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Analysis and Evaluation of User Acceptance on the Use of Enterprise Resource Planning (ERP) Systems at PT Trisco Tailored Apparel Manufacturing

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A B S T R A C T

Enterprise Resource Planning is a system that connects business areas, which benefits companies by increasing productivity, reducing costs, and simplifying business processes. However, it also found a case that considers the use of ERP systems to fail. Therefore, the use of ERP systems needs to be optimized, one of which is in terms of users. This research will be analyzed and evaluated the factors that influence user acceptance using the TAM2 model. The variables used are 11 variables in TAM2, including moderator variables. This research was conducted at PT Trisco Tailored Apparel Manufacturing, with a sample of 43 and an online questionnaire as a data collection method. Data processing using SmartPLS. The analysis conducted in the analysis of inner models such as validity and reliability tests, and analysis of inner models such as the coefficient of determination and path coefficient. The final step is testing the hypothesis with the bootstrapping method. The results obtained are the most significant factor is the image of the perceived usefulness, then the perceived usefulness of the intention to use the system. It has also found that if the system were mandatory, voluntariness would not be significant. Therefore, the results of this study can use as a source of evaluation for the company.

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1. Introduction

Information Technology is one of the things that can help the achievement of company goals because it can increase company productivity [1]. One of the most widely used Information Technologies is the Enterprise Resource Planning (ERP) system. ERP system is a collection of modules that can integrate business areas and the benefits of getting information quickly, reducing costs, and simplifying business processes [2]. A US survey reveals that 70% of companies succeed in implementing ERP systems [3].

One of the companies that use ERP systems is PT Trisco Tailored Apparel Manufacturing, engaged in manufacturing. PT Trisco Tailored Apparel Manufacturing is part of PT Trisula International. To get fast information from every company, the company implements an ERP system. One of the ERP systems used at PT Trisco Tailored Apparel Manufacturing is SAP.

Based on interviews with employees in the IT Division, employees assume that SAP is an inflexible system, and the information obtained is incomplete. Users find it difficult because it requires many steps in one process. The company requires the addition of items in SAP, but to customization SAP requires high costs. Therefore, PT Trisco Tailored Apparel Manufacturing developed a system called the Trisco System. Thus, the company does not use SAP as a whole, but SAP used as a database. Overall, SAP with the Trisco System has the same appearance. Only on the Trisco System additional items to get more details.

This situation is interesting to do an ERP system evaluation. Due to high costs, the use of the system must be optimized. One of the success factors of a system is the role of humans as end-users. Many companies fail to implement ERP systems. There is research that explains that 55% to 75% of ERP system implementations fail. The company suffered a loss, and this is because the ERP system is not as expected [2], [4].

Therefore, in this study, an analysis of user acceptance of the ERP system will be carried out. This research uses the Technology Acceptance Model 2 (TAM2). Technology Acceptance Model 2 (TAM 2) was introduced by Venkatesh and Davis in 2000 [5]. TAM 2 is an extension of the Technology Acceptance Model (TAM) introduced by Davis in 1986 [6]. TAM and TAM 2 is to determine the user's acceptance of technology influenced by any factor.

Then, this study will examine the factors that influence user acceptance. The benefits of this research are that it can be used as a reference by companies to evaluate the use and development of ERP systems in companies. This research can also be used as a strategic analysis tool by managers to make better decisions and maximize available resources.

2. Related Works

In this study using factors that are determinants of perceived usefulness, namely job relevance, result demonstrability, output quality, image, and subjective norm as evidenced in several studies conducted by [7], [8], and [9] these factors affect the acceptance and use of the system.

For perceived ease of use is thought to affect user acceptance. It is proven in research [10] that perceived ease of use is one of the factors of user acceptance with a significant relationship to perceived usefulness. For perceived usefulness and intention to use proven in research conducted by [9] is a factor of user acceptance. For the voluntariness variable, according to [8], if the use of the system in a company is an obligation, voluntariness is considered to be insignificant. Variable

experience is used in this study because it is considered if experienced users have a good assessment of the system [8].

