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Evaluation And Solution For SAP Implementation Using Technology Acceptance Model : A Case Study In An Indonesian Food Trading Company

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ABSTRAK

Beberapa perusahaan sudah mengimplementasikan sistem end-to-end SAP, namun mengalami kendala. Untuk mencari penyebab kendala ini, penelitian ini mengevaluasi penerimaan pengguna karyawan terhadap SAP pada satu perusahaan perdagangan makanan di Indonesia menggunakan Technology Acceptance Model. Selain variabel asli model, variabel ekternal yang digunakan meliputi *Top Management Support, Communication, Cooperation,* dan *Training*. Hasilnya evaluasi menunjukkan beberapa hipotesis ditolak meliputi *Perceived Ease of Use* terhadap *Perceived Usefulness*, *Attitude Toward Use* terhadap *Behavioral Intention to Use*, dan *Training* terhadap *Cooperation*, serta *Training* terhadap *Perceived Ease of Use*. Setelah mengetahui bahwa *Training* merupakan penyebab terbesar kendala implementasi SAP di perusahaan ini, maka dirancang solusinya berupa sebuah website yang bertujuan memperbaiki training SAP di perusahaan ini.

ABSTRACT

Several companies have implemented an end-to-end SAP system, but are experiencing problems. To find the cause of this problem, this study evaluates employee user acceptance of SAP at a food trading company in Indonesia using the Technology Acceptance Model. In addition to the original model variables, the external variables used include Top Management Support, Communication, Cooperation, and Training. The results of the evaluation showed that several hypotheses were rejected including Perceived Ease of Use on Perceived Usefulness, Attitude Toward Use on Behavioral Intention to Use, and Training on Cooperation, as well as Training on Perceived Ease of Use. After knowing that training is the biggest cause of problems with SAP implementation in this company, a solution is designed in the form of a website that aims to improve SAP training in this company.

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INTRODUCTION

In today's competitive business environment, technology has become a critical tool for companies to gain a competitive advantage. Enterprise Resource Planning (ERP) can provide a competitive advantage for businesses by streamlining their operations, reducing costs, and increasing efficiency. Therefore, ERP has become an important implement for companies to enhance performance and take better decisions and achieve competitive advantage (Alaskari et al.,

2021). Besides, ERP is an integrated, adaptable, and adjustable information system that simplifies corporate operations to keep data from across the entire organization in one location (Malik & Khan, 2021). One of the products of ERP is System Application and Processing (SAP). SAP is a backend application that is integrated with tens of thousands of installations globally, and it is specifically designed to track and manage business processes for medium to large-scale enterprises (Öztürk et al., 2022).

However, SAP system implementation is indeed very complex. Studies explore that nearly 50% of all SAP systems do not meet organizational expectations The SAP implementation problems also happened at the Company where this study is performed. Based on the results of interviews, several obstacles are felt by users when using the SAP system, the first obstacle is that new users who have never used the SAP system find adjusting to the method challenging. Because it takes experience and an understanding of theory when using the SAP system. The second obstacle is implementation when making system changes due to new policies that take a long time. So, it is not efficient if users need fast work. In addition to taking a long time, there are obstacles during the policy change implementation process where information on changes in the system and the implementation used by users are out of sync. The third obstacle is that the SAP system does not provide Indonesian tax rules, so users, especially in the accounting division, need to adjust to different regulations in the SAP system. The fourth obstacle is the ease with which the SAP system can be customized according to the Company's needs, making all users have to participate in training if there are new system policies/changes so that it takes the user's work time (Lutfi, 2021).

There are four constraints identified. Constraint one is an individual user problem. Constraints two and three are problems from factors outside the Company. Therefore, this study chose the fourth constraint for further evaluation of user acceptance of the SAP system. Because until now, The staff of the Company has never had their system evaluated. Evaluation of user acceptance of the Company on the SAP system needs to be done to find out what factors affect the acceptance of the use of the SAP system at the Company. One of the popular user acceptance evaluation models used is the Technology Acceptance Model or TAM. Where Top Management Support, Technical Complexity, Training, Communication, and Collaboration are the five essential elements for the success of SAP system adoption (Chauhan et al., 2021).

