. Confirmation in the collection of questionnaires carried out 3 times. Based on the survey results, the majority of respondents were male (60%) with age 20-30 years (80%). The education sector was accounting (35%), information systems (35%) and laws (30%) and education of majors of respondents were S1 (80%)

The value of  $R^2$  from the construct of this research was 0.7015. The value explained that variations in the change of perceptual constructs of the use of clouds the use of cloud-based Regional Management Information Systems can be explained by 70% by the construct of problem infrastructure IT,

problem of human resources competency, perceived usefulness, and perceived ease of use. While the remaining 30% was explained by the other constructs outside this research model.

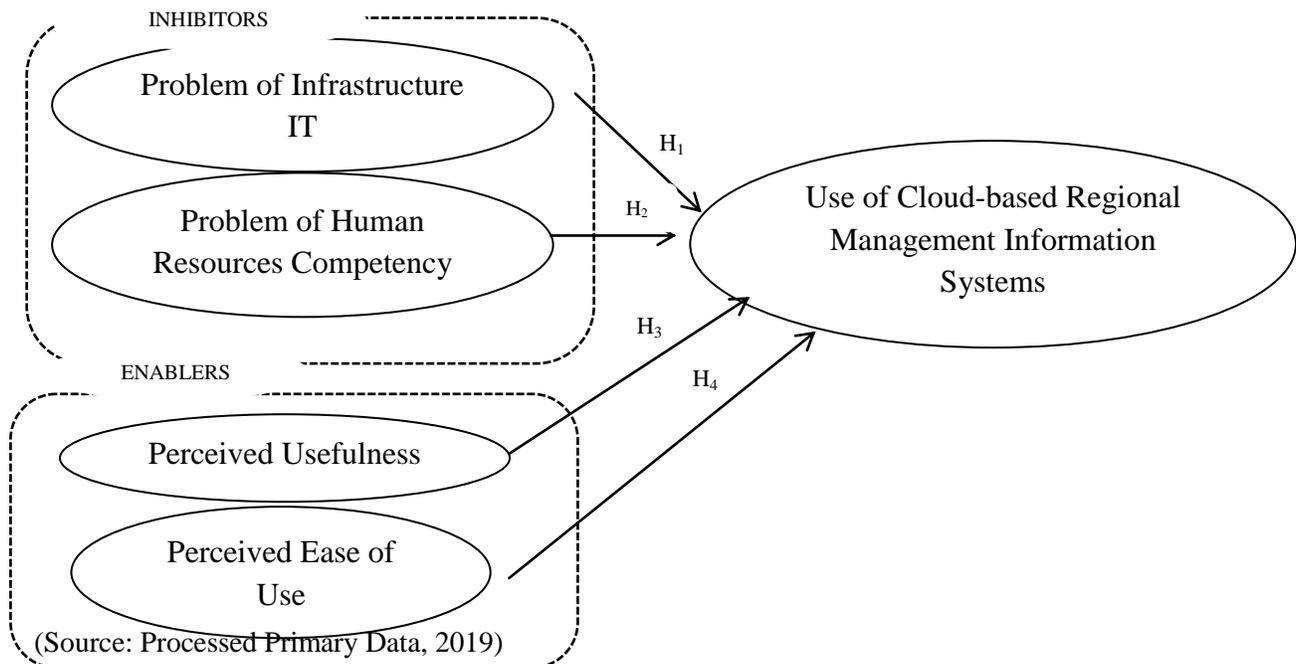
The loading factor value of all constructs was more than 0.7, while the Average Variance Extracted (AVE) value and the communality value was more than 0.5. In addition, the AVE root value was more than the correlation of latent variables. The value of Cronbach's Alpha and Composite Reliability was above 0.7. Therefore, it can be concluded that all indicators in the instrument of this study was valid and reliable, so the hypothesis testing can be done.

**Table 1 - The Result of Main Hypothesis Testing**

Hypothesis	Construct	Original Sample	t-Statistics	Result
H <sub>1</sub>	Problem of Infrastructure IT -> Use of cloud-based regional management information systems	-0.075	3.3857	Accepted
H <sub>2</sub>	Problem of Human Resources Competency -> Use of cloud-based regional management information systems	-0.065	2.2947	Accepted
H <sub>3</sub>	Perceived Usefulnes -> Use of cloud-based regional management information systems	0.0454	2.5775	Accepted
H <sub>4</sub>	Perceived Ease of Use -> Use of cloud-based regional management information systems	0.0267	2.4314	Accepted

Source: Primary Data Processed (2019)

**Figure 1 - Structural Model of Hypothesis Testing**



Problem of infrastructure IT has a negative affect to the Use of Cloud-based Regional Management Information Systems. The higher applicability of problem infrastructure IT in Regional Apparatus Organization (OPD) Jember Regency, the Regional Apparatus Organization (OPD) Jember Regency's perception on Use of Cloud-based Regional Management Information Systems is getting lower. This result is consistent with various study from Mpofu & Watkiens-Mathys (2011), Brook *et al.* (2006), Braun & Davis (2003), Henderson III *et al.* (2016). Inadequate IT infrastructure services such as problematic internet connections, software, and hardware are obstacles in the use of IT. Problems in application systems such as the length of data processing can also be classified as inhibitors, namely problems in the IT infrastructure. Like, users enter data into the system several times, this is caused by system errors and slow internet connections. Cenfetelli (2004) confirms in quadrant IV that discusses the integration and description of inhibitors and enablers in the use of the system, there are conditions where high inhibitors and low enablers in these conditions. In these conditions the poor IT infrastructure in the system will have specific features and minimal functions, so that it will inhibit and prevent users from using the system. In other words, poor and malfunctioning in the system, no consideration is given to the needs of the end user (user), so the user can prevent the use of the system.