3. Research Method

3.1. Population and Sample

The population in this study is the users of ERP systems at PT Trisco Tailored Apparel Manufacturing. This study used 43 samples distributed to several divisions at PT Trisco Tailored Apparel Manufacturing and used an online questionnaire.

3.2. Research Framework

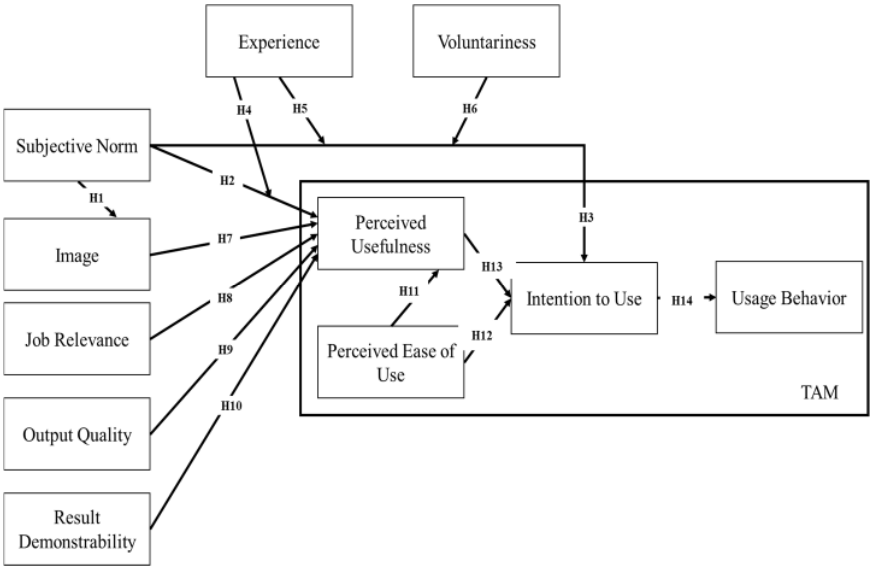

Figure 1 Research Framework

Figure 1 is the TAM2 model developed by Venkatesh and Davis in 2000 [5]. In TAM theory, the perceived usefulness and ease of use are determinants in the intention to use the system. Intention to use is the primary determinant in actual use. In TAM2, added predictor variables for perceived usefulness, namely social influence variables and cognitive variables. Which includes social influence variables are the subjective norm, image, voluntariness. Meanwhile, for the cognitive variables are result demonstrability, output quality, job relevance [8]. The predictor variable is considered important for research into user acceptance of the technology. Venkatesh and Davis in 2000 [5] found that subjective norms must be distinguished based on the context of use. Therefore, voluntariness as a moderator variable used to distinguish the context of usage, which is mandatory and voluntary. The next moderator variable is experience. In this theory, with increasing individual experience, user acceptance can vary. TAM2 was retaining the main variable, TAM. Previous research found that perceived ease of use and perceived usefulness significantly affect the intention to use it [11].

3.3. Hypothesis

Based on the research framework, the hypothesis is as follows.

- H1: Subjective Norm has a significant effect on the Image.
- H2: Subjective Norm has a significant effect on Perceived Usefulness.
- H3: Subjective Norm has a significant effect on the Intention to Use.

- H4: Experience significantly moderates the effect of Subjective Norm on Perceived Usefulness.
- H5: Experience significantly moderates the effect of Subjective Norm on Intention to Use.
- H6: Voluntariness will not significantly moderate the effect of Subjective Norm on Intention to Use.
- H7: Image has a significant effect on Perceived Usefulness.
- H8: Job Relevance has a significant effect on Perceived Usefulness.
- H9: Output Quality has a significant effect on Perceived Usefulness.
- H10: Result Demonstrability has a significant effect on Perceived Usefulness.
- H11: Perceived Ease of Use has a significant effect on Perceived Usefulness.
- H12: Perceived Ease of Use has a significant effect on the Intention to Use.
- H13: Perceived Usefulness has a significant effect on the Intention to Use.
- H14: Intention to Use has a significant effect on Usage Behavior.