RESEARCH METHOD

Back in 1986, The TAM model was advanced by Davis (Bahaj et al., 2019). The TAM model's goal is to provide a comprehensive explanation of the variables affecting computer adoption that can be applied to different end-user computing platforms and user groups. As shown by the numerous earlier studies on evaluating technology acceptance using the TAM model, the TAM model has been the most mentioned and influential model for understanding new technology acceptance. It has also gained a great deal of empirical support (Alkaff et al., 2021). TAM presents an effective and concise explanation of how people accept and use technology (Lee & Wella, 2018).

The outer model shown in Figure 1 is built by utilizing Structural Equation Modeling or SEM. SEM is a method of multivariate analysis for testing and assessing causal relationships between variables, even when interactions are hypothetical or cannot be directly observed. Partial Least Square or PLS is an SEM technique that optimizes the explained variance of the endogenous components using an iterative process. Each indicator on the variable will be put to the test by the assessment model to assess its reliability and validity (Hair & Alamer, 2022).

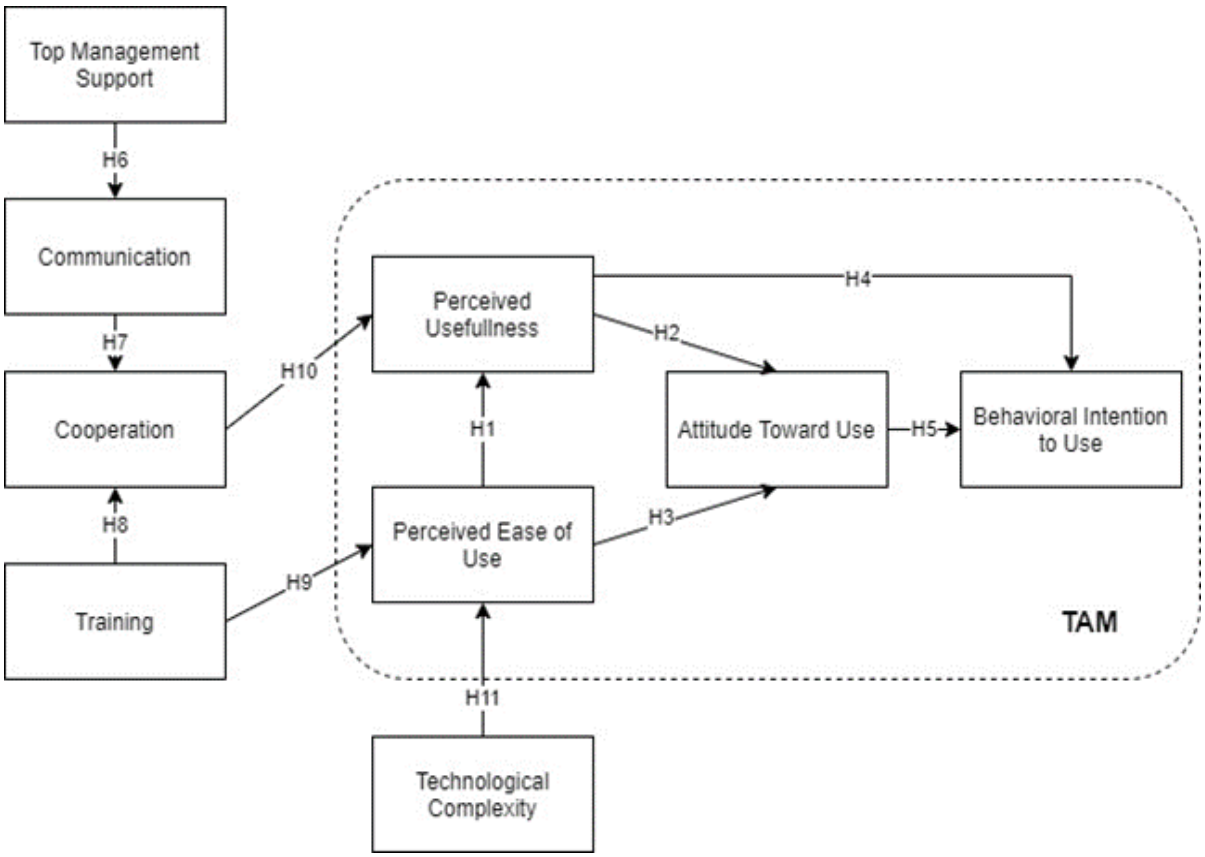

Figure 1. Outer Model (Putri et al., 2020)

The model utilized in this study refers to previous research with the adoption of the TAM model (Putri et al., 2020). Previous research aims to evaluate user acceptance of the SAP system using some original variables from TAM. "Perceived usefulness" is used to see how far a person is employees of an organization believe that using a system that can improve job performance (Dube et al., 2020). "Perceived ease of use" is used to determine if an employee thinks a certain technology would be easy to use (Utami, 2021). "Attitude Toward Use" involves evaluating whether the behavior is good or bad and whether the user supports or opposes the use of the system (Schepman & Rodway, 2020). Behavioral Intention refers to the level of an evaluative effect associated with individuals using the target system in their work (Alam et al., 2018).

Other inputs from Putri et al. study are the use of some external variables such as top management support, communication, cooperation, training, and technological complexity. "Top Management Support shows" active participation from manager of a company in matters related to success information system implementation. "Communication" is used to promote user trust in the system and consequently user acceptance. So