Problem of Human Resources Competency has a negative affect to the Use of Cloud-based Regional Management Information Systems. The higher applicability of problem human resources competency in Regional Apparatus Organization (OPD) Jember Regency, the Regional Apparatus Organization (OPD) Jember Regency's perception on Use of Cloud-based Regional Management Information Systems is getting lower. This result is consistent with the study of Mac Gregor *et al.* (2005), Packalen (2010), Dharmalingan & Kannabiran (2012), Hertanto (2017). The problem of human resource competency as a disturbance arising from inherent individual characteristics and is part of the personality of the individual concerned at work in various situations. Employees whose work is below the standard are considered incompetent to do the work. Early indications of lack of employee competency are seen from lack of professionals in carrying out work activities, lack of speed in solving problems, inefficiency in completing work assignments, lack of ability to adapt quickly when there are changes in work tasks from superiors, lack of sensitivity in facing science and technology and have not understand good work standards.

The problem of human resource competency can be a factor that inhibits the use of the system, in this study the problem of competency is considered as an inhibitor, because often the staff who operate Use of Cloud-based Regional Management Information Systems still lack mastering the available application systems. Cenfetelli (2004) also confirmed in his research that in quadrants III and IV. That is, the table that discusses the integration and description of inhibitors and enablers in the use of the system, there are conditions where low enablers and inhibitors are present in these conditions. In these conditions the user is considered to have no perception at all about the information system, because the user does not control the system or even have never operated the system. Based on the description from Cenfetelli (2004), it can be concluded that the low competence of human resources can be an obstacle to the use of the system, because this is caused by low ability, lack of experience, education and user expertise in operating the system.

Perceived Usefulness has positive affect to the Use of Cloud-based Regional Management Information Systems. The higher applicability of perceived usefulness for use system in Regional Apparatus Organization (OPD) Jember Regency, the Regional Apparatus Organization (OPD) Jember Regency's perception on Use of Cloud-based Regional Management Information Systems is getting high. This result is consistent with the study of Thompson *et al.* (1991), Chin & Todd (1995) and Henderson III *et al.* (2016). Based on several definitions and literature review, it can be concluded that the usefulness of the use of information technology can be known from the trust of users of information technology in deciding the acceptance of information technology, with a belief that the use of information technology has a positive contribution for its users.

Perceived Usefulness can be classified as enablers because when a user is given a system, the user will generally analyze the system first. In this context, the user is considered to have a positive perception of the system because the user has a high level of understanding of the information system. In addition, the system also has a good quality system so that this perception encourages users to use the system. Henderson III *et al.* (2016) revealed that ease of use is categorized as an enabler because this construct can significantly influence the use of the system, this is driven by the user's belief that using their work information system can increase. Furthermore, Cenfetelli (2004) revealed that if the user has the perception that the system can support and facilitate the user's work because the system can be operated easily, provide information needed now, and provide good services for users and have a good quality system, then this perception (perceived usefulness) can increase system usage. Someone believes and feels that using a computer is very helpful and enhances the performance achieved, or in other words the person believes the use of information technology (Clouds-based Regional Management Information System) has provided benefits to the work and performance achievement.

Perceived Ease of use has positive affect to the Use of Cloud-based Regional Management Information Systems. The higher applicability of perceived ease of use for use system in Regional Apparatus Organization (OPD) Jember Regency, the Regional Apparatus Organization (OPD) Jember Regency's perception on Use of Cloud-based Regional Management Information Systems is getting high. This result is consistent with the study of Wang (2002), Cenfetelli & Schwarz (2011), Venkatesh (2000) and Purwitasari Mega & Pratomo (2015). The free dimension uses perception by using four question items including: clear and understandable, does not require a lot of mental effort, easy to use, easy to get the system to do what he/she wants to do.

These dimensions in the journal Cenfetelli (2004) are classified as quadrant I, which is a condition where high enablers and low inhibitors factors, in this condition the user is predicted to adopt the system in a sustainable manner. This is driven by the dimensions revealed by Venkatesh (2000) above. If the system is in a condition that is easy to understand, flexible, then easy to use, and can meet the needs and desires of the user, then the user will feel that the system will be very easy to use, so this has an impact on the adoption and use of the system in a sustainable manner.

## **Conclusion**

Overall, the findings in this study explain the use of cloud management information systems based on the dual factor theory approach. Our research model, based on the dual factor theory postulates that inhibitors such as problem infrastructure IT and problem human resources competency in addition to enablers such as perceived usefulness and perceived ease of use. The results of this study prove that IT infrastructure problems and human resource competency problems negatively affect the use of cloud-based regional management information systems. Meanwhile, perceived usefulness and perceived ease of use have a positive effect on the use of cloud-based regional management information systems. The results of this study support the inhibitors, enablers such as dual factor theory and TAM.

## **Limitation and Suggestion**

Suggestions and input for future researchers because this research is still less than perfect. First, collecting data through a questionnaire takes a very long time because at the time of the distribution of the questionnaire at the beginning of the month there was an inspection (inspection) from the Supreme Audit Agency (BPK). Second, the object in this study is only one location, namely Jember Regency so this

research is still less than perfect and it is recommended for further researchers to add more than one research location.

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