4. Result and Discussion

4.1. Analysis and Testing of the Outer Model

Analysis of external models for validity testing is the value of Average Variance Extracted (AVE) and outer loadings. Meanwhile, the reliability test is the value of Cronbach's Alpha. AVE is used to see how many latent variables explain variations in the indicator [12]. Outer loading is used to see the magnitude of the correlation between the indicator and its latent variable [13]. Then, it is used for Cronbach's alpha to see the extent to which indicators measure the same variable [14]. Here is the formula for AVE and Cronbach's Alpha.

$$AVE = \frac{\sum_{i=1}^{N} l_i^2}{N} \qquad \text{Equation 1}$$

Equation 1 is the equation of AVE, where N is the overall indicator of a construct, l_i^2 is the outer loading value of the *i* indicator [15].

$$\text{Cronbach}'\text{alpha} = \left(\frac{N}{N-1}\right)\left(1 - \frac{\sum_{i=1}^{N} S_i^2}{S_t^2}\right) \qquad \text{Equation 2}$$

Equation 2 is the equation of Cronbach's Alpha, where N is the overall indicator, S_i^2 is the indicator variance *i* of the construct, S_t^2 is the sum of the variance of all N indicators of the construct [15].

Table 1 Outer Loadings, AVE and Cronbach's Alpha

Indicators	Outer Loadings	Variables	AVE	Cronbach's Alpha
EXP1	0,832	EXP	0.754	0,679
EXP2	0,903			
IMG1	0,901	IMG	0.828	0,793
IMG2	0,919			
IU1	0,728	IU	0.572	0,630
IU2	0,754			
IU3	0,786			
JR1	0,841	JR	0.780	0,725

Indicators	Outer Loadings	Variables	AVE	Cronbach's Alpha
JR2	0,923			
OQ1	0,870	OQ	0.754	0,674
OQ2	0,866			
PEU1	0,861	PEU	0.673	0,762
PEU2	0,809			
PEU3	0,788			
PU1	0,838	PU	0.672	0,838
PU2	0,807			
PU3	0,844			
PU4	0,789			
RES1	0,907	RES	0.744	0,827
RES2	0,851			
RES3	0,827			
SN1	0,703	SN	0.582	0,639
SN2	0,845			
SN3	0,734			
UB1	0,820	UB	0.789	0,754
UB2	0,952			
VOL1	0,841	VOL	0.739	0,832
VOL2	0,938			
VOL3	0,793			

The values are obtained using the SmartPLS application. The expected outer loadings value is > 0.7. An indicator is declared valid if it has an outer loadings value > 0.7 [16]. These results are shown in Table 1; all indicators declared valid. Outer loadings range from 0.703 to 0.952. The expected result for the AVE value is > 0.5. A variable is declared valid if the value AVE > 0.5 [16], [15]. The results are in Table 1; all variables are valid. AVE values range from 0.572 to 0.828. A variable is declared reliable if the value of Cronbach's alpha> 0.6 [14]. As shown in Table 1, all of the variables in this study revealed reliable.

4.2. Analysis and Testing of the Inner Model

Inner Model Analysis used in this study is the test of the coefficient determination (R^2) and path coefficients.

4.2.1. Coefficient Determination

Table 2 Coefficient Determination

Variables	R^2
IMG	0,003
PU	0,482
IU	0,488
UB	0,012

The determination coefficient is used to determine the size of the relationship between the independent and the dependent variables. The coefficient of determination ranges between 0 and 1 [17], [18]. There are four dependent variables tested in this study. As shown in Table 2, there are the coefficient of determination values from IMG, PU, IU, UB. IMG variable has the smallest coefficient of determination that is equal to 0.003 or 0.3%. This means that the SN variable gives information or influences only by 0.3%. The remaining 99.7% is influenced by other variables not used in this study. For the largest coefficient of

determination, the IU variable is 0.488 or 48.8%. The values are obtained using the SmartPLS application.