organizations can develop a cooperative environment to solve problems inter-organization. Cooperation is defined as internal and external cooperation that can provide security to users and help in achieving objectives. Internal collaboration occurs between different functional areas of the company. In addition, "cooperation" refers to relationships with an SAP system provider company. Training is recommended before, during, and after system implementation. "Training" in SAP systems helps users to know the system and also to reduce barriers stemming from technological complexity (Putri et al., 2020).

As a result, the list of hypotheses can be seen in Table 1 while these indicator variables are shown in tables 2 and 3.

Table 1. List of Hypotheses

Code	Hypotheses
H1	Perceived Ease of Usage exerts a positive impact on Perceived Usefulness.
H2	Perceived Usefulness exerts a positive impact on Attitude Toward Use
H3	Perceived Ease of Use exerts a positive impact on Attitude Toward the Use
H4	Perceived Usefulness exerts a positive impact on Behavioral Intention to Use
H5	Attitude Toward Use exerts a positive impact on Behavioral Intention to Use
H6	Top Management Support exerts a positive impact on Communication
H7	Communication exerts a positive impact on Cooperation
H8	Training exerts a positive impact on Cooperation
H9	Training exerts a positive impact on Perceived Ease of Use
H10	Cooperation exerts a positive impact on Perceived Usefulness
H11	Technological Complexity exerts a positive impact on Perceived Ease of Use

Table 2. Indicator Variables (Putri et al., 2020)

Variables	Indicators	Codes
Perceived Usefulness	Improved effectiveness	PUS1
	Improved efficiency	PUS2
	Improved performance	PUS3
	Improved Productivity	PUS4
	Useful at work	PUS5
Perceived Ease of Use	Easy to interact	PEU1
	Easy to understand	PEU2
	Easy to use	PEU3
	Easy to understand	PEU4
	The system does what I want	PEU5
Attitude Toward Use	Provides a lot of data	ATU1
	Better SAP system	ATU2
	Easy to make data analysis	ATU3
	Integrated, timely and reliable system	ATU4
Behavioral Intention to Use	Motivation to use	BIU1
	Information in the SAP system is useful	BIU2
	Recommend to others	BIU3
	Motivated by features	BIU4
Top Management Support	Strong manager involvement	TMS1
	My manager supports the SAP system	TMS2
	Understand the importance of the system	TMS3
	Understanding system opportunities	TMS4
	Maintain operating unit pressure	TMS5
Communication	Easily communicating	COM1
	Information through presentations	COM2
	Regular Meeting	COM3
	Trustworthy Information	COM4