4.2.2. Path Coefficient

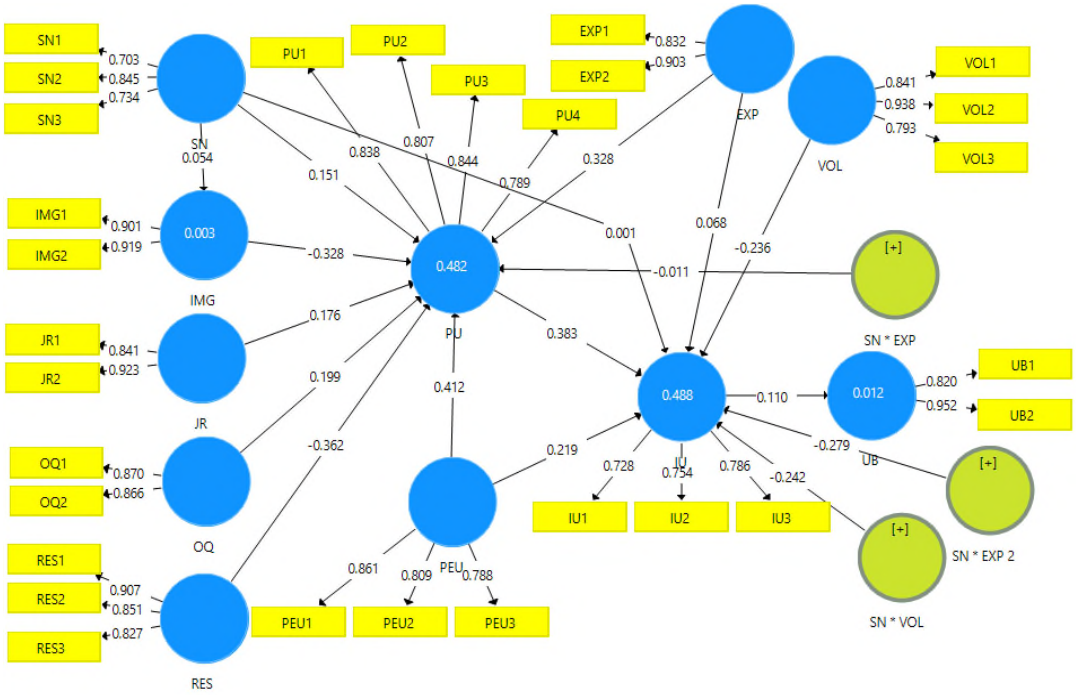

Figure 2 Path Coefficient on SmartPLS

Figure 2 is the result of the path coefficient processed in SmartPLS. The path coefficient (β) is used to see the strength of the relationship between variables. Path coefficient values range between -1 and +1. A value close to +1 means there is a strong positive relationship. Meanwhile, a value close to -1 means there is a negative relationship [15], [19]. As shown in Table 3, IMG → PU, RES → PU, SN + EXP → PU, SN + EXP → IU, SN + VOL → IU have negative path coefficient values. It means that the independent variables negatively affect each dependent variable. The highest path coefficient value is PEU → PU, with a value of 0.412. The values are obtained using the SmartPLS application.

Table 3 Path Coefficient

Path	Path Coefficient
IMG → PU	-0,328
IU → UB	0.110
JR → PU	0.176
OQ → PU	0.199
PEU → IU	0.219
PEU → PU	0.412
PU → IU	0.383
RES → PU	-0.362
SN → IMG	0.054
SN → IU	0.001
SN → PU	0.151
SN + EXP → PU	-0.011
SN + EXP → IU	-0.279
SN + VOL → IU	-0.242

4.3. Hypothesis Test

Hypothesis testing in this study uses the T-test, using SmartPLS software. On SmartPLS, the T-test is performed using bootstrapping. Bootstrapping results are shown in Figure 3.