Table 3. Indicator Variables (Putri et al., 2020)

Variables	Indicators	Codes
Cooperation	SAP system enhances teamwork internal	COP1
	SAP system improves teamwork external	COP2
	SAP system increases the willingness to work same team	COP3
	SAP system increases willpower leader	COP4
Training	Completed training for the SAP system	TRA1
	The training is quite long and detailed	TRA2
	Level of comprehension has significantly improved as a result of the program training	TRA3
	The instructors are educated and aid in my comprehension of the SAP system.	TRA4
	Training in the SAP system boosts confidence	TRA5
Technology Complexity	The use of a convoluted SAP system makes it hard to comprehend what is happening	TCO1
	The SAP system requires too much time to utilize for a mechanical activity.	TCO2
	The SAP system training process was very time-consuming.	TCO3
	The SAP system might be extremely difficult to operate in general.	TCO4

Characteristics of respondents are employees of the Company which uses the SAP system. There are five divisions as users of the SAP system, namely Accounting, Head Resource Management, Purchasing, Sales, and Treasury. The questionnaire was developed using a Likert scale tool with a range of 1 (strongly disagree) to 5 (strongly agree). This study analyzes the key factors that determine the success of ERP implementations by using CSF to extend a TAM model consisting of nine variables. The independent variables consist of Top Management Support, Communication, Cooperation, Technology Complexity, and Training variables. Meanwhile, the dependent variable comprises Attitude Toward Use, Behavioral Intention to Use, Perceived Ease of Use, and Perceived Usefulness. The preparation of the questionnaire in this study refers to the questionnaire items in previous studies. Questionnaires were distributed via Google Forms to 44 users as respondents.

RESULT AND DISCUSSION

Model Measurement

Model measurement takes place in two stages: validity testing and reliability testing. A validity test is applied to calculate how accurate the research instrument is in carrying out its function. Convergent validity and discriminant validity are two ways for determining the validity of test data. Convergent validity is decisively using the loading factor value and the average variance extract or AVE. For each indicator, if the outer value loading is greater than 0.7 as well as the AVE is greater than 0.5, then the indicator is treated to be valid. As shown in Table 3, 10 indicators are found invalid consisting of PUS2 and PUS5, PEU2 and PEU5, ATU2, TMS5, COM4, COP2 and COP4, and TCO2 (Fauziah & Nurhasanah, 2020).

Afterward, the reliability test is performed. A reliability test aims to show that a valid claim can be trusted as a means of data collection and can deliver reliable field data (Fauziah & Nurhasanah, 2020). Also shown in Table 4, the reliability test is evaluated using two values:

Cronbach's alpha and composite reliability. The test is reliable if it shows a Composite Reliability value as well as Cronbach's Alpha of more than 0.7. In this study, entire variables were reliable except Cooperation with Cronbach's Alpha is 0.682. To increase its reliability value, the 10 invalid indicators are removed from the model (Leguina, 2015). As a result, the value of Cronbanch's Alpha for Cooperation now becomes 0.823. So its status is turned to be reliable.

Table 4. Model Measurement

Variables	Codes	Outer Loading	AVE	Composite Reliability	Cronbach's Alpha
Perceived Usefulness	PUS1	0,876	0,546	0,844	0,767
	PUS2	0,555			
	PUS3	0,894			
	PUS4	0,877			
	PUS5	0,299			
Perceived Ease of Use	PEU1	0,704	0,507	0,836	0,757
	PEU2	0,607			
	PEU3	0,737			
	PEU4	0,802			
	PEU5	0,697			
Attitude Toward Use	ATU1	0,869	0,606	0,838	0,730
	ATU2	0,177			
	ATU3	0,923			
	ATU4	0,886			
Behavioral Intention to Use	BIU1	0,868	0,729	0,915	0,876
	BIU2	0,849			
	BIU3	0,845			
	BIU4	0,855			
Top Management Support	TMS1	0,721	0,557	0,861	0,799
	TMS2	0,784			
	TMS3	0,846			
	TMS4	0,788			
	TMS5	0,559			
Communication	COM1	0,901	0,642	0,869	0,800
	COM2	0,905			
	COM3	0,883			
	COM4	0,398			
Cooperation	COP1	0,885	0,528	0,811	0,682
	COP2	0,641			
	COP3	0,812			
	COP4	0,508			
Training	TRA1	0,734	0,616	0,888	0,851
	TRA2	0,847			
	TRA3	0,879			
	TRA4	0,710			
	TRA5	0,740			
Technological Complexity	TCO1	0,772	0,653	0,878	0,826
	TCO2	0,524			
	TCO3	0,925			
	TCO4	0,940			