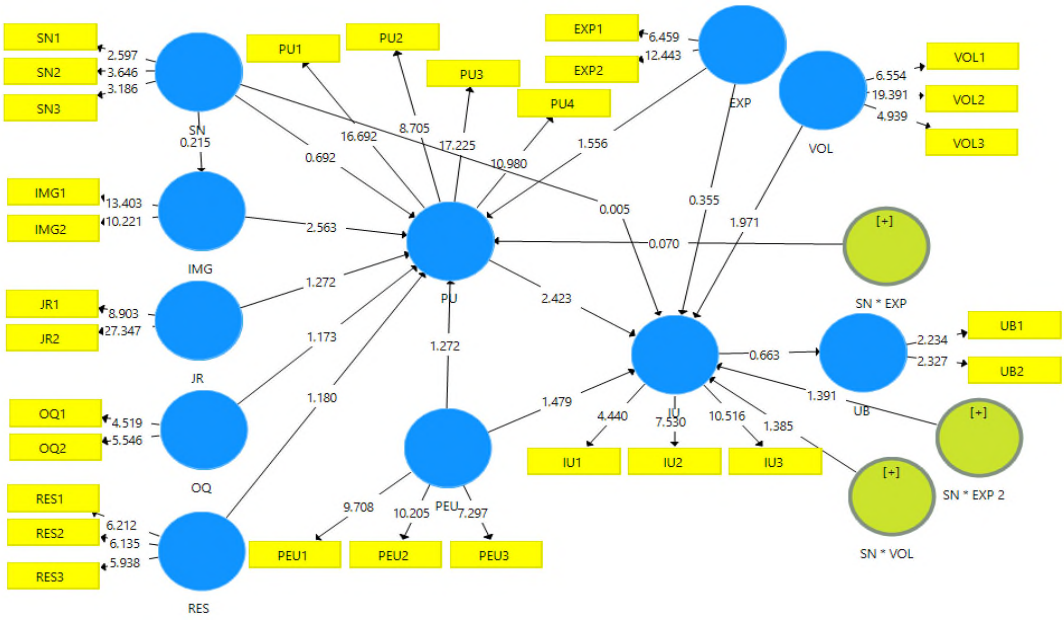

Figure 3 Bootstrapping on SmartPLS

Table 4 represents the results of the hypothesis by conducting a t-test to see the significance. The t-test is used by looking at the t-statistic value, then compared with the t-table value. The significance level used is 5% or 0.05 [15]. The degree of freedom (df) used is 32 (df = n - k), n is the number of observations, and k is the number of variables used. With two-tailed testing, the t-table value is 2.04. Declared significant if t-statistic> t-table.

SN has a positive effect on IMG (β = 0.054), but it is not significant (t-statistic = 0.215). Thus, H1 has rejected it. Similarly, H2, H3, is rejected. Although SN on PU and SN on IU have a positive influence, the data obtained is not significant. The results of this study are supported by research conducted by Reference [10]; they found that subjective norms did not have a significant effect on the intention to use. Research conducted by [9] found that subjective norm has no significant effect on perceived usefulness. In this study, individuals with high SN were not always directly proportional to high PU. It's the same with SN on IU.

In this study, the experience did not significantly moderate the effect of SN on PU (t-statistic = 0.070). This can be interpreted that the experience is not able to moderate the effect of SN on PU, or the usefulness of the system is not influenced by SN + EXP. Similarly, SN with IU, experience does not significantly moderate the relationship (t statistic = 1.391). Thus, H4, H5, has rejected it. This study found that voluntariness did not significantly affect the SN relationship at IU. VOL does not moderate significantly because the use of the system at this company is mandatory. Individuals tend to be obedient to use the system because if they do not use the system, their work will not complete. Therefore, voluntariness has not found in this study. Reference [8] found the same results as this study. Then, H6 is accepted.

Table 4 Hypothesis Test

Path	T-statistic	T-table	Significance	Hypothesis Conclusion
SN → IMG	0.215	2.04	Not significant	H1 Rejected (SN does not have a significant effect on IMG)
SN → PU	0.692	2.04	Not significant	H2 Rejected (SN does not have a significant effect on PU)
SN → IU	0.005	2.04	Not significant	H3 Rejected (SN does not have a significant effect on IU)
SN + EXP → PU	0.070	2.04	Not significant	H4 Rejected (SN+EXP does not have a significant effect on PU)
SN + EXP → IU	1.391	2.04	Not significant	H5 Rejected (SN+EXP does not have a significant effect on IU)
SN + VOL → IU	1.385	2.04	Not significant	H6 Accepted (SN+VOL does not have a significant effect on IU)
IMG → PU	2.563	2.04	Significant	H7 Accepted (IMG does not have a significant effect on PU)
JR → PU	1.272	2.04	Not significant	H8 Rejected (JR does not have a significant effect on PU)
OQ → PU	1.173	2.04	Not significant	H9 Rejected (OQ does not have a significant effect on PU)
RES → PU	1.180	2.04	Not significant	H10 Rejected (RES does not have a significant effect on PU)
PEU → PU	1.272	2.04	Not significant	H11 Rejected (PEU does not have a significant effect on PU)
PEU → IU	1.479	2.04	Not significant	H12 Rejected (PEU does not have a significant effect on IU)
PU → IU	2.423	2.04	Significant	H13 Accepted (PU does not have a significant effect on IU)
IU → UB	0.663	2.04	Not significant	H14 Rejected (IU does not have a significant effect on UB)