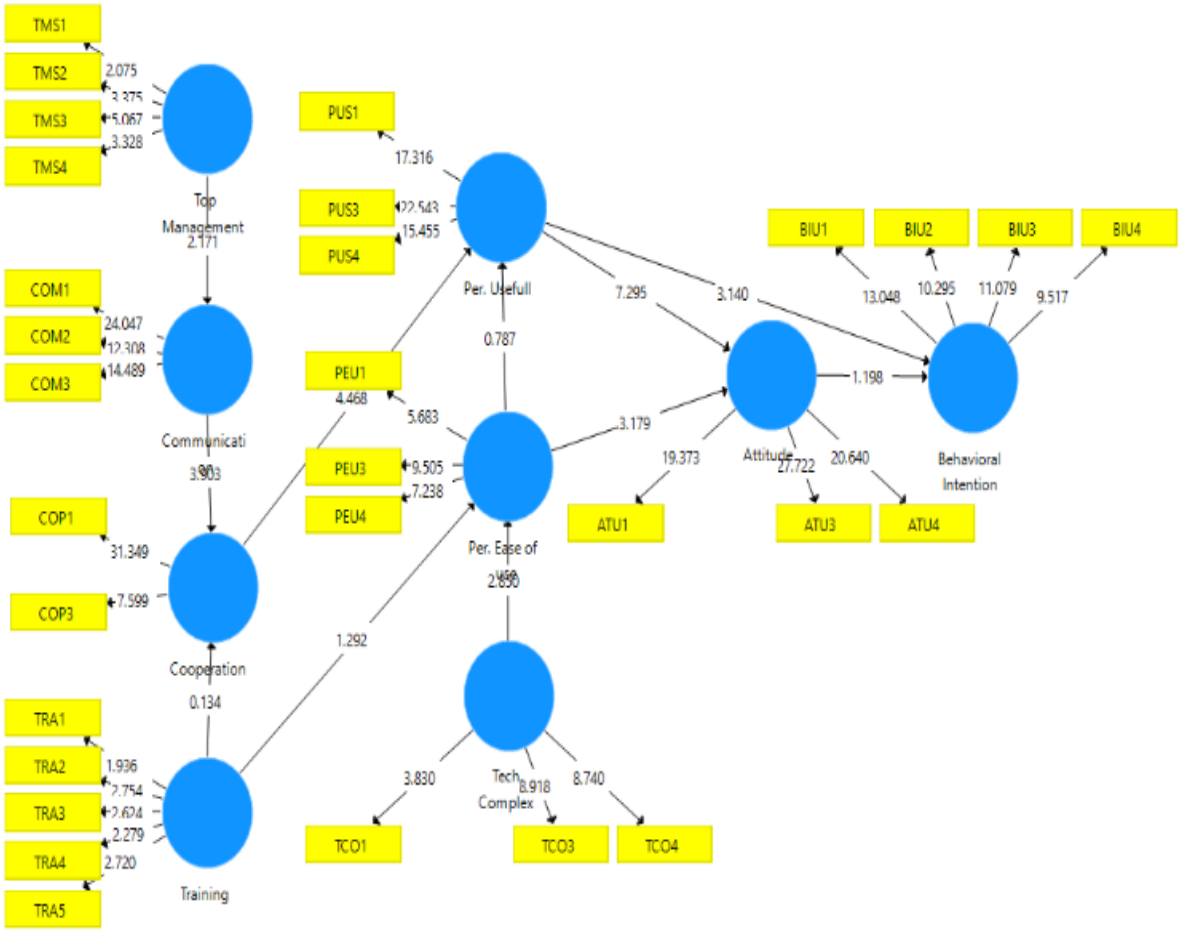

Figure 2. Outer Model

After the validity and reliability test have passed, the next step is the structural model test. This test explains the relationship between latent variables by using the T statistic value. If the T statistic value exceeds 1.96 with a 5% level of significance then the hypothesis is accepted otherwise rejected (Putri et al., 2020). As shown in Table 5, some H1, H5, H8, and H9 are rejected while others are accepted. As a result, the perceived ease of use of the SAP system does not have a positive influence on Perceived Usefulness. Also, the Behavioral Intention to Use the SAP system is not positively influenced by the Attitude Toward Use. While hypothesis test results for H8 and H9 demonstrate that training has no positive impact on Cooperation as well as Perceived Ease of Use of the SAP system.

Table 5. Hypothesis Test Results

Hypothesis	Path		T Statistic	Results
	From	To		
H1	Perceived Ease of Use	Perceived Usefulness	0,787	Rejected
H2	Perceived Usefulness	Attitude Toward Use	7,295	Accepted
H3	Ease of Use	Attitude Toward Use	3,179	Accepted
H4	Perceived Usefulness	Behavioral Intention to Use	3,140	Accepted
H5	Attitude Toward Use	Behavioral Intention to Use	1,198	Rejected
H6	Top Management Support	Communication	2,171	Accepted
H7	Communication	Cooperation	3,903	Accepted
H8	Training	Cooperation	0,134	Rejected
H9	Training	Perceived Ease of Use	1,292	Rejected
H10	Cooperation	Perceived Usefulness	4,468	Accepted
H11	Technological Complexity	Perceived Ease of Use	2,850	Accepted

Recommendation System Design

Considering the hypothesis test results, variable Training was chosen to be the major SAP implementation problem in the Company since it has two rejected hypotheses. Based on the results of interviews with one of the Company employees, the current training system does not have a special training system. Training is carried out every time there is a change in company policy, where all employees who use the SAP system must participate in the training process which is carried out simultaneously and at one time. There are many factors to determine whether the training is successful or not, for example, the factor of the training material, the quality of the trainer in delivering the material, the facilities during the training, and the quality of the modules. Therefore, system recommendations are made regarding the decision support system website which aims to determine whether a user needs to be retrained or not. This aims to help companies identify employees who use the SAP system but still have not mastered certain modules during training.

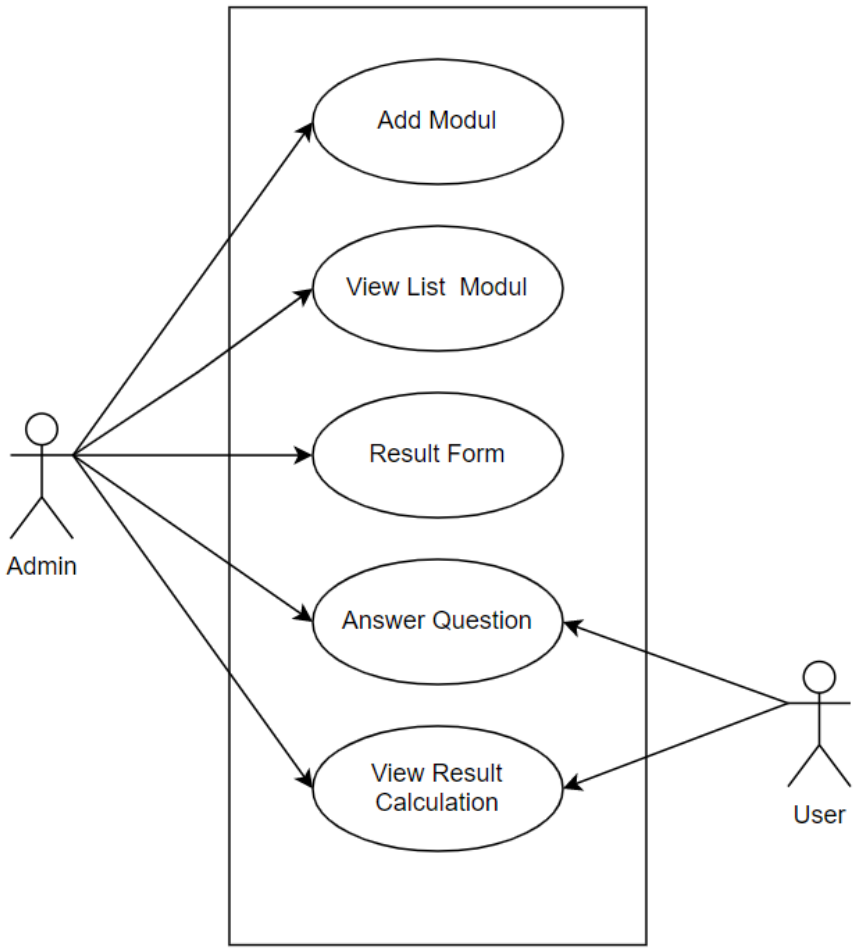

Figure 3. Use Case Diagram

Training system requirements are gathered by conducting interviews with the SAP system users of the Company. Figure 3 shows the Use Case Diagram made from the result of the interview. The training system consists of two roles, namely a role for users and a role for the admin where users' roles are to Answer Questions and View Result Calculations while Admin has all roles. The system in the user role is used to fill in the answers to questions from the criteria determined by the admin while the admin role is used to manage module assessment from the criteria entered. Admin Role can also add module assessment, save, edit, and delete the module, and save the results of data processing that has been input by users. The system can determine which module users need to be trained on.

CONCLUSION

The results of the evaluation analysis using the TAM model and methods SEM results in the suitability of the research model used for research acceptance of SAP system users in the Company as the model is valid and reliable. There are seven accepted hypotheses showing the relation of positive influences including Perceived Usefulness to Attitude Toward Use, Perceived Ease of Use to Attitude Toward Use, Perceived Usefulness to Behavioral Intention to Use, Top Management Support to Communication, Communication to Cooperation, Cooperation to Perceived Usefulness, and Technological Complexity to Perceived Ease of Use.

In addition, several hypotheses were rejected consisting of Perceived Ease of Use to Perceived Usefulness, Attitude Toward Use to Behavioral Intention to Use, Training to Cooperation, and Training to Perceived Ease of Use. Suggesting that there is not a significant relationship between the variables they propose. The training was chosen as the major problem because it has 2 hypotheses which are all rejected. Then the training is used as a reference to create a solution in the form of a web-based application to improve SAP training at the Company. The requirements for the training system were gathered through conducting interviews with SAP system users in the company. There are two roles in the system: user and admin. The user role is responsible for answering questions and viewing result calculations, while the admin role has all roles, including managing module assessments, adding, saving, editing, and deleting modules, and saving user input data processing results.

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