H7 is accepted because IMG has a significant effect on PU (t-statistic = 2.563). However, IMG on PU has a negative effect (β = -3232). This study is different from the Reference [20] study; in that study, IMG has a positive effect on PU, individuals perceive that using that technology can improve their image and social status. Therefore, technology users who appreciate an increase in image and social status will assume that technology is useful. In contrast to this study, individuals assume that the usefulness of a system not based on the influence of image and social status. IMG tends to below, but the value for PU is high. Research by Reference [11] also found that IMG has a negative effect on PU. JR, OQ, and RES has no significant effect on PU (t-statistic = 1.272, t-statistic = 1.173, t-statistic = 1.180). This study found that individuals assume a useful system not always based on job relevance, output quality, and result demonstrability. The results of this study are consistent with research conducted by [10], [8], [7]. Thus, H8, H9, and H10 rejected. Likewise, PEU has not significant on PU, H11 rejected.

In contrast to research conducted by [21], in that study, PEU significantly influenced PU. In this study, the fact that when individuals assume a system is easy to use does not always make an individual assessment of the system's usefulness increases. This research is in line with research conducted by [22].

PEU has not significant on IU (t-statistic = 1.479), with positive effect (β = 0.219). Thus, H12 rejected it. Meanwhile, for relationship between PU and IU has significant effect (t-statistic = 2.423), with positive effect (β = 0.383). Thus, H13 accepted. If seen from these results, in this study, the intention to use the system based on usefulness, not ease of use the system. Positive results mean that the intention to use the system increases if the user considers a system useful. Venkatesh and Davis in 2000 [5] assume that a significant determinant of intention is the perceived usefulness. But surprisingly, this study found that the only variable that affects perceived usefulness is image. IU has no significant effect on UB (t-statistic = 0.663), H14 rejected. In this study, it has found that good intentions do not always affect actual usage.

5. Conclusions and Implications

In the TAM theory, the intention to use the system is determined by two variables, namely perceived ease and perceived usefulness. Perceived usefulness is a variable that mediates among the determinants of the intention to use the system. Perceived usefulness is thought to be the strongest determinant of the intention to

use the system [11]. Based on the results of this study, which also affect the perceived usefulness of only image (H7 accepted). Meanwhile, for subjective norm, job relevance, output quality, and result demonstrability are not significant in this study (H2, H8, H9, H10 rejected). Subjective norm also not significant on image and intention to use (H1, H3 rejected). It was also found in research that perceived ease of use does not signify perceived usefulness and intention to use (H11, H12 rejected).

Meanwhile, the perceived usefulness of intention to use has a positive and significant effect (H13 accepted). So, it can be concluded that in this study, the determinant of the intention to use the system is only the perception of usefulness. The experience was found not significantly to moderate the influence of subjective norms on perceived usefulness, and also subjective norms on the intention to use (H4, H5 rejected). Likewise, the voluntariness variable, which, as expected, will not be significant if the use of the system is considered mandatory (H6 accepted). However, surprisingly, the intention to use is not significant to usage behavior; this means that the intention to use does not determine the system's actual use (H14 rejected).

Companies can use the results of this study as an evaluation. In total, 11 variables were not significant. The company must pay attention to this. For example, in the relevance of work, the quality of output, and the ability to show results, the company needs to develop the ERP system's output and development related to items in the ERP system. Companies, especially the EDP section, are advised to routinely distribute questionnaires to discover user understanding, user complaints, and system deficiencies. The influence of superiors and the ease of the system is needed so that individuals feel the system's use is useful. The developer must also ensure that the features and items in the ERP system benefit the user. Regular outreach and training are needed so that users feel more at ease